



Interactive  
Whiteboard-  
Compatible CD



Level

1-2

Using  
**Google Earth™**:

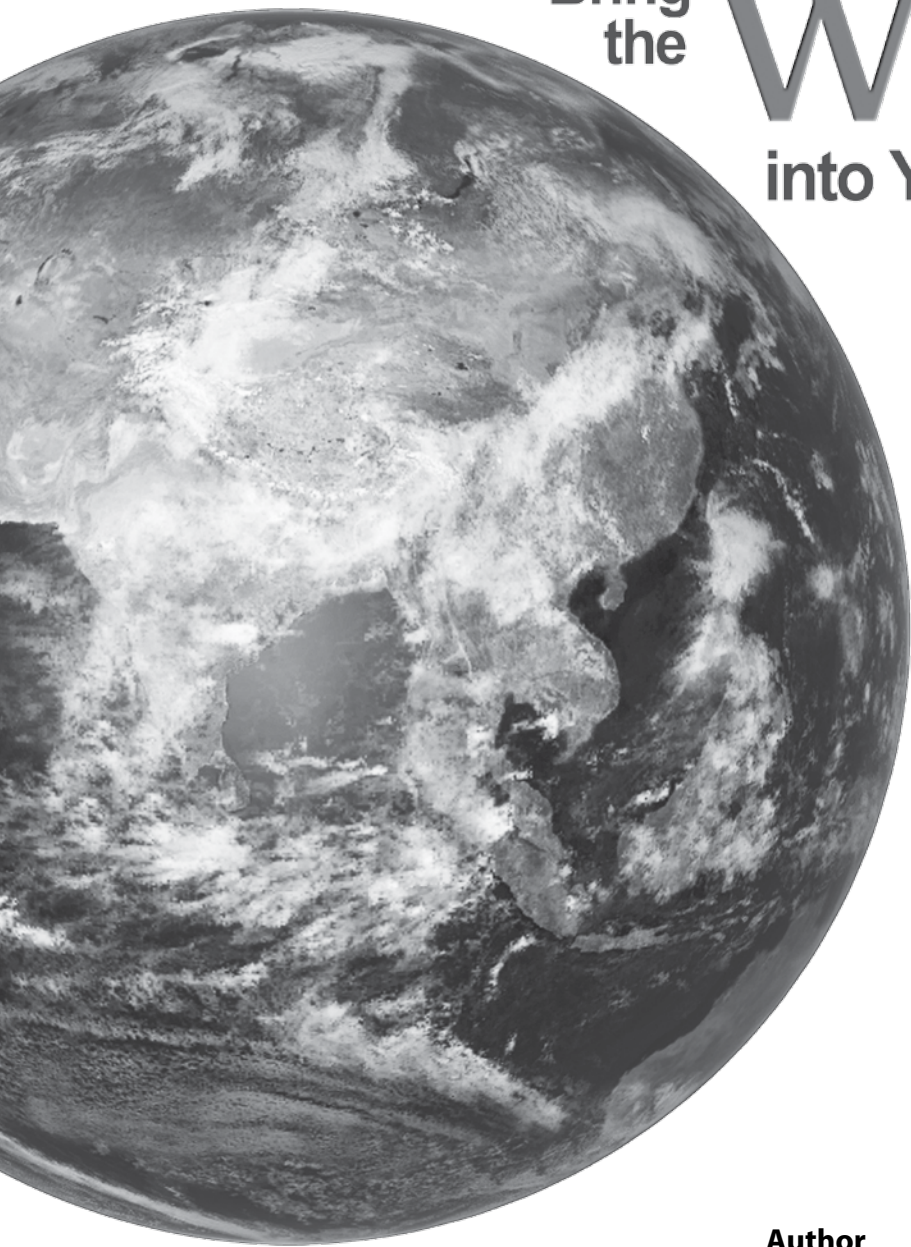
Bring  
the

**World**

into Your Classroom



**JoBea Holt**



Using  
**Google Earth™:**  
Bring the **World**  
into Your Classroom

Level **1-2**

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The author would like to thank her family for all their support, ideas, and critical reviews.

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## **Shell Education**

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## Research and Introduction

No matter how hard you look, you will never find Oz, Neverland, or Narnia on a map. But, if you know where to look and what to look for, you will find the great Mississippi River where Minn and Huck Finn traveled, the prairies and woods where Laura and Caddie grew up, and San Nicolas Island where Karana and Rontu became friends. You may discover that Minn and Huck passed by the starting point for Lewis and Clark's expedition, only at a different time, or that Karana eventually was rescued and taken to the mission in Santa Barbara. Or, you may discover that Laura's family moved from their little house on the prairie because it was in Indian Territory, or that your grandmother lives where Caddie played.

*Using Google Earth™: Bring the World into Your Classroom* introduces students to Google Earth, and more importantly, to Earth itself. There is so much Earth can tell us about the landscapes where explorers traveled, the settings in classic children's literature, and how the forces of nature shape our planet's surface.

### Objectives

There are several objectives for *Using Google Earth™: Bring the World into Your Classroom*:

1. To introduce students to children's literature, social studies, mathematics, and Earth science through a very visual experience.
2. To add an exciting geographic dimension to reading, social studies, mathematics, and science.
3. To create student-generated maps that link students' personal worlds to the worlds of literature, science, mathematics, and social studies.
4. To allow students to build a Google Earth™ folder system to record where they travel in their reading adventures, social studies lessons, and in their personal experiences.
5. To encourage project-based learning and authentic tasks.
6. To align with national standards in social studies, science, mathematics, language arts, geography, and technology.

"Geography is an integrating discipline that helps students understand, participate in, and make informed decisions about the world around them" (Shultz et al. 2008). By using images of Earth as an integrating force, literature, social studies, mathematics, and science flow together. "The interactive nature of virtual globes can facilitate learning through an enjoyable and individually-oriented session..." (Shultz et al. 2008). The ability to use a three-dimensional model of Earth facilitates understanding of the Earth system and the many subject areas that it comprises, from science, to history, to art, or any topic with a geographic component (SERC 2009). Plus, research suggests that when technology is integrated throughout the curriculum, students will not only learn technology skills but also content (Silverstein et al. 2000).



## Research and Introduction *(cont.)*

### Teaching with Technology

Using Google Earth encourages the teacher to step out of a traditional lecture-based mode of teaching and into the role of facilitator or coach as students navigate through the program. Cognitive research shows that learning improves when students are actively involved in learning, working in groups, frequently interacting and receiving feedback, and seeing the connections to real life (Roschelle et al. 2001). One goal of this resource is to show students (and teachers) that this technology is more than just a fun tool—it provides an access point for content-area instruction. “It is important to remember that teaching students how to use the program is not enough. Think about why the students are using the program. What project can they accomplish? What question or problem can they solve when they use the program to create a product?” (Frei, Gammill, and Irons 2007). *Using Google Earth™: Bring the World into Your Classroom* offers students an entry way into the curriculum that is broad, authentic, and engaging. And the more students practice functioning in creative, integrated, collaborative learning domains across all the content areas, the better (Bean 2010).

Because Google Earth is inherently engaging and maneuverable, it is a natural fit for interactive whiteboards and computer use in classrooms. Students will learn to see Earth in new ways and to explore and develop stories

about what they discover. According to the Project New Media Literacies (Card, Mackinlay, and Shneiderman 1999), maps offer students opportunities for visualization, and better visualization makes us smarter. “Google Maps/Earth are helping us tell stories better and bringing geographic data to life in ways that make traditional maps look more like decorations on the wall” (Castiglione 2009). With this resource, students can build a growing set of maps that record their adventures in books and in class, and tie these adventures to their family histories and personal experiences.

### Google Earth and Reading

Through Google Earth, teachers can also incorporate informational text into their lessons from sources such as *TIME® for Kids*, NASA’s *Earth Observatory* website, and *National Geographic* magazine. Reading informational text is a key initiative from the Common Core Curriculum Standards for Language Arts, especially in terms of analyzing key ideas and details, and the integration of knowledge and ideas (Common Core State Standards 2010). By tying informational text to a real-world setting, and then having students experience that location in an authentic visual way, they are able to add dimension to the details described in the text, as well as build schema as they integrate new information into their existing understanding of the world.





## Overview of Google Earth

### Images from Space

The first picture of Earth was not inspiring. It was taken in 1946 by a 35mm camera on a V-2 missile at an altitude of 65 miles and was very fuzzy. Perhaps the most important image of Earth taken by the National Aeronautics and Space Administration (NASA) is called Earthrise—an image captured in 1968 on Apollo 8, the first manned mission to orbit the Moon, by astronaut Bill Anders. He said, “We came all this way to explore the Moon, and the most important thing is that we discovered the Earth.” The first Earth Day soon followed.

NASA continues to take images of Earth, but now focuses on using a variety of instruments operating at a wide range of wavelengths in order to measure our atmosphere, land surface, and oceans.



IMAGE COURTESY OF NASA'S ASTRONOMY PICTURE OF THE DAY  
WEBSITE: <http://apod.nasa.gov/apod/ap081224.html>

"Earthrise" photograph from Apollo 8, the first manned mission to orbit the moon

A suite of NASA satellites continuously monitors key factors that help scientists understand our water, energy, and biological cycles. To see these datasets in detail, visit <http://earthobservatory.nasa.gov/GlobalMaps/>.



IMAGE COURTESY OF NASA'S ASTRONOMY  
PICTURE OF THE DAY WEBSITE: <http://antwrp.gsfc.nasa.gov/apod/ap101115.html>

Astronaut Tracy Caldwell Dyson enjoys the view from the International Space Station's window

However, ask any astronaut what they spend their spare time doing in orbit, and most will say they spend it looking out the window of the Space Shuttle or the International Space Station, watching Earth go by. Their photographs are one of their most valued treasures from their missions, and all are available for us to see. Visit the Gateway to Astronaut Photography of Earth's website at <http://eol.jsc.nasa.gov/>. The best and most relevant images are presented on NASA's Earth Observatory (<http://earthobservatory.nasa.gov/>), a website that keeps us informed of dynamic and timely events with daily images of Earth.



## Overview of Google Earth *(cont.)*

### What Is Google Earth ?

Google Earth is both a data set and a software tool.

#### Data Set

The data set consists of thousands of high-resolution images of our planet taken from space that have been mosaicked together onto a globe. The global mosaic primarily contains cloud-free images of the highest resolution. In some cases, however, nearby images can look quite different if they have been taken in a different season, at a different time of day, or with a different instrument.

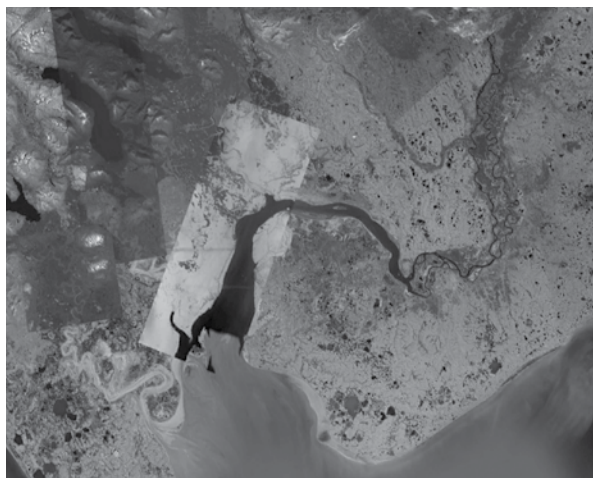


IMAGE ©2010 TERRAMETRICS, ©2010 GOOGLE,  
DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO, ©2010  
EUROPA TECHNOLOGIES

A view of southern Alaska showing images from a variety of seasons, sun angles, and instruments.

Images from past times, going back to the 1940s, can also be accessed using Google Earth in some locations. Some of these are black and white and many are of much lower resolution than the latest

versions, but all can tell us something about how our planet has changed. Many of the Google Earth images have been taken by NASA instruments on satellites in polar orbits.

#### Software Tool

The second part of Google Earth is the software that allows users to explore the mosaicked images. This software operates through the Internet to allow a user to “fly” to any place on Earth at almost any resolution without keeping a high-resolution global data set on his or her computer.

In 2010, NASA flew an instrument called Shuttle Radar Topography Mission (SRTM) on the Space Shuttle. The instrument used two imaging radar antennas configured to measure the topography of the entire land surface between the latitudes of 60° north and south in only 11 days. This digital topographic data set has been layered on top of the Google Earth image globe to provide Google Earth’s 3D capabilities.

Most recently, several organizations, including the U.S. Navy and the National Oceanic and Atmospheric Administration (NOAA), have provided ocean data to Google Earth. This capability is rapidly being enhanced to allow users to explore beneath the surface of the sea.





## How to Use This Book

*Using Google Earth™: Bring the World in Your Classroom* was created by a former NASA scientist to provide teachers with a manageable way to access this technology in the context of content-area lessons, and use the features in the images to teach students about the history and sciences of our planet. Each lesson introduces and demonstrates one or more Google Earth tools within a simple, easy-to-follow format, always keeping the standard as the focus of the lesson.

The first three units of this resource introduce students to the basic features of Google Earth. The first unit introduces students to the Earth in the **3D viewer**, the **navigation tools**, and the **Search, Places, and Layers panels**. The lessons are organized to build student competency with Google Earth. The second unit teaches students how to see natural, artificial, and abstract features on Earth and provides a means of referencing the scale of features they are seeing. The third unit shows students how to save and organize the places they visit so that these places can be compared to places students visit in the future.

In the remaining five units, students will learn to explore our planet in Google Earth in the context of content-area lessons, including language arts, social studies, science, and mathematics, as well as a cross-curricular unit that includes space exploration, the oceans, colors, and the Earth at night.

The information on pages 8–12 outlines the major components and purposes for each activity and pages 14–21 detail how to prepare for instruction. Page 13 gives a visual reference of the main Google Earth tools used in this book.



## How to Use This Book *(cont.)*

### Lesson Plan

**Standard** shows the geography objective addressed in the activity. Content-area lessons address the subject-specific standard in addition to geography.

### Google Earth Tools

are listed here. Tools introduced in the lesson are denoted with an asterisk. Use the *Google Earth Reference Window* on page 13 and the Teacher Resource CD (Reference.pdf) to familiarize yourself with the locations of the various tools.

**Vocabulary** words and **Materials** are shown here.

Building My World

**Making Literature Connections**

**Standard**  
Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).

**Google Earth Tools**

- Layers panel: 3D Buildings\*
- Places panel: Folders
- Toolbar: Placemark

**Overview**  
Students will use Google Earth to explore the setting of a book and begin to build a folder for keeping book settings in Google Earth.

**Vocabulary**

- 3D view
- ground-level view

**Materials**

- *Places in Books* activity sheets (pages 96–98)
- *Madeline* by Bemelmans (1939)

\* Tool introduced in this lesson

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### Procedure

- 1 Tell students that today you will make a Google Earth folder to save places students see in books. In the **Places panel** under **My Places**, create a folder titled, *Our Books*, *Room 9's Books*, or something similar.
- 2 Read *Madeline* by Bemelmans (1939) to students. Tell students that this story takes place in the city of Paris, France. Ask students to pay attention to the illustrations and look for places they might be able to find in Google Earth. Right-click on the books folder and add a subfolder for *Madeline*.
- 3 Distribute copies of the *Places in Books* activity sheets (pages 96–98) to students and open Google Earth. **Fly to Paris, France.** Turn on the **3D Buildings layer** in the **Layers panel**. Use the **Fly to box** to go to the following locations from the story:
  - "Opera Garnier" ("They smiled at the good")
  - "Place Vendome" ("and frowned at the bad")
  - "Cathedrale Notre-Dame de Paris" ("in rain")
  - "Jardin du Luxembourg" ("or shine")
  - "Eiffel Tower" ("In a car with a red light..." and book cover)

**Procedure**, a step-by-step description of the lesson, is shown here. It is recommended that teachers work through the procedure for each lesson in Google Earth and preset all placemarks before presenting the lesson to students.





## How to Use This Book *(cont.)*

### Lesson Plan *(cont.)*

**Building My World**

**Making Literature Connections** *(cont.)*

**Procedure** *(cont.)*

- At each landmark, **zoom** all the way in to **ground-level view**. Use the top arrow on the **Look joystick** to tilt your view up at the buildings, then use the right and left arrows to look around. Students can see a view as if they were standing right in front of the Eiffel Tower or in the Jardin du Luxembourg. **Placemark** each location and add it to the **Madeline** folder.
- Have students choose one location from the story and draw it on their activity sheets. They will draw the overhead Google Earth view and the **ground-level** 3D view (questions 1 and 2).
- Have students compare the two views and write about how they are the same (question 3) and different (question 4).
- Have students write "My Books" on the folder on their activity sheets and list some other places from books they have read that they would like to visit in Google Earth (question 5).

**Extension Activities**

- Let students play with Google Earth's **3D Buildings** layer. Can they land on top of the Eiffel Tower? Use the **Look joystick** to get a 360-degree view of Paris. Try going inside Notre Dame to view the beautiful architecture.
- Have students **Fly to** and visit some of the places from books that they listed on their activity sheets. Some other options include:
  - A Bear Called Paddington, Paddington Station, London, England
  - The Cricket in Times Square, New York City

**Did You Know?**

**Street View** and the **3D Building layer** are realistic and offer an excellent opportunity for students to relate something they are familiar with to a map. Always return to a view from above after exploring at the street level to insure students continue to learn about maps and regions.

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**Extension Activities** provide opportunities for independent practice, or allow teachers to add more dimension or provide additional challenges.

**Did You Know?** offers related information and fun facts to help students make connections across content areas and activate their prior knowledge.

**Building My World**

**Making Literature Connections** *(cont.)*

**User Tip**

With the **3D Buildings** layer on, you can see a computer-modeled **ground-level view**. You can also see a photographic **Street View** (where available). Drag the orange **pegman icon** (above the **zoom slider**) and drop it where you want to see a **ground-level view**. To return to regular navigation, click **Exit Street View** or **Exit ground-level view**. Hit the "u" key on your keyboard to return to an overhead view.

**Screenshot**

Paris, France

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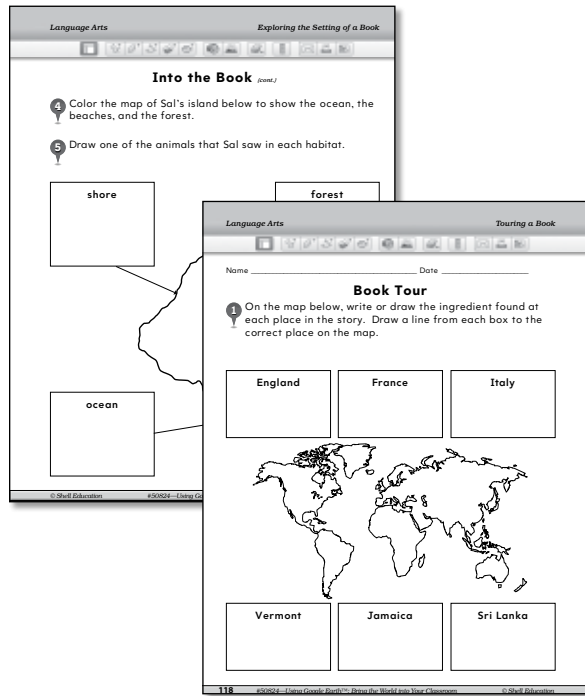
**User Tips** offer technical advice or shortcuts.

**Screenshots** provide a visual frame of reference.

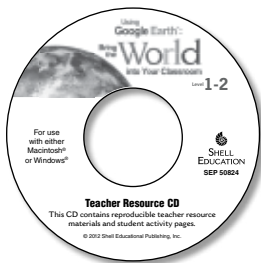


## How to Use This Book *(cont.)*

### Lesson Plan *(cont.)*



**Student Activity Sheets** assess students' content knowledge as well as their Google Earth technology skills. Answer keys are provided in Appendix B (pages 224–229), and an Assessment Rubric Guide is available in Appendix C (pages 230–231), and on the Teacher Resource CD (Tech\_Rubric.pdf).



The **Teacher Resource CD** contains reproducible copies of all the student activity pages and additional teacher resources. See Appendix H for a list of CD contents.



## How to Use This Book *(cont.)*

### Preparing for Lessons

Before presenting each lesson, work through the lesson yourself in Google Earth and **placemark** each location. Then, when you are presenting to the class, you can double-click on each **placemark** in the **Places panel** to fly directly to each location.

### Google Earth Reference Window

Distribute copies of the **Google Earth Reference Window** to students at the beginning of the first lesson. Make a copy for yourself as well or enlarge it and display it in the classroom. This visual reference will be very helpful in identifying **Google Earth Tools** as you work through the lessons.

### Lesson Presentation

The **Procedures** in each lesson describe how to manipulate Google Earth on a projected screen or interactive whiteboard in front of students. Students can observe Google Earth on the screen or whiteboard and fill out their activity sheets.

Depending on your classroom setup, there are a number of alternative ways to present the lessons:

- Ask individual students to manipulate Google Earth using the class computer or interactive whiteboard during the lessons.

- If students have their own computers or small groups of students can share computers, they can follow along through each step of the lesson.
- Present part of the lesson to students as a group and then let them complete the activity sheets using their computers.

The **Extension Activities** are designed to be completed by individual students or small groups of students after they have received instruction in the main lesson.



The screenshot shows the Google Maps toolbar with the following tools and their labels:

- Placemark**: A pushpin icon.
- Polygon**: A four-sided polygon icon.
- Path**: A series of connected dots forming a path.
- Tour**: A camera icon with a plus sign.
- Image Overlay**: A picture of a house with a plus sign.
- Clock**: A clock face icon.
- Sun**: A sun icon.
- Planets**: A planet with a ring icon.
- Ruler**: A ruler icon.
- Email**: An envelope icon.
- Print**: A printer icon.
- View in Google Maps™**: A small globe icon.





## Preparing for Google Earth Instruction *(cont.)*

### Preparing the Technology

Exploring with Google Earth requires a computer, access to the Internet (preferably through a direct line connection), and display technology in your classroom.

#### 1. System Requirements

Google Earth runs on both PCs and Macs. System requirements to run Google Earth 6.0 for Macs and PCs and video card requirements are shown here:

#### System Requirements

PC	Mac
<b>Minimum:</b> <ul style="list-style-type: none"> <li>Operating System: Windows XP, Windows Vista, or Windows 7</li> <li>CPU: Pentium 3, 500Mhz</li> <li>System Memory (RAM): 256 MB</li> <li>Hard Disk: 400MB free space</li> <li>Screen: 1024 × 768, “16-bit High Color” DirectX9 (to run in Direct X mode)</li> <li>Graphics Card: Direct X9 and 3D capable with 64 MB of VRAM</li> <li>Network speed: 128 Kbits/sec</li> </ul>	<b>Minimum:</b> <ul style="list-style-type: none"> <li>Operating System: Mac OS X 10.5.0 or later</li> <li>CPU: Any Intel Mac</li> <li>System Memory (RAM): 256 MB</li> <li>Hard Disk: 400MB free space</li> <li>Screen: 1024 × 768, “Thousands of Colors”</li> <li>Graphics Card: Direct X9 and 3D capable with 64 MB of VRAM</li> <li>Network speed: 128 Kbits/sec</li> </ul>
<b>Recommended:</b> <ul style="list-style-type: none"> <li>Operating System: Windows XP, Windows Vista, or Windows 7</li> <li>CPU: Pentium 4, 2.4GHz+ or AMD 2400xp+</li> <li>System Memory (RAM): 512 MB</li> <li>Hard Disk: 2GB free space</li> <li>Screen: 1280 × 1024, “32-bit True Color”</li> <li>Graphics Card: Direct X9 and 3D capable with 256 MB of VRAM</li> <li>Network speed: 768 Kbits/sec</li> </ul>	<b>Recommended:</b> <ul style="list-style-type: none"> <li>Operating System: Mac OS X 10.5.2 or later</li> <li>CPU: Dual Core Intel Mac</li> <li>System Memory (RAM): 512 MB</li> <li>Hard Disk: 2GB free space</li> <li>Screen: 1280 × 1024, “Millions of Colors”</li> <li>Graphics Card: Direct X9 and 3D capable with 256 MB of VRAM</li> <li>Network speed: 768 Kbits/sec</li> </ul>

**Note:** A version of Google Earth is available for the iPad™, but it does not include many of the features used in these lessons.



## Preparing for Google Earth Instruction *(cont.)*

### Preparing the Technology *(cont.)*

#### 2. Internet Requirements

High-speed Internet is required to run Google Earth. The minimum speed required is 128 Kbits/sec and the recommended speed is a minimum of 768 Kbits/sec.

Google Earth requires a large amount of bandwidth to run.

If you are using a wireless connection, the screen may freeze and Google Earth will need to be restarted. If the problem persists, try connecting directly to your router via an ethernet cable.

Full resolution views of the most recent places you visited are saved temporarily on your computer's cache, and can be replayed from the hard drive without connecting to the Internet.

Some school sites use Internet blockers or firewalls which can interfere with Google Earth content.

#### 3. Display Technology for Flexible Grouping

The optimum means to display Google Earth is to use an interactive whiteboard or a projector with your computer. Students may interact with the program by coming up to the board or by pressing the appropriate keys on the teacher's computer keyboard. Alternately, small groups of students may

gather around a single computer and work through the lessons together. If you are using this resource in a lab where students each have access to a computer, students may observe as the teacher introduces the lesson, and then continue to work through the lesson at their own stations.

#### 4. Maintaining Student and Classroom .kmz Files

Students have the opportunity to develop files that record their adventures in the Google Earth file format called Keyhole Markup Language (.kml). Most files in Google Earth use the extension **.kmz**, which stands for KML-zipped. Ideally, students will maintain these **.kmz files** throughout their school careers. Given that students may do some of their work on school computers and some on home computers, students may choose to keep their working **.kmz files** on a memory stick. Instruct students on how to also maintain a backup file on their home or classroom computer in case the memory stick is lost. Ensure students save their entire **.kmz file** at the end of the school year so that it is ready to augment the following year.





## Preparing for Google Earth Instruction *(cont.)*

### Setting Up Google Earth

Google Earth is a program that can be downloaded from the Internet for free. To use the program, you must have access to the Internet with the specifications outlined on page 14.

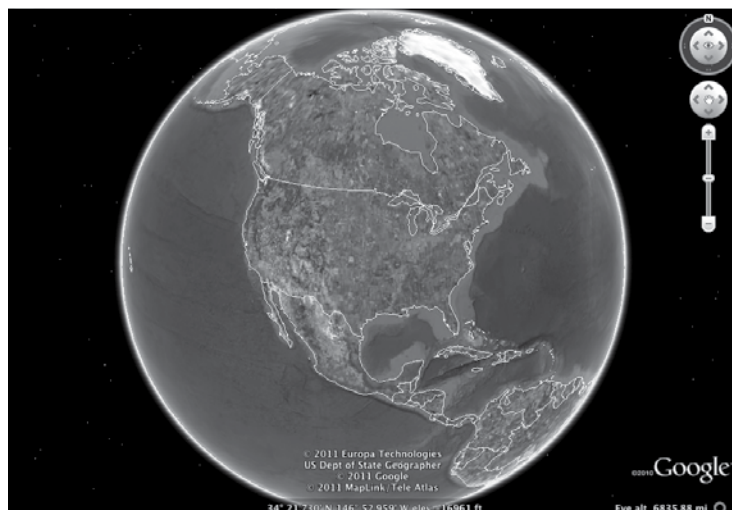
#### 1. Download Google Earth

Open your Internet browser, go to <http://earth.google.com>, click on “Download Google Earth,” and then “Agree and Download.” Look for the .dmg file on your desktop or in your download folder (Mac) or the .exe file (PC) and click on it to install it. Follow the directions for installing Google Earth on your computer. If you use a Mac, find Google Earth in your **Applications** folder and drag it to your dock. If you use a PC, find Google Earth in your **Programs** file and create a shortcut on your desktop.

Open Google Earth by double-clicking on the Google Earth icon in your dock or desktop.

**Note:** If the “Tip” window opens, click the button that says you no longer want this window and close it. You will see the **3D viewer** (a picture of Earth with the sky in the background) on the right, and three panels titled **Search**, **Places**, and **Layers** on the left. You are now ready to explore!

**Note:** Keep a copy of the *Google Earth Reference Window* near your keyboard as you begin to explore in Google Earth. Give each student a copy to use as they learn new tools, or enlarge the *Google Earth Reference Window* and post it where it will be visible to all and easily referenced during lessons.



3D viewer in Google Earth

IMAGE ©2011 EUROPA TECHNOLOGIES, U.S. DEPT. OF STATE GEOGRAPHER, ©2011 GOOGLE, ©2011 MAPLINK/ TELE ATLAS



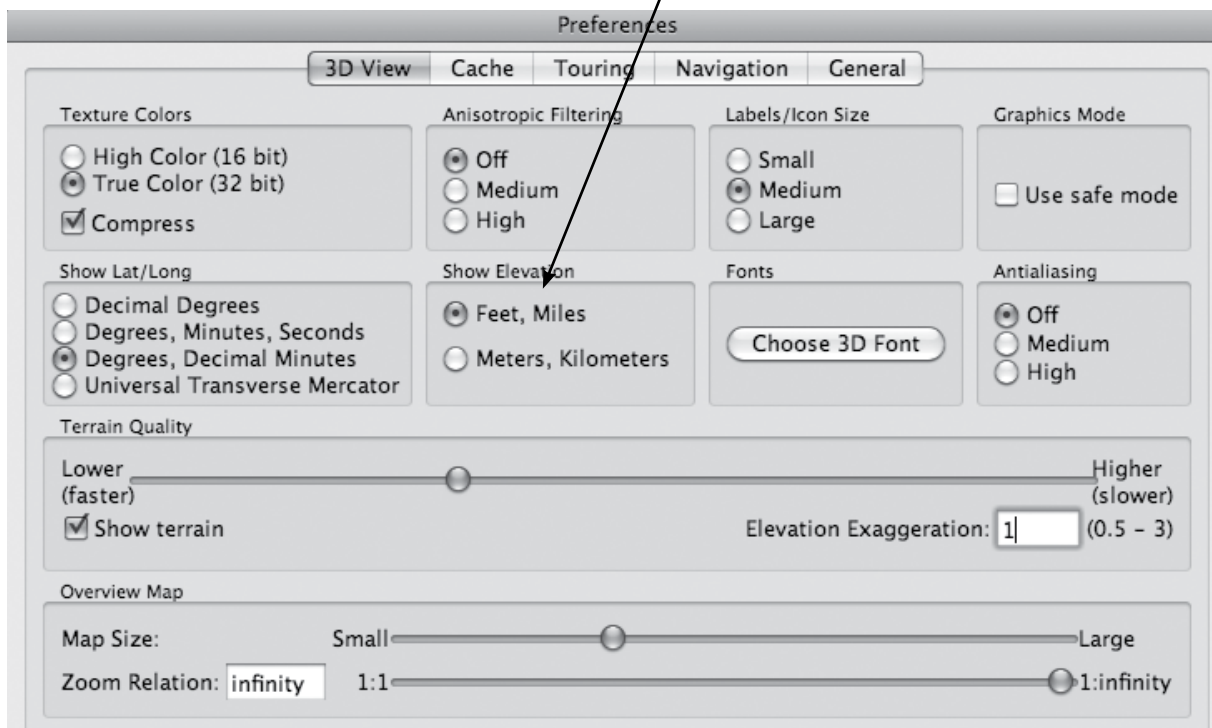
## Preparing for Google Earth Instruction *(cont.)*

### Setting Up Google Earth *(cont.)*

#### 2. Set Your Preferences

To access the **Preferences** settings on a Mac, click on **Google Earth** in the **Google Earth Menu Bar**, and choose **Preferences** from the dropdown menu. On a PC, click on **Tools**, then **Options**, and choose **Google Earth Options** from the dropdown menu to open the **Preferences window**. Set your Google Earth preferences to match the screenshots that follow.

Choose "Feet, Miles" or "Meters, Kilometers"



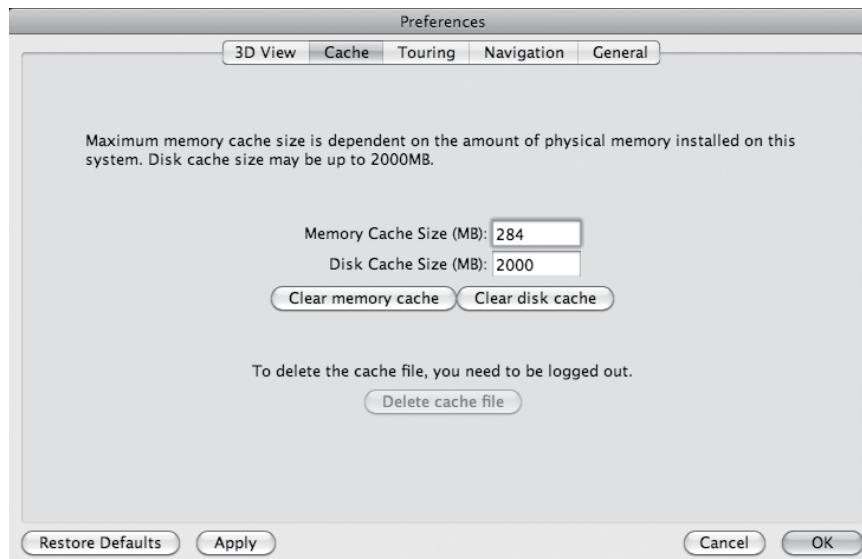
**Preferences Window:** Set preferences for texture colors, icon sizes, standard or metric measurements, fonts, terrain quality, and map size.



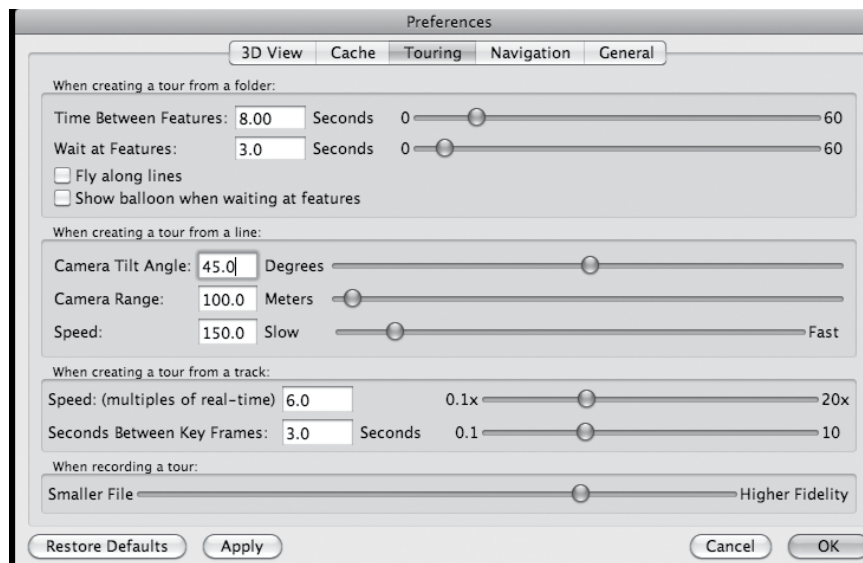
## Preparing for Google Earth Instruction *(cont.)*

### Setting Up Google Earth *(cont.)*

#### 2. Set Your Preferences *(cont.)*



**Cache tab:** You can make the cache size as large as 2,000 MB (2 Gigabytes). By having a large cache, you can save your latest Google Earth views and find them even without Internet access.



**Touring tab:** Adjust the settings for touring. Try to keep the speeds low enough so students can keep track of where they are going.

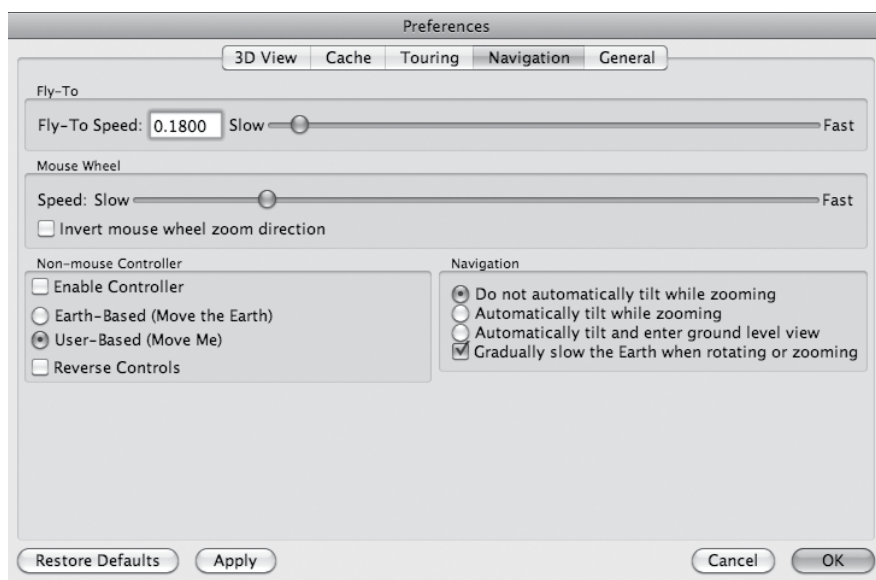




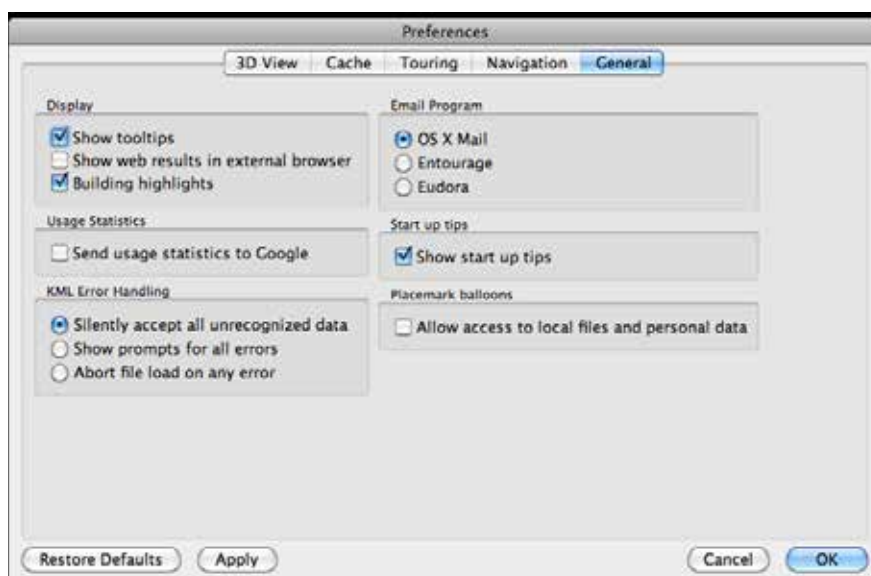
## Preparing for Google Earth Instruction *(cont.)*

### Setting Up Google Earth *(cont.)*

#### 2. Set Your Preferences *(cont.)*



**Navigation tab:** Change settings for “flying” speeds and set preferences for tilt and ground level views.



**General tab:** Set your display preferences and choose the appropriate email program you wish to access for sending files. Select whether to see user tips every time Google Earth starts, and allow your **placemarks** compatibility with other files and data.

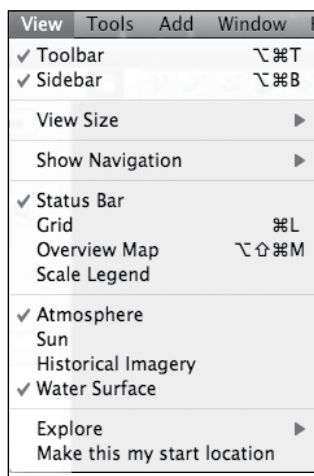


# Preparing for Google Earth Instruction *(cont.)*

## Setting Up Google Earth *(cont.)*

### 3. Set the View Menu

In the **Google Earth Menu Bar** across the top of the screen, click on **View** and turn on the following options:



### 4. Select the Fly To Tab

In the **Search panel**, select the **Fly To tab** (instead of the **Find Businesses tab** or the **Directions tab**).

### 5. Turn Off Folders and Layers

Before starting each lesson, be sure all layers in the **Layers panel** are turned off, except perhaps the **Borders and Labels layer**. Look through your **Places panel** and turn off any **placemarks** that are not relevant to your lesson. Or, leave the **placemarks** turned on to compare places your class has visited.

### 6. Apply Google SafeSearch™

Make sure that Google SafeSearch is set to *strict filtering* as Google Earth will provide students with access to the Internet. Open the Google home page (<http://www.google.com/>) and look in the upper right corner for the **gear icon**. Click the **gear icon** and select *Search Settings*. Look for *SafeSearch Filtering* and select *Use strict filtering (Filter both explicit text and explicit images)*. Then, click **Save Preferences** to save.



## Preparing for Google Earth Instruction *(cont.)*

### Important Technology Notes

#### Using the Mouse

Lesson procedures often call for right-clicking with the mouse. If you have a single-click mouse or a trackpad, you can use control-click to accomplish the same function.

#### Finding Locations

Some locations may be tricky to find in Google Earth. Before using the **Fly to box** to search for a specific location, first navigate to the general area of the Earth. Always preview each location before presenting a lesson to students.

#### Printing

Images from Google Earth should be printed at a high resolution, but color printing can be expensive. Consider saving images as PDFs and displaying your images onscreen rather than printing them.

#### Updating Google Earth

Like any evolving technology, Google Earth is constantly updating their application and services. Always make sure you have the most up-to-date version downloaded, and install updates regularly. Depending on the version you use, tools and commands may be found in slightly different locations on the screen than what is described in this resource.

Google Earth is constantly updating the layers data. If any of the layers used in these lessons do not appear in the **Layers panel**, search in the **Google Earth Gallery** for the missing layers.

#### Getting Help

The How-to Guide in Appendix D of this book (pages 232-238) contains instructions for using most Google Earth tools. For additional help, see the online Google Earth Support pages (<http://earth.google.com/support>). Google Earth is fairly intuitive, and in most cases, the online resource will be able to help you solve your problem.



# Differentiation

## Why Differentiate?

To successfully differentiate instruction, teachers must first know their students. Teachers must determine the readiness levels of students, as well as take into consideration the type of support they may need. It is important to make adjustments in the curriculum when students are having trouble with the material. Finding new ways to present information, using manipulatives or realia, and providing opportunities for targeted support are important aspects of a differentiated classroom.

Below are some reasons why and ways to differentiate the curriculum for diverse learners using this resource.

- **Content:** Vary the content (what is being taught or the materials students will use) when students are not at the same academic readiness level.
- **Process:** Vary the process (how it is taught or what amount of support you provide students) when you have students with diverse learning styles or readiness levels.
- **Product:** Vary the product (what students produce) when you have students with a variety of different readiness levels, interests, and passions.

Using *Google Earth™: The World in Your Classroom* offers a tremendous opportunity for differentiation with an authentic and engaging way to capture student interest and have them connect to the material. The interactive nature of Google Earth requires students to engage in higher-order thinking skills as they analyze what they see, apply their knowledge of locations to new settings, synthesize the information they discover, and evaluate the effects of social and environmental conditions on geography. This is an inherent differentiation strategy built into the lessons because all students will approach these tasks and questions at their own readiness and ability levels.

## Content

When using this resource with below-level learners and English language learners, key vocabulary terms are called out so that they may be introduced before each activity. Provide graphic organizers or word banks to scaffold instruction. In addition, each lesson offers an **Extension Activity** for above-level learners. Use these activities to encourage more in-depth investigation of a topic or to ask students to apply the skills they have learned in an alternate setting or situation.





## Differentiation *(cont.)*

### Why Differentiate? *(cont.)*

#### Process

The lessons in *Google Earth™: The World in Your Classroom* offer students the ability to participate in authentic tasks with real-world applications. By exploring and investigating Earth, students are actively engaged in discovery learning, inquiry-based learning, and authentic problem-solving. Students can work in flexible group arrangements, with partners, in small groups, or individually. The **Extension Activities** suggest ideas for students to complete independent investigations, and can be modified for below-level students or English language learners to be completed in pairs or small groups. The lessons can be slowed down or sped up depending on the readiness levels of the students, as well.

#### Product

The activities in *Google Earth™: The World in Your Classroom* appeal to students' varying interests. Students draw, write, and research. They build models, interact with technology, and use kinesthetic methods to experience and retain information. Tier the products in the lessons and assign

appropriate products to match student readiness levels. Allow above-level students to extend their learning by creating more challenging products as a result of the lessons. For example, students can create visual art based on what they saw in Google Earth, or create and narrate an interactive presentation.

### Additional Differentiation Strategies

The research-based strategies above can be used to differentiate the content, process, and product (Conklin 2011) of this resource. The next section offers a brief definition of each strategy.



## Differentiation *(cont.)*

### Strategies for Working with English Language Learners

Google Earth offers a truly visual and experiential way to see Earth, investigate science, uncover mathematical concepts, participate in history, and become immersed in literature—a practical resource for diverse learning styles. For English language learners, this tool provides incredible support and access to the curriculum.

Nevertheless, it is appropriate to provide additional scaffolds to these learners. Here are some ways to support the English language learners in your classroom.

#### 1. Use visual media as an alternative to written responses.

The activities in this book offer options for students to sketch or capture screenshots or use pictures in their answers.

#### 2. Frame questions to make language accessible.

When possible, provide word banks and introduce key vocabulary before completing the activities. This will help students use new words in context. Sentence frames or question frames can also make the language more accessible. Some examples include:

- Would it be better if...?
- How is \_\_\_\_\_ related to \_\_\_\_\_?
- Why is \_\_\_\_\_ important?
- Why is \_\_\_\_\_ better than \_\_\_\_\_?

#### 3. Give context to questions to enable understanding.

Use pictures and icons to help students recall key instructions and vocabulary. The activities in this book include **screenshots** to help provide visual references, and the icons are highlighted as well.

#### 4. Provide sentence frames or stems to encourage higher-order thinking.

Providing language tools will help students express what they think and will help you get the information you are looking for. In addition, these frames will provide models for oral language responses. Some examples include:

- This is important because...
- This is better because...
- This is similar to...
- This is different from...
- I agree/disagree with \_\_\_\_\_ because...
- I think \_\_\_\_\_ because...



## Standards Correlations

Shell Education is committed to producing educational materials that are research- and standards-based. In this effort, we have correlated all of our products to the academic standards of all 50 United States, the District of Columbia, the Department of Defense Dependent Schools, and all Canadian provinces. We have also correlated to the Common Core State Standards.

### How to Find Standards Correlations

To print a customized correlation report of this product for your state, visit our website at <http://www.shelleducation.com> and follow the on-screen directions. If you require assistance in printing correlation reports, please contact Customer Service at 1-877-777-3450.

### Purpose and Intent of Standards

Legislation mandates that all states adopt academic standards that identify the skills students will learn in kindergarten through grade twelve. Many states also have standards for Pre-K. This same legislation sets requirements to ensure the standards are detailed and comprehensive.

Standards are designed to focus instruction and guide adoption of curricula. Standards are statements that describe the criteria necessary for students to meet specific academic goals. They define the knowledge, skills, and content students should acquire at each level. Standards are also used to develop standardized tests to evaluate students' academic progress. Teachers are required to demonstrate how their

lessons meet state standards. State standards are used in the development of all of our products, so educators can be assured they meet the academic requirements of each state.

### McREL Compendium

We use the Mid-continent Research for Education and Learning (McREL) Compendium to create standards correlations. Each year, McREL analyzes state standards and revises the compendium. By following this procedure, McREL is able to produce a general compilation of national standards. Each lesson in this product is based on one or more McREL standards. The chart on pages 26-29 lists each standard taught in this product and the page number(s) for the corresponding lesson(s).

### TESOL Standards

The lessons in this book promote English language development for English language learners. The standards listed on page 30 support the language objectives presented throughout the lessons.



## Standards Correlations *(cont.)*

Lesson Title	Standard
Finding Earth (pages 31–36)	Geography: Students understand the globe as a representation of Earth.
Navigating Our Planet (pages 37–42)	Geography: Students understand the globe as a representation of Earth.
Searching to Find Me (pages 43–48)	Geography: Students know the location of school, home, neighborhood, community, state and/or country.
Exploring Layers (pages 49–54)	Geography: Students know the location of school, home, neighborhood, community, state, and/or country.
Investigating Natural Features (pages 55–60)	Geography: Students know that places can be defined in terms of their predominant human and physical characteristics.
Identifying Man-made Features (pages 61–66)	Geography: Students know that places can be defined in terms of their predominant human and physical characteristics.
Overlaying Abstract Features (pages 67–72)	Geography: Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).
Creating Reference Scales (pages 73–78)	Geography: Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).
Placemarking Our Discoveries (pages 79–84)	Geography: Students know the physical and human characteristics of the local community (e.g., neighborhoods, schools, parks, creeks, shopping areas, airports, museums, sports stadiums, hospitals).
Saving Our Places (pages 85–90)	Geography: Students know the physical and human characteristics of the local community (e.g., neighborhoods, schools, parks, creeks, shopping areas, airports, museums, sports stadiums, hospitals).
Making Literature Connections (pages 91–96)	Geography: Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).
Building History Connections (pages 97–102)	Geography: Students know ways in which people depend on the physical environment (e.g., food, clean air, water, mineral resources).





## Standards Correlations *(cont.)*

Lesson Title	Standard
Exploring the Setting of a Book (pages 103–108)	Language Arts: Students use descriptive words to convey basic ideas, and uses adjectives in written compositions. Geography: Students know areas that can be classified as regions according to physical criteria.
Mapping the Setting of a Book (pages 109–114)	Language Arts: Students know setting, main characters, main events, sequence, narrator, and problems in stories. Geography: Students know the absolute and relative location of a community and places within it (e.g., parks, stores, landmarks).
Touring a Book (pages 115–120)	Language Arts: Students know setting, main characters, main events, sequence, narrator, and problems in stories. Geography: Students know the role that resources play in our daily lives.
Narrating a Book (pages 121–126)	Language Arts: Students read aloud familiar stories, poems, and passages with fluency and expression. Geography: Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).
Going Back in Time (pages 127–132)	Social Studies: Students understand changes in community life over time. Geography: Students know how areas of a community have changed over time.
Mapping Columbus (pages 133–138)	Social Studies: Students know the journeys of Marco Polo and Christopher Columbus, the routes they took and what happened as a result of their travels. Geography: Students know the modes of transportation used to move people, products, and ideas from place to place.
Coming to America (pages 139–144)	Social Studies: Students know why important buildings, statues, and monuments (e.g., the White House, Lincoln Memorial, Statue of Liberty, Ellis Island, Angel Island, Mt. Rushmore, veterans' memorials) are associated with state and national history. Geography: Students know the basic components of culture.
Celebrating American Holidays (pages 145–150)	Social Studies: Students understand reasons that Americans celebrate certain national holidays. Geography: Students know the basic components of culture.



## Standards Correlations *(cont.)*

Lesson Title	Standard
Tracking Ocean Animals (pages 151–156)	Science: Students know that living things are found almost everywhere in the world, and that distinct environments support the life of different types of plants and animals. Geography: Students know areas that can be classified as regions according to physical criteria.
Follwing the Sun (pages 157–162)	Science: Students know basic patterns of the Sun and Moon. Geography: Students understand the globe as a representation of Earth.
Observing Weather (pages 163–168)	Science: Students know that short-term weather conditions (e.g., temperature, rain, snow) can change daily, and weather patterns change over the seasons. Geography: Students know the role that resources play in our daily lives.
Analyzing Ice (pages 169–174)	Science: Students know that water can be a liquid or a solid and can be made to change from one form to the other. Geography: Students know that places can be defined in terms of their predominant human and physical characteristics.
Shaping the Capital (pages 175–180)	Mathematics: Students use the names of simple geometric shapes to represent and describe real-world situations. Geography: Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).
Drawing Field Patterns (pages 181–186)	Mathematics: Students understand that patterns can be made by putting different shapes together or taking them apart. Geography: Students know the role that resources play in our daily lives.
Measuring Animals (pages 187–192)	Mathematics: Students understand the basic measures length, width, height, weight, and temperature. Geography: Students know areas that can be classified as regions according to physical criteria.



## Standards Correlations *(cont.)*

Lesson Title	Standard
Graphing Trains (pages 193–198)	Mathematics: Students collect and represent information about objects or events in simple graphs. Geography: Students know modes of transportation are used to move people, products and ideas from place to place, their importance and their advantages and disadvantages.
Exploring the Moon (pages 199–204)	Geography: Students understand the composition and structure of the universe and Earth's place in it. Science: Students know basic patterns of the Sun and Moon.
Diving Below the Ocean Surface (pages 205–210)	Science: Students know that Earth materials consist of solid rocks, soils, liquid water, and the gases of the atmosphere. Geography: Students know areas that can be classified as regions according to physical criteria.
Describing Colors on Earth (pages 211–216)	Visual Arts: Students know the differences among visual characteristics (e.g., color, texture) and purposes of art (e.g., to convey ideas). Geography: Students know areas that can be classified as regions according to physical criteria.
Observing Earth at Night (pages 217–222)	Science: Students know that electricity in circuits can produce light, heat, sound, and magnetic fields. Geography: Students understand why people choose to settle in different places.



## Standards Correlations *(cont.)*

### TESOL Standards

Lesson	Content Area	Standard
All lessons	All content areas	To use English to communicate in social settings: Students will use English to participate in social interactions.
All lessons	All content areas	To use English to communicate in social settings: Students will interact in, through, and with spoken and written English for personal expression and enjoyment.
All lessons	All content areas	To use English to communicate in social settings: Students will use learning strategies to extend their communicative competence.
All lessons	All content areas	To use English to achieve academically in all content areas: Students will use English to interact in the classroom.
All lessons	All content areas	To use English to achieve academically in all content areas: Students will use English to obtain, process, construct, and provide subject matter information in spoken and written form.
All lessons	All content areas	To use English to achieve academically in all content areas: Students will use appropriate learning strategies to construct and apply academic knowledge.
All lessons	All content areas	To use English in socially and culturally appropriate ways: Students will use the appropriate language variety, register, and genre according to audience, purpose, and setting.
All lessons	All content areas	To use English in socially and culturally appropriate ways: Students will use nonverbal communication appropriate to audience, purpose, and setting.
All lessons	All content areas	To use English in socially and culturally appropriate ways: Students will use appropriate learning strategies to extend their sociolinguistic and sociocultural competence.





## Finding Earth

### Standard

Students understand the globe as a representation of Earth.

### Google Earth Tools

- 3D viewer\*
- cursor\*

### Overview

Students will observe multiple colors on Earth in Google Earth, and learn that the colors represent different environments (forest, ocean, ice and snow, etc.).

### Vocabulary

- continent
- globe
- satellite

### Materials

- *Exploring the Globe* activity sheets (pages 34–36)
- a globe of Earth
- crayons
- *Earth: Our Planet in Space* (Simon 2003) (optional)

### Procedure

1

Read *Earth: Our Planet in Space* (Simon 2003) or another book about Earth. (See the Recommended Literature List, Appendix F, page 242, for more titles.) Show students a globe and explain that a globe is a map in the round shape of Earth. Pass the globe around. Ask students if there is something on the globe that is not real (e.g., the colors, the borders, the writing).

2

Open Google Earth and point out to students the globe in the **3D viewer**. Tell students that they are looking at a map of Earth made from photographs taken by satellites flying over Earth.

3

Ask students to look at the different colors on Earth. Explain that when viewed from space, oceans and other large bodies of water look blue and the land can be green, brown, or white. Use the cursor to turn Earth. Point out some continents, including your own, Antarctica, and Africa, and ask students to describe what they see using adjectives. Encourage them to use adjectives that describe the colors (e.g., rust-red or goldenrod) and the textures (e.g., rippled or organized).

\* Tool introduced in this lesson



## Finding Earth *(cont.)*

### Procedure *(cont.)*

- 4 Distribute crayons and copies of the *Exploring the Globe* activity sheets (pages 34–36) to students.
- 5 In Google Earth, point out some different types of land: a desert, a forest, an island, and ice- and snow-covered regions. Have students label them on their activity sheets and color each with the color that appears in Google Earth, such as blue for oceans, green for forest, and tan or brown for desert (question 1).
- 6 Navigate to a view of Earth that shows the continent of Africa, similar to that on students' activity sheets. Ask students to color Africa on their activity sheets to match the colors they see on the Google Earth globe (question 2). Have them label the forest, desert, and ocean.

### Did You Know?

Students will notice that in many places the land is made up of many different rectangles that do not match the pieces next to them, like a patchwork quilt. This is because the satellite images are taken at separate times with different lighting or possibly different instruments. Students will often find boundaries related to the images that make up the mosaic of Google Earth and should not confuse these with natural or man-made boundaries.

### Extension Activities

- Use the cursor to roll the Google Earth globe and name the remaining continents. Ask students to compare the different colors and types of land they see.
- Have students compare several maps, a globe, and Google Earth, and describe the similarities and differences between the different representations of Earth.

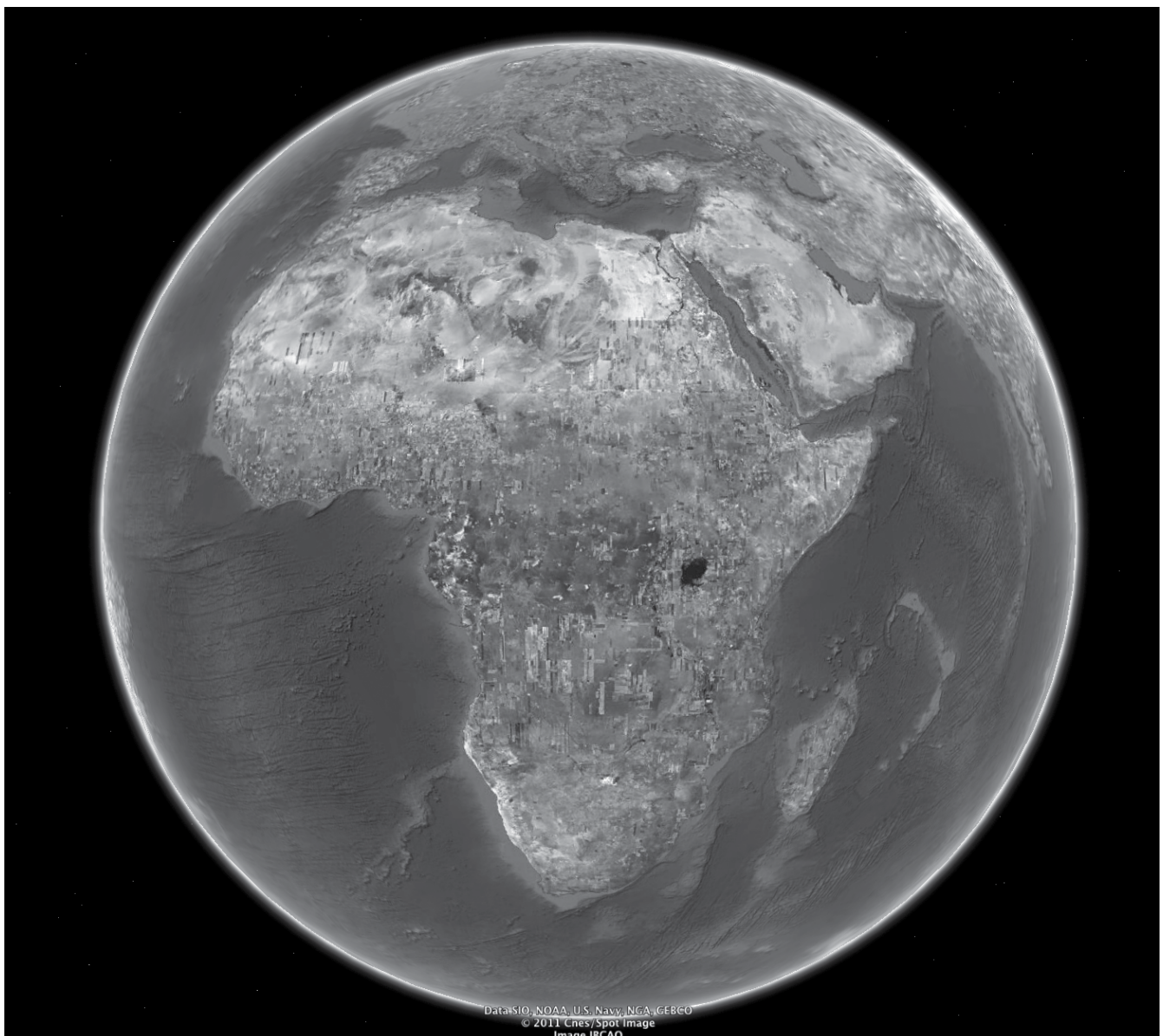


## Finding Earth *(cont.)*

### Screenshots



cursor



DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO IMAGE IBCAO ©2011 CNES/SPOT IMAGE © GOOGLE

Globe in Google Earth



Name \_\_\_\_\_ Date \_\_\_\_\_

## Exploring the Globe

- 1 Label each drawing with a word from the box and color each feature with the color it would have in Google Earth.

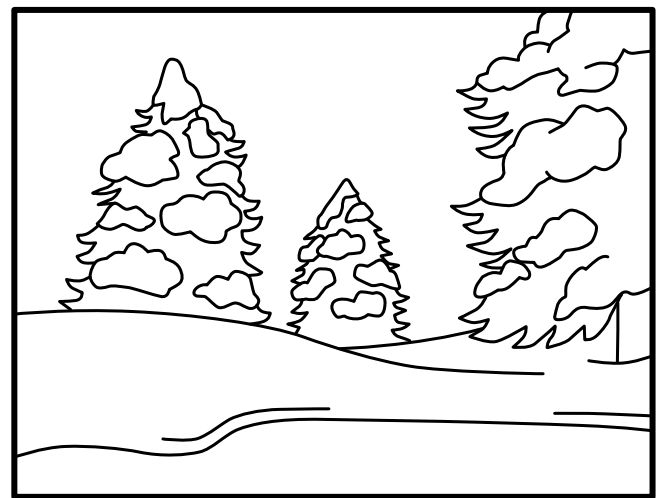
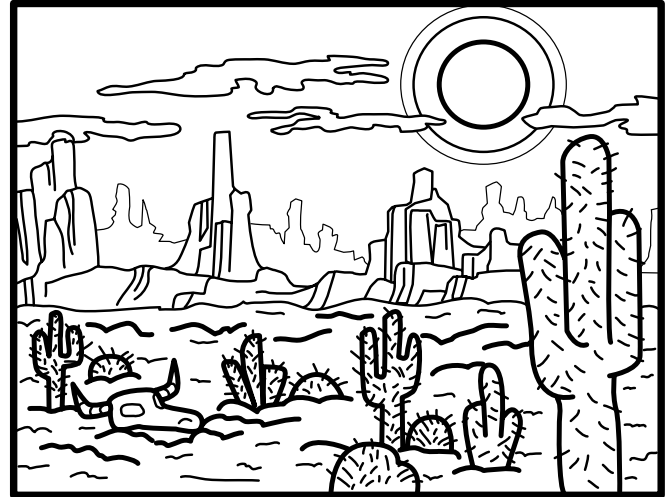
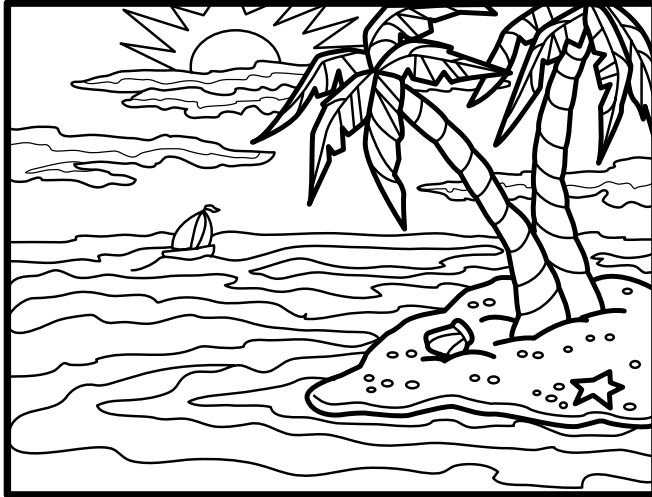
Word Bank		
desert	forest	island
ice and snow	ocean	jungle







## Exploring the Globe *(cont.)*

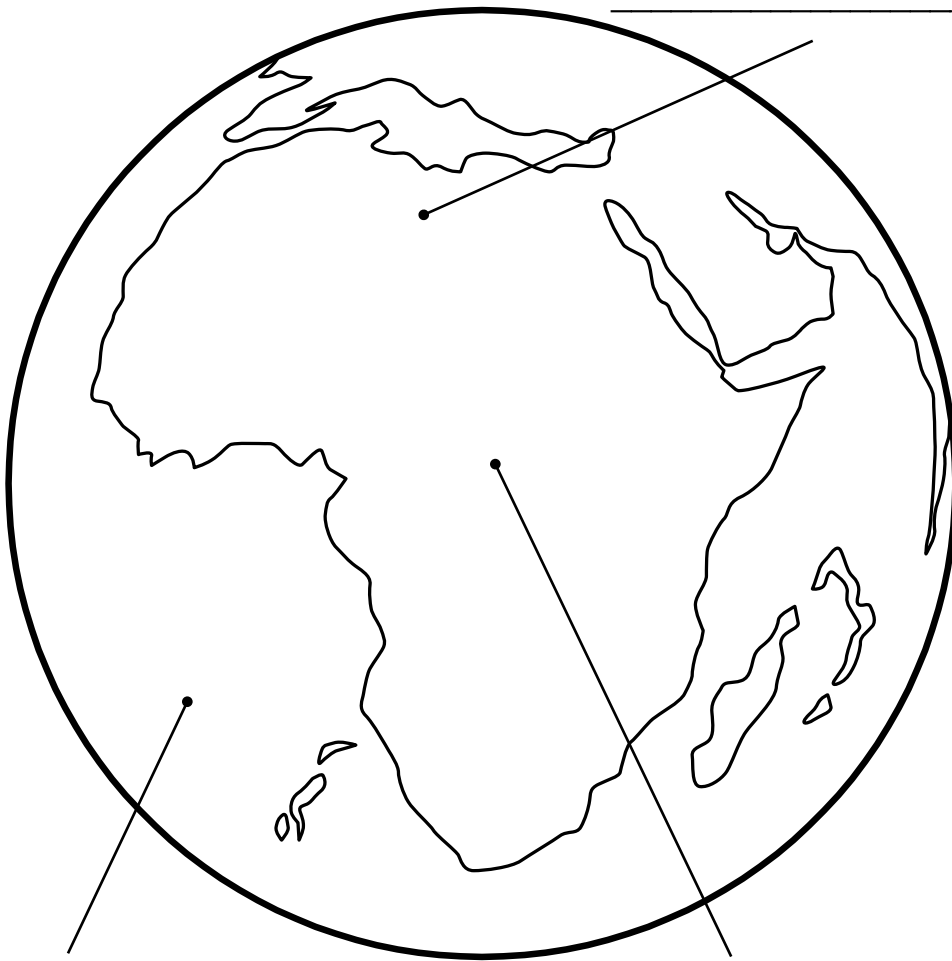




## Exploring the Globe *(cont.)*

- 2 Color the continent of Africa based on what you see in Google Earth. Label each color with one of the words in the Word Bank:

Word Bank		
forest	desert	ocean





# Navigating Our Planet

## Standard

Students understand the globe as a representation of Earth.

## Google Earth Tools

- 3D viewer
- Look joystick\*
- Move joystick\*
- North-up button\*
- Zoom slider\*

## Overview

Students will learn to use the basic Google Earth navigation tools to move closer to Earth's surface.

## Vocabulary

- horizon
- north

## Materials

- *Moving Around Earth* activity sheets (pages 41–42)
- a globe of Earth
- crayons
- *Anno's Journey* (Anno 1997) (optional)

## Procedure

1

Before beginning the lesson, read a book with illustrations featuring overhead views of a landscape or town, such as *Anno's Journey* (Anno 1997). (See the Recommended Literature List in Appendix F, page 242, for more titles.) Discuss with students what landscapes and buildings look like from an airplane.

2

Distribute crayons and copies of the *Moving Around Earth* activity sheets (page 41–42) to students. Open Google Earth and rotate Earth so your country or state is in view.

3

Show students the **zoom slider** in the upper-right of the **3D viewer**. Explain that the **zoom slider** makes things look closer or farther away. Have students hold their hand close to their face, then move it farther away. Does their hand appear to change size? Point out that things that are close seem larger and get smaller as you move farther away. The **zoom slider** has a **+zoom** to zoom in (closer) and a **-zoom** to zoom out (farther away). Use the cursor to roll Earth to show Hawaii and have students practice using the **zoom slider**. **Zoom** in on the island chain, then on each island. Ask students to color and label the **zoom slider** on their activity sheet (question 1).

\* Tool introduced in this lesson



## Navigating Our Planet *(cont.)*

### Procedure *(cont.)*

**4** Show students the **Look joystick** in the upper-right corner of the **3D viewer**. Ask students to look at a friend and slowly tilt their heads up and down, then look left and right. Tell students that they can do the same thing using the **Look joystick** in Google Earth by clicking on the small arrows.

**5** **Zoom** in so the big island of Hawaii fills the **3D viewer**. Click and hold the arrows of the **Look joystick** to look up and down the island and all around the mountain range and the valley below. Point out the eye in the center of the **Look joystick** that will help students remember that this tool helps them look around in Google Earth. **Zoom** out to view the whole island and use the **Look joystick** or hit the "u" key on your keyboard to return to a view from above. Ask students to color and label the **Look joystick** on their activity sheet (question 1).

**6** Have students look at a friend and tilt their heads left and right, leaning their ears towards their shoulders. Have them tilt until they are looking at each other upside down. What happens to their view? Tell students they can do the same thing using the **North-up button** in Google Earth.

**7** **Zoom** out until the entire Earth is visible. Show students that as you click and drag to rotate the **North-up button**, Earth rotates in the **3D viewer**. Explain to students that most maps keep north at the top. In Google Earth, north may not always be at the top of the screen. Click the N on the **North-up button** to make it return to the top. Ask students to color and label the **North-up button** on their activity sheet (question 1).

**8** Show students the physical globe of Earth. Turn the globe with your hand. Tell students that the **Move joystick** and the cursor are used to do the same thing in Google Earth. Click and hold on the arrows of the **Move joystick** to move around Earth. Demonstrate how to click and drag with the cursor (hand) as well.

**9** **Zoom** back in to Hawaii and have students come up and practice using the **Move joystick** and the cursor to explore different areas of Hawaii. With a little practice, they will be able follow the shore or move up the mountain. Point out the hand in the center of the **Move joystick** that will help them remember that these tools move the pictures like a hand. Have students color and label the **Move joystick** and the cursor on their activity sheet (question 1).



## Navigating Our Planet *(cont.)*

### Procedure *(cont.)*

**10** **Zoom** out until all of Earth is visible, and then slowly **zoom** in just until the edges of Earth are no longer visible. Click and hold the top arrow on the **Look joystick** until the horizon is visible. Is it flat or curved? Explain that the horizon looks curved when viewed from far above Earth. Have students draw a curved horizon on their activity sheets (question 2).

**11** Use the **Look joystick** to center the horizon on the screen and then **zoom** in slowly until the horizon becomes flat (use the **Look joystick** to adjust the view if the horizon goes off the screen). Explain that Earth is round, but it is so big that when we are close to it, it looks flat. Ask students to draw a flat horizon on their activity sheets (question 3).

### Did You Know?

In Google Earth, most of the world is covered with images that have a 15 m resolution, but more and more cities are now being covered with 15 cm resolution. If you can see cars in detail, like in Las Vegas, Nevada, or Melbourne, Australia, the resolution is 15 cm.

### Extension Activities

- Give students some time to use the navigation tools to explore Google Earth as they please.
- Have students brainstorm a list of places they would like to explore in Google Earth.







## Navigating Our Planet *(cont.)*

### Screenshots



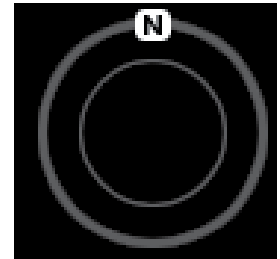
Zoom slider



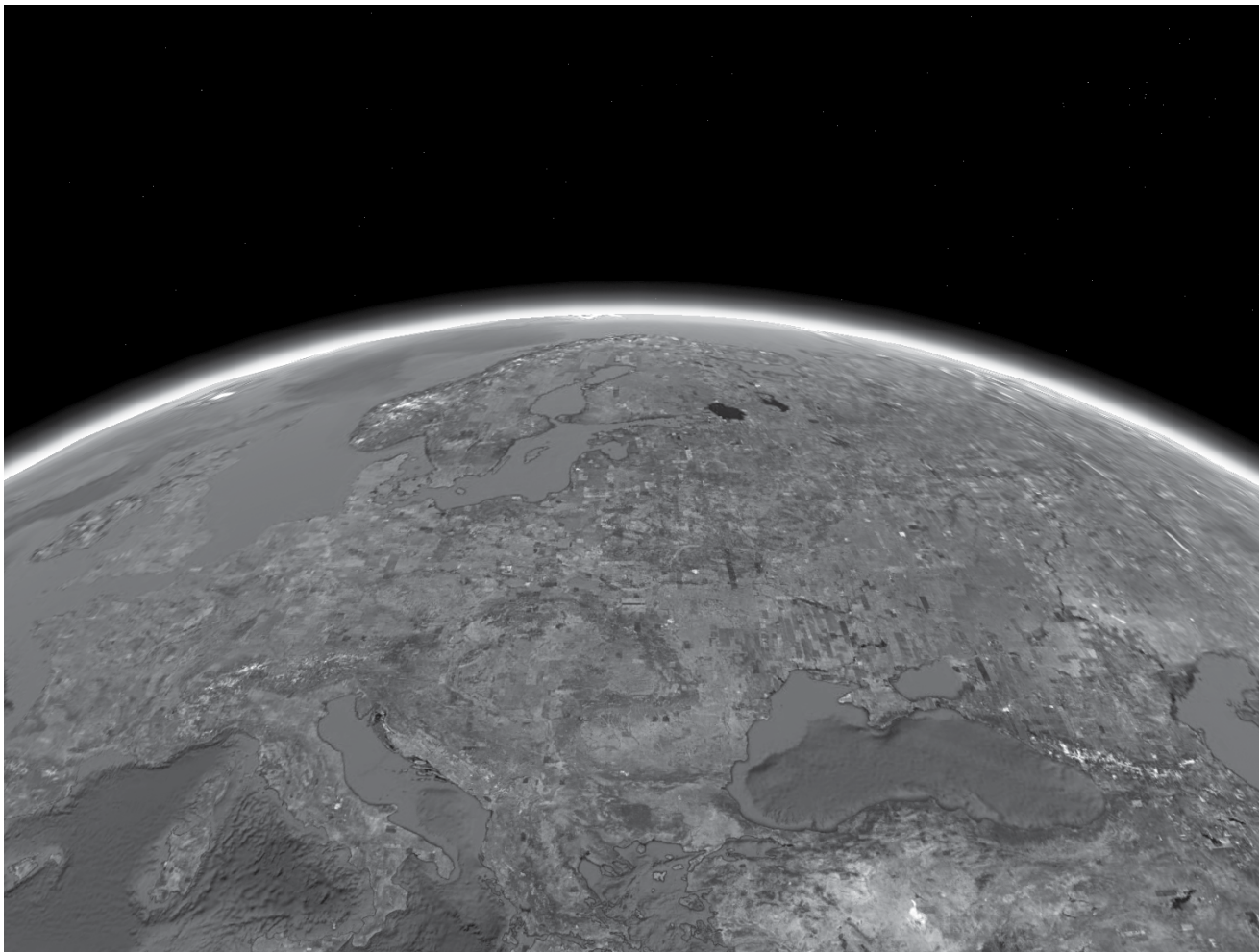
Look joystick



Move joystick



North-up button



Curved horizon



Name \_\_\_\_\_ Date \_\_\_\_\_

## Moving Around Earth

- 1 Label the tools you used in Google Earth.

### Word Bank

Look joystick

Zoom slider

Move joystick

North-up button

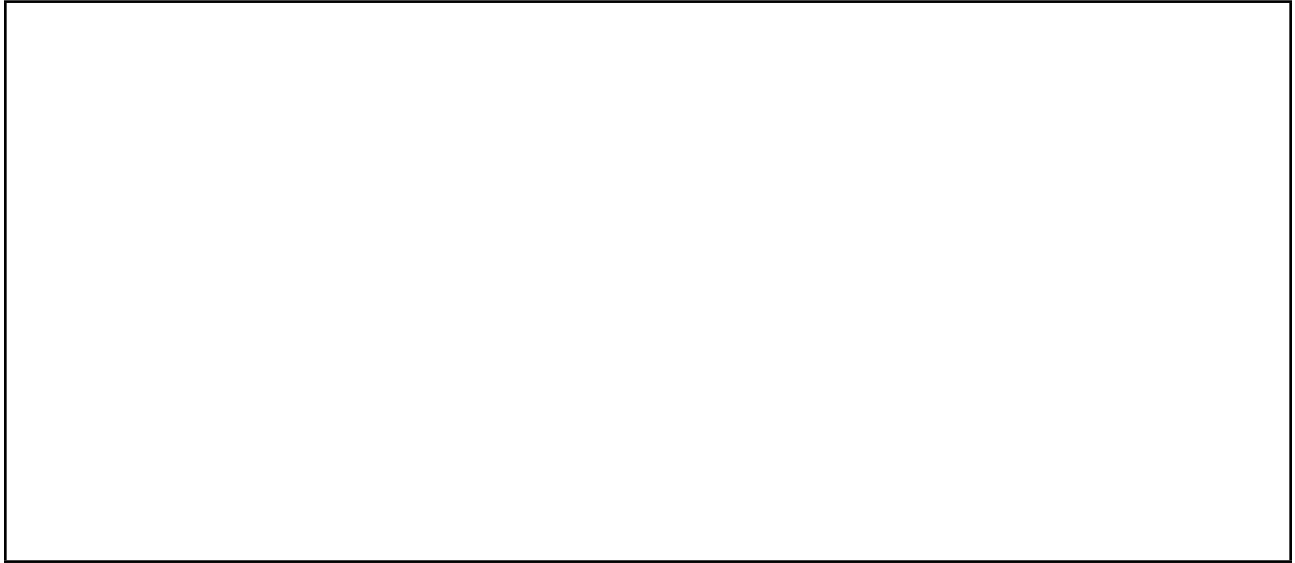


© GOOGLE

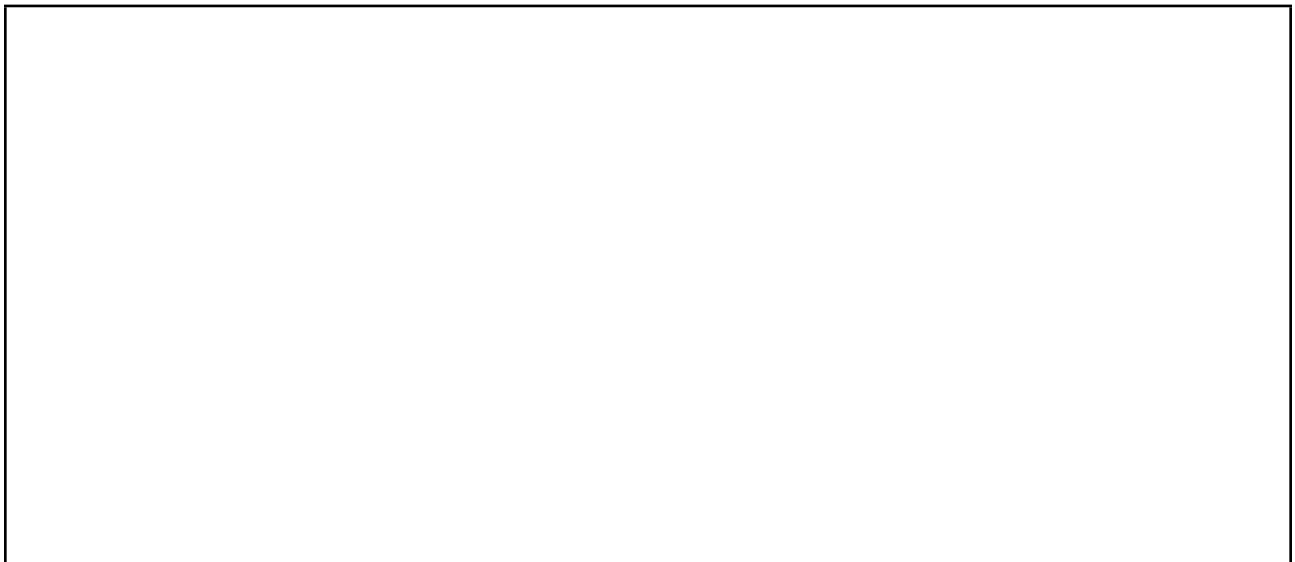


## Moving Around Earth *(cont.)*

- 2 Draw a picture that shows the horizon as seen from far above Earth.



- 3 Draw a picture that shows the horizon as seen from on Earth.





## Searching to Find Me

### Standard

Students know the location of school, home, neighborhood, community, state, and/or country.

### Google Earth Tools

- Search panel: Fly to box\*

### Overview

Students will learn to search for specific places on Earth and will explore the Statue of Liberty and their school from above.

### Vocabulary

- geometric
- overhead view

### Materials

- *Different Views* activity sheets (pages 46–48)
- blocks and toy cars
- *The Story of the Statue of Liberty* (Maestro 1989) (optional)

### Procedure

- 1 Have students work with partners or in small groups to build a “town” on the floor using blocks, toy cars, etc. Have them look at the town from ground level and then stand on their chairs and look down at the town from above. Ask students to describe how things look different from above and from on the ground.
- 2 Distribute copies of the *Different Views* activity sheets (pages 46–48) to students and ask students to draw their block town as it appears from above (question 1).
- 3 Read *The Story of the Statue of Liberty* (Maestro 1989) or another book about the Statue of Liberty. (See the Recommended Literature List in Appendix F, page 242 for more titles.) Ask any students who have visited the statue to share their experiences.
- 4 Open Google Earth. Show students the **Search panel** and the **Fly to box** in the upper-left corner of the screen, and tell them this is how they can find a specific place, like a town or a monument, in Google Earth.

\* Tool introduced in this lesson



## Searching to Find Me *(cont.)*

### Procedure *(cont.)*

- 5 Type "Statue of Liberty, New York City, New York" in the **Fly to box** and click on the magnifying glass (or press the Enter or Return key on your keyboard). Tell students that you were careful to include the name of the place you are searching for along with its city and state or country.
- 6 **Zoom** in until the statue fills the **3D viewer**. Ask students if they recognize this famous monument from this angle. Have students describe the shapes they see in the overhead view.
- 7 On their activity sheets, in the box labeled *Statue of Liberty Overhead View* have students sketch what they see using only geometric shapes like circles, squares, and triangles (question 2).
- 8 Type the name of your city and state (e.g., "Pasadena, CA"), or city and country (e.g., "Rome, Italy") into the **Fly to box** and click the magnifying glass. **Zoom** in to show your town or neighborhood and point out some familiar features to orient your students. Ask students to come up and point out features they recognize.

- 9 Type the address of your school into the **Fly to box** (e.g., "1201 100th St. NE, Granite Falls, WA") and click the magnifying glass. Ask students to carefully write your school name and address on their activity sheets (question 3). Use the **zoom** and cursor to view your entire school, including playgrounds and fields. On their activity sheets, have students circle the items they see on their school's grounds (question 4).

### Extension Activity

**Fly to** some more places and have students sketch them as they appear from above. Try these places with interesting shapes:

- Fort McHenry, Baltimore, MD
- Washington Dulles International Airport
- Petit Parc, Versailles, France
- Dole Plantation, Wahiawa, Hawaii







## Searching to Find Me *(cont.)*

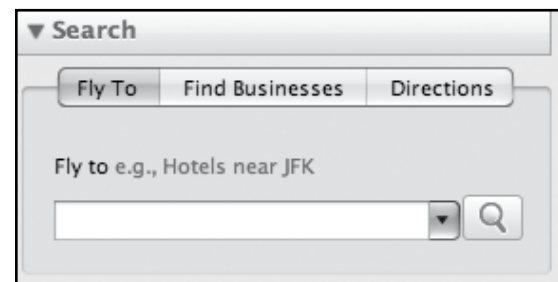
### Did You Know?

Using Google Earth, look in the water surrounding the Statue of Liberty for waves and boats. Behind each boat is a boat wake that changes the patterns of waves on the ocean surface.

### User Tip

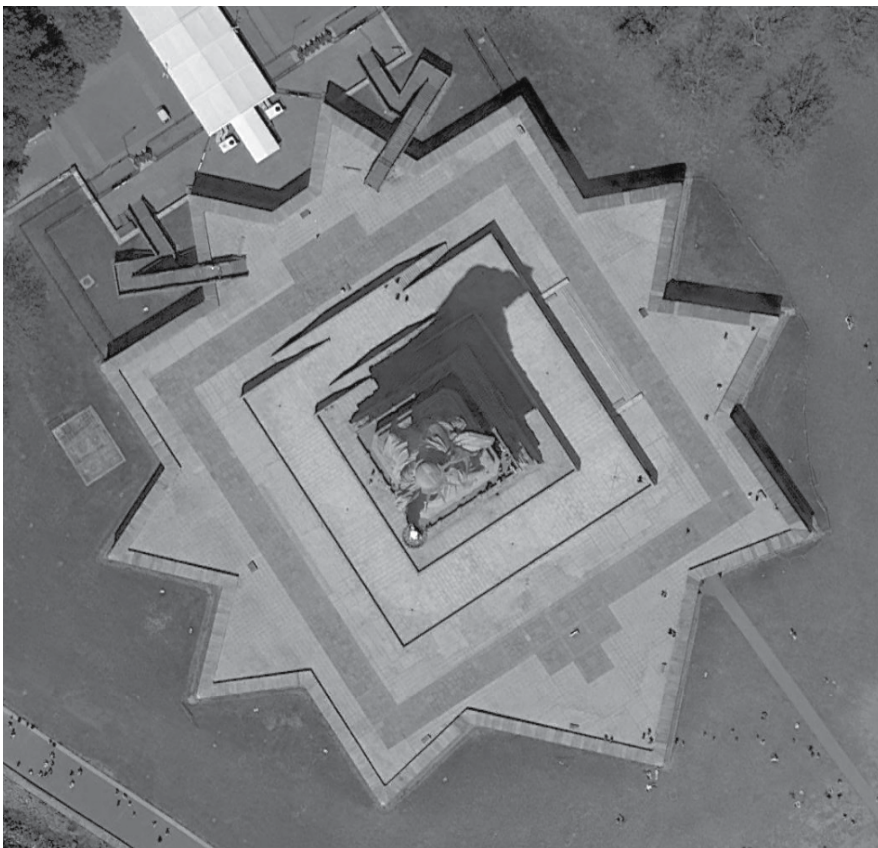
When searching for locations using the **Fly to box**, make sure the **Fly To** tab is selected (not the **Find Businesses** or the **Directions** tabs).

### Screenshots



© GOOGLE

Search panel with Fly to box



© GOOGLE

Statue of Liberty from overhead in Google Earth



Name \_\_\_\_\_ Date \_\_\_\_\_

## Different Views

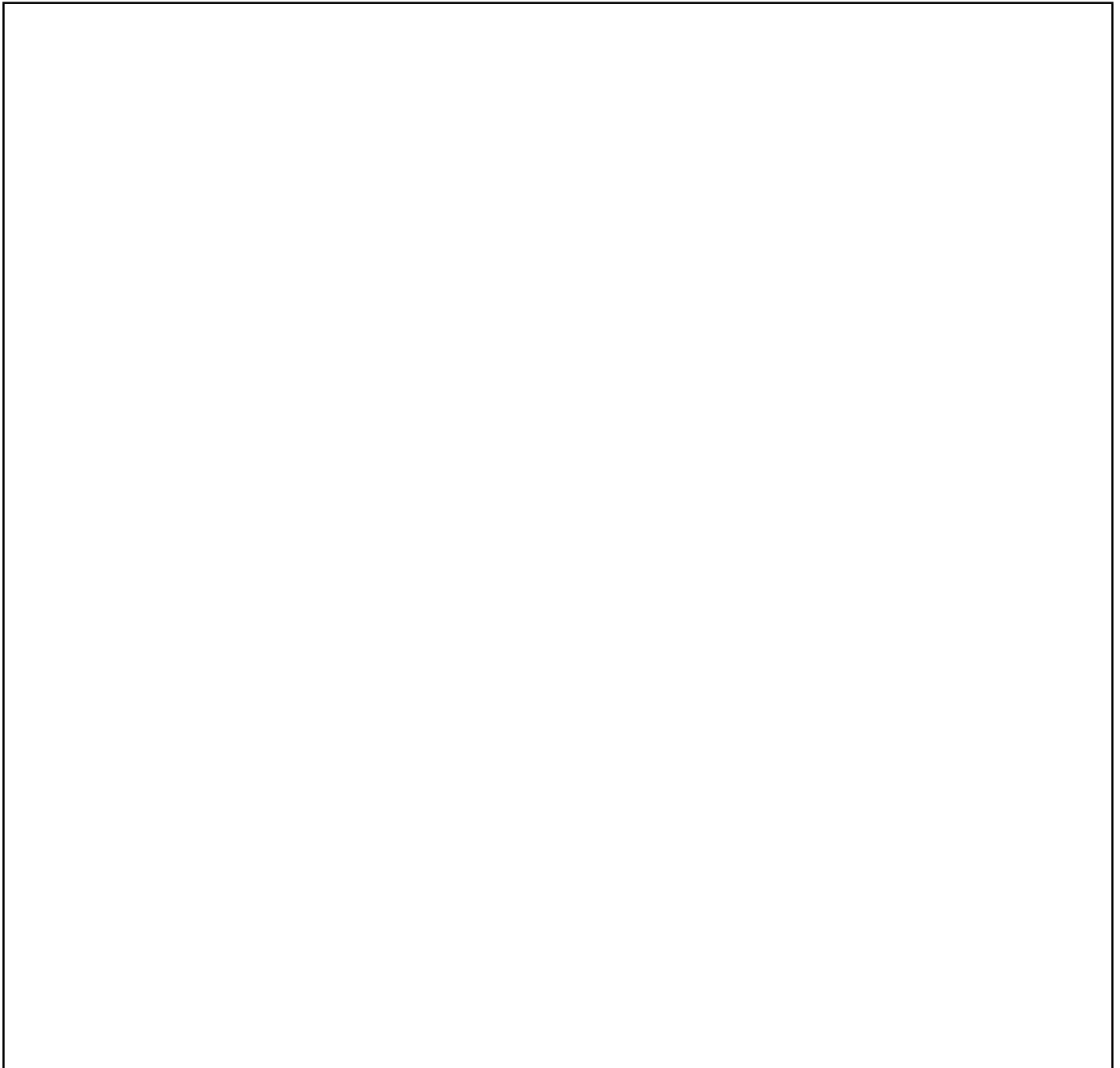
- 1 Draw the town you built. Show it as it looks from overhead.



## Different Views *(cont.)*

- 2 Use shapes to draw what the Statue of Liberty looks like from above.

### Statue of Liberty Overhead View





## Different Views *(cont.)*

**3**

Write the name and the address of your school.

---

---

---

---

**4**

Circle the items you saw at your school while using Google Earth.

playground	sports field	lunch area
classrooms	gym	parking lot



## Exploring Layers

### Standard

Students know the location of school, home, neighborhood, community, state, and/or country.

### Google Earth Tools

- Layers panel: Borders and Labels\*

### Overview

Students will use Google Earth to get a broader view of their state, their country, and their continent.

### Vocabulary

- border

### Materials

- *Big Picture* activity sheets (pages 52–54)

### Procedure

1

Distribute copies of the *Big Picture* activity sheets (pages 52–54) to students and open Google Earth. **Fly** to your school.

2

**Zoom** out and navigate until you see your entire continent. Ask students if they can identify their country. Look for the **Layers panel** in the lower-left of the **Google Earth Window**. Click on the small arrow or (+) sign next to the word *Layers* to open the **Layers panel**. If you only see Primary Database, click the small arrow or (+) sign to see additional layers. Check the small box to the left of the layer called **Borders and Labels**. This will display borders and some place names in the **3D viewer**. Ask students to point out their country.

3

Have students sketch the shape of their country and label it on their activity sheets (question 1).

4

Have students use Google Earth to help them answer the questions about their country (questions 2–5). Ask students the following questions: Is your school in the north, south, east, or west of your country? What other countries border your country? What bodies of water are in or border your country?

\* Tool introduced in this lesson





## Exploring Layers *(cont.)*

### Procedure *(cont.)*

- 5 **Zoom** in until the names of states or provinces appear. Ask students to point out their state and sketch and label it on their activity sheet (question 6).
- 6 Continue to **zoom** in until you see your school again. Center your school in the middle of the **3D viewer** and **zoom** out again until your state boundaries appear.
- 7 Have students use Google Earth to help them answer the questions about their state (questions 7–10).

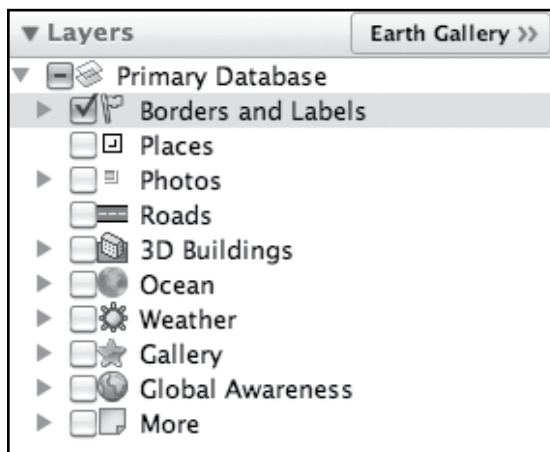
### Did You Know?

Maine is the only state in America that borders just one other state. Missouri and Tennessee border the most other states, at eight states each. Point Roberts, Washington cannot be entered over land without going through Canada. Weirton, West Virginia is the only place in the United States where a state is only one city wide.

### Extension Activity

The names of water bodies are also displayed in Google Earth when the **Borders and Labels** layer is turned on. Ask students to find the nearest ocean to your town and to **Fly to** some of the biggest lakes in the world, including the Great Salt Lake in Utah, Lake Tahoe in California, Lake Baikal in Russia, and Lake Victoria in Africa.

### Screenshots



© GOOGLE

**Borders and Labels layer**



## Exploring Layers (cont.)

### Screenshots (cont.)



DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO, US DEPT OF STATE GEOGRAPHER, ©2011 EUROPA TECHNOLOGIES © 2011 GOOGLE

**U.S.A. with Borders and Labels layer on**



Name \_\_\_\_\_ Date \_\_\_\_\_

## Big Picture

- 1 Write the name of your country on the line and draw its shape in the box below.

---

- 2 Draw an X where your state is located in your country.
- 3 Is your school in the north, south, east, or west of your country?

\_\_\_\_\_



## Big Picture *(cont.)*

4

What other countries border your country?

---

---

5

What bodies of water are in or border your country?

---

---

6

Write the name of your state on the line and draw its shape in the box below.

---

7

Draw an X where your school is in your state.



## Big Picture *(cont.)*

8 Is your school in the north, south, east, or west of your state?

---

9 What other states border your state?

---

---

10 What bodies of water are in or border your state?

---

---

---

---

---

---





## Investigating Natural Features

### Standard

Students know that places can be defined in terms of their predominant human and physical characteristics.

### Google Earth Tools

- Status bar: elev\*

### Overview

Students will investigate natural features in Google Earth, including a volcano, canyon, sea, mountain, and island.

### Vocabulary

- elevation
- natural
- volcano

### Materials

- *Highs and Lows* activity sheets (pages 58–60)
- pencils and crayons
- *How Mountains are Made* (Zoehfeld, 1995) (optional)

### Procedure

- 1 Before beginning the lesson, read a book about natural features, such as *How Mountains are Made* (Zoehfeld, 1995). (See the Recommended Literature List in Appendix F, page 242, for more titles.)
- 2 Distribute copies of the *Highs and Lows* activity sheets (pages 58–60) to students. On their activity sheets, have students draw what they think a volcano looks like (question 1).
- 3 **Fly to** Egmont National Park, New Zealand using the **Fly to box**. The main feature of this park is Mt. Taranaki, a perfectly formed volcano. **Zoom** to a view in which the volcano fills the screen. Ask students to describe what they see.
- 4 Use the **navigation tools**, especially the **Look joystick**, to see different views of the volcano. Have students draw Mt. Taranaki (question 2). How does this volcano differ from what students thought a volcano would look like? (question 3)

\* Tool introduced in this lesson



## Investigating Natural Features *(cont.)*

### Procedure *(cont.)*

- 5 Return to a view from above using the bottom arrow of the **Look joystick**. Show students the **elev** display in the **Status bar** at the bottom of the **3D viewer**. Tell them that this number shows elevation, or height above sea level, of the land where the cursor is located.
- 6 Place the cursor on the top of the volcano (without clicking) and look at the elevation number. Move the cursor slowly up and down the slope and observe what happens to the elevation number. With students, find the highest elevation on Mt. Taranaki and have students write it on their activity sheets (question 4).
- 7 Introduce the term natural. Guide students to understand that things that are natural, like volcanoes, are part of Earth and not created by people. Navigate around Mt. Taranaki and ask students to look for natural features on the volcano like snow, soil, rivers, and forests. **Zoom** in to get a close look, and **zoom** out to compare the view from a distance.

- 8 **Fly to** and explore the following natural features and determine their highest elevations:

- The Grand Canyon, Arizona
- Uluru, Australia
- The Dead Sea, Israel
- The Matterhorn, Italy
- Isla Fernandina, Ecuador

- 9 On their activity sheets, have students draw a picture of four of the natural features they see and write the highest elevation they could find on each (question 5).

### Extension Activity

**Zoom** to a view of Mt. Taranaki that includes the ocean and move the cursor from the top of the volcano to the coastline to the ocean. Ask students to describe what happens to the elevation.

**Zoom** out and look for some darker areas in the ocean and investigate their depth. Ask students where the ocean is deepest.



### User Tip

To change the **elev** display between meters and feet in the **Status bar**, click **Google Earth** in the **Menu Bar** and select **Preferences** (Mac). Or, go to **Tools** and select **Options** (PC).



## Investigating Natural Features *(cont.)*

### Screenshots

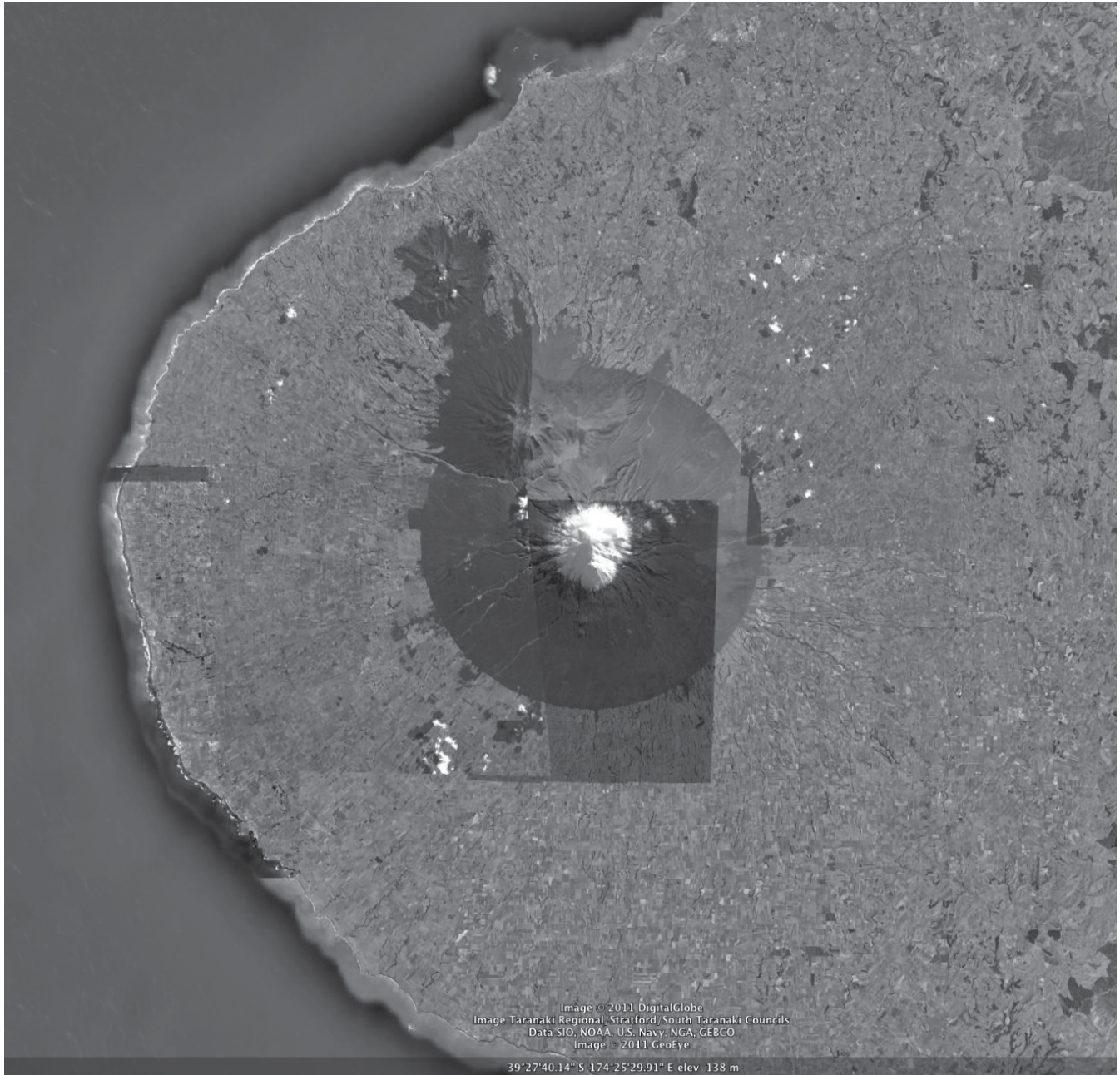


IMAGE © 2011 GEOEYE, IMAGE TARANAKI REGIONAL/STRATFORD/SOUTH TARANAKI COUNCILS, DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO © GOOGLE

**Mt. Taranaki, Edgemont National Park, New Zealand**

elev 2092 m

© GOOGLE

elev display



Name \_\_\_\_\_ Date \_\_\_\_\_

## Highs and Lows

- 1 Draw a volcano.



## Highs and Lows *(cont.)*

2 Draw Mt. Taranaki.

3 How is Mt. Taranaki different from what you thought a volcano would look like?

---

---

---

4 What is the highest elevation you found on Mt. Taranaki?

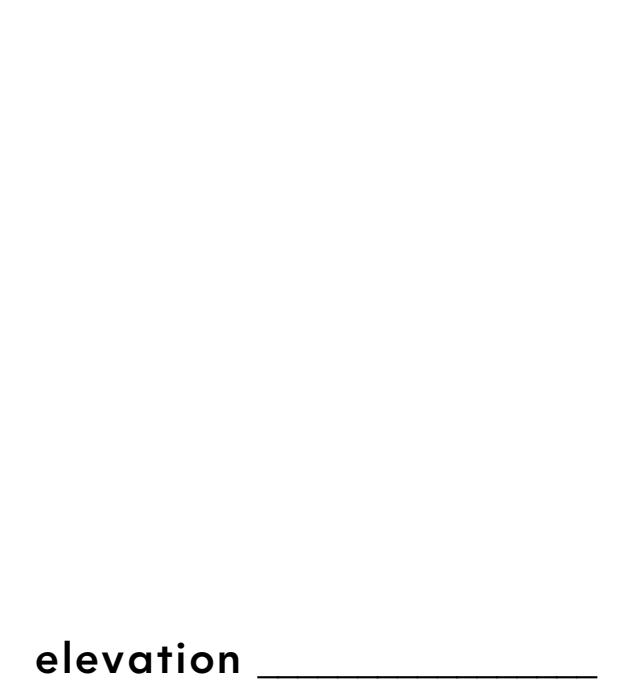
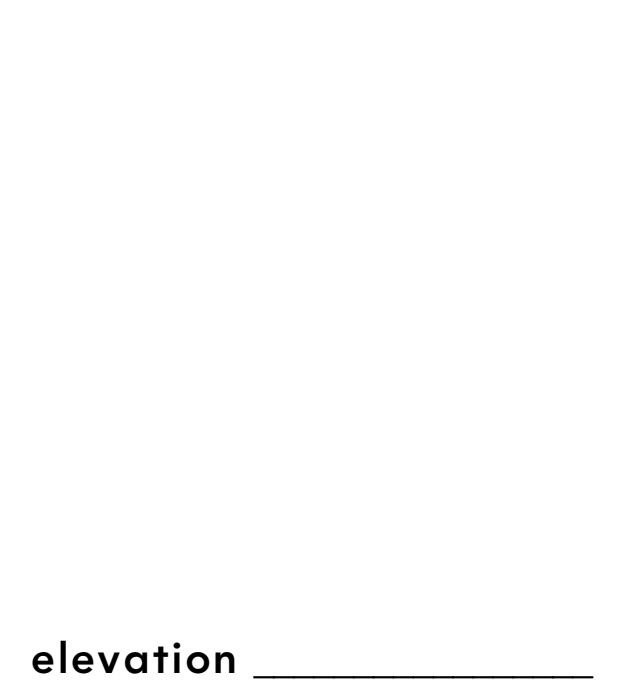
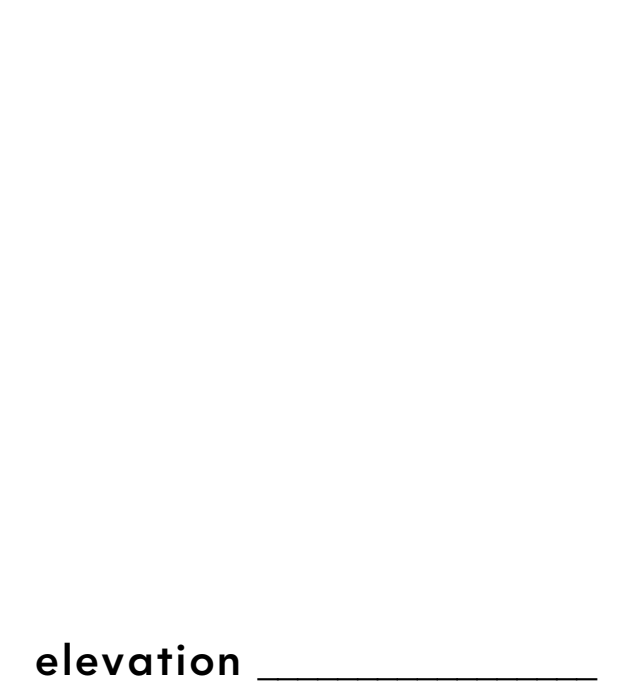
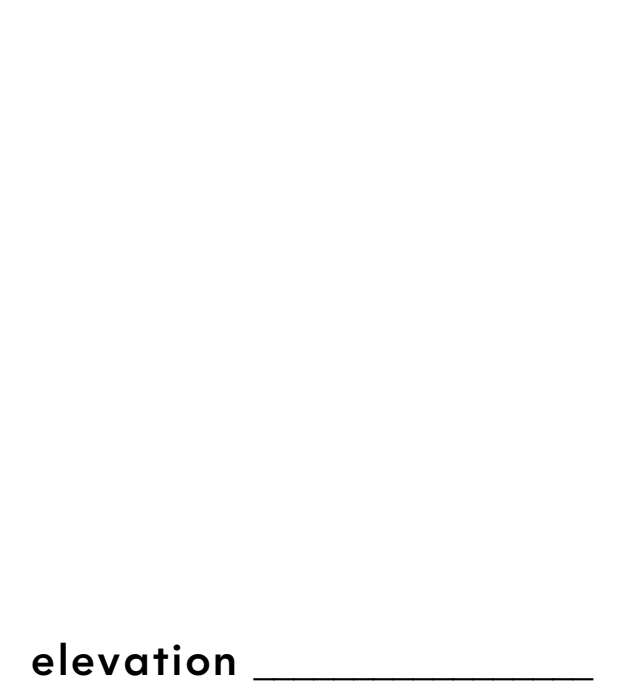
---





## Highs and Lows *(cont.)*

5 Draw four of the natural features you see in Google Earth. Write the highest elevation of each feature.

 <p>elevation _____</p>	 <p>elevation _____</p>
 <p>elevation _____</p>	 <p>elevation _____</p>



## Identifying Man-made Features

### Standard

Students know that places can be defined in terms of their predominant human and physical characteristics.

### Google Earth Tools

- Status bar: Eye alt\*

### Overview

Students will use Google Earth to investigate man-made features on Earth.

### Vocabulary

- man-made
- structure

### Materials

- *Adding to Earth* activity sheets (pages 65–66)
- crayons
- magnifying glasses
- tape measure
- *The Little House* (Burton 1978) (optional)

### Procedure

**Note:** Preset Google Earth for this lesson by searching for “Golden Gate Bridge” in the **Fly to box**. Turn off the boxes in the **Search panel** to remove the **red balloon icons**. Center the **3D viewer** over the bridge and then use the **zoom slider** to **zoom** all the way out to the smallest view of Earth.

1

Read a book about man-made features such as *The Little House* (Burton 1978). (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Distribute copies of the *Adding to Earth* activity sheets (pages 65–66) to students. Remind students that natural means things that are part of Earth and man-made means things created by people. With students, brainstorm lists of things that are natural and man-made and have them fill in the chart on their activity sheets (question 1).

3

Open Google Earth (preset as detailed above). Point out **Eye alt** in the **Status bar** at the bottom-right of the **3D viewer**. Explain that **Eye alt** stands for “Eye altitude” and this number tells how high above Earth the camera (the **3D viewer's** eye) is. This is different from the **elev** number which tells how high the land under the cursor (hand) is.

\* Tool introduced in this lesson



## Identifying Man-made Features *(cont.)*

### Procedure *(cont.)*

**4** Use the **zoom slider** to **zoom** in and out and observe what happens to the **Eye alt** number. **Zoom** out as far as possible. What is the **Eye alt** at this view of Earth? (64,000 km, 40,000 mi.) Can students see any man-made features from this altitude?

**5** **Zoom** in to an **Eye alt** of about 6,400 km (4,000 mi.). Can students see any man-made features from this altitude? Remind students that they may see artificial lines and shapes created by the patchwork of images that make up a Google Earth view. These are not man-made features.

**6** **Zoom** to about 390 km (240 mi.), an average orbit altitude for the International Space Station or the Space Shuttle. Tell students that this is a view that astronauts might have of Earth. Ask students to look for man-made features. (Sharp-eyed students may spot bridges at this altitude.)

**7** **Zoom** in slowly and ask students to raise their hands when they see a man-made feature. **Zoom** in until the Golden Gate Bridge fills the **3D viewer** and explore using the **navigation tools**.

**8** **Zoom** out to an **Eye alt** of about 100 km (65 mi.) to show the entire bay. On the outline of San Francisco Bay on their activity

sheets, have students color the land green or brown and the water blue (question 2).

**9** Ask students to imagine a time before the bridges were built. How far would people have to travel to go all around the bay? Use the cursor to trace a route around the outside of the bay from where one side of the Golden Gate Bridge now stands to the other side, without using any bridges. Have students draw the route in red (question 3). Then, have students draw the bridges in black (question 4) and compare the routes.

**10** **Fly to** and explore these man-made features:

- Disneyland, California
- Beaumaris Castle, United Kingdom
- The London Eye, London, England



## Identifying Man-made Features *(cont.)*

### Screenshots

Eye alt 91.71 km

© GOOGLE

#### Eye alt display



IMAGE © 2011 TERRAMETRICS, DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO

San Francisco Bay, California

### Did You Know?

Astronauts take hundreds of photographs of Earth on their missions. Have students check out some of the astronauts' favorite man-made features to photograph and view them in Google Earth from an **Eye alt** of around 420 km (260 mi.), the average altitude for the International Space Station: Aswan Dam, Egypt; Kennedy Space Center, Florida; and their home base of Houston, Texas.

### Extension Activity

Have students use magnifying glasses to look closely at everyday surfaces such as carpet, tabletops, and pavement. Tell them to “zoom out” by moving higher above the surface, just like they did in Google Earth. Using a tape measure, ask students to measure their highest **Eye alt** and their favorite **Eye alt** for looking at each surface.

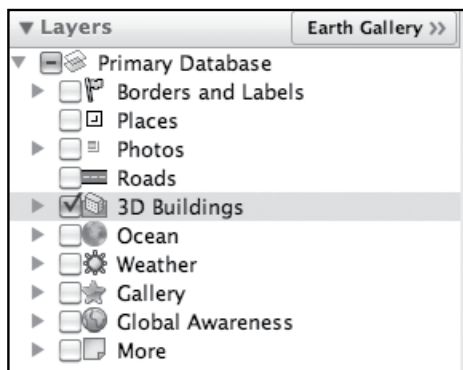






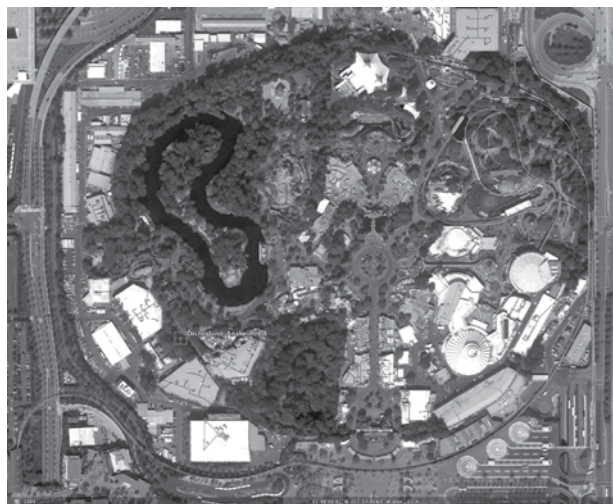
## Man-made Features *(cont.)*

### Screenshots *(cont.)*



© GOOGLE

**3D Buildings in the Layers panel**



© GOOGLE

**Disneyland, Anaheim, California**



IMAGE © 2011 GETMAPPING PLC © GOOGLE

**Beaumaris Castle, Wales**





Name \_\_\_\_\_ Date \_\_\_\_\_

## Adding to Earth

**1** Fill in the chart using the words below.

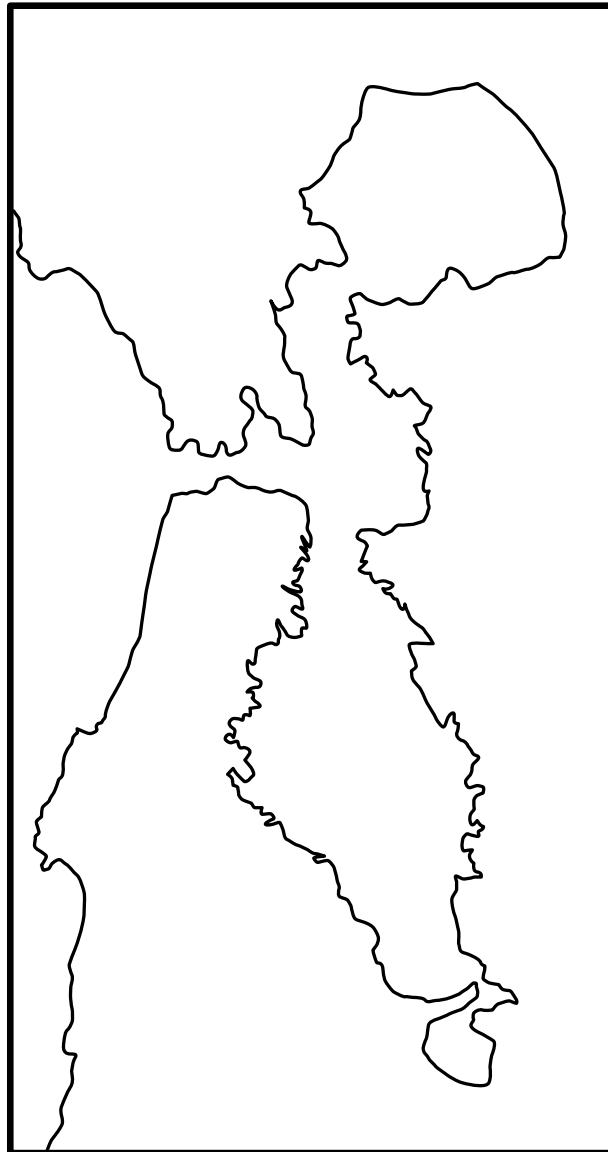
Word Bank			
grass	trees	houses	animals
roads	cars	birds	oceans
playgrounds	schools		

Natural Features	Man-made Features



## Adding to Earth *(cont.)*

- 2 On the map below, color the land green or brown and the water blue.
- 3 In red, draw a route from one side of the Golden Gate all the way around the bay to the other side.
- 4 In black, draw the bridges you see on Google Earth.





## Overlaying Abstract Features

### Standard

Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).

### Google Earth Tools

- Layers panel: Borders and Labels
- Status bar: Eye alt
- View: Grid\*

### Overview

Students will use Google Earth to investigate borders and the lines of our geographic coordinate system.

### Vocabulary

- artificial
- border
- equator
- latitude
- longitude

### Materials

- *Reading Between Earth's Lines* activity sheets (pages 70–72)
- a globe of Earth
- *Me on the Map* (Sweeney 1998) (optional)

### Procedure

1

Read a book about maps such as *Me on the Map* (Sweeney 1998). (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Show students a globe and ask if they see anything on the globe that is not real (e.g. the colors of the countries, the borders, or the writing). Ask students if they see lines on Earth when they are riding in a car or walking. Tell students that the lines and writing they see on maps, globes, and Google Earth are artificial—they do not exist in real life—but they help us find things on maps.

3

Distribute copies of the *Reading Between Earth's Lines* activity sheets (pages 70–72) to students and open Google Earth. Navigate to Africa at an **Eye alt** of about 9,600 km (6,000 mi.). Click on **View** in the **Menu Bar** (at the top of the screen) and select **Grid** to turn on the latitude/longitude grid.

4

Point out the equator and show students how it encircles Earth like a belt and divides Earth into two halves. Show students the equator on the globe and have a student trace the equator all the way around the globe with his or her finger. Have students draw the equator on the globe on their activity sheets (question 1).

\* Tool introduced in this lesson



## Overlaying Abstract Features *(cont.)*

### Procedure *(cont.)*

- 5 **Fly to** the Galapagos Islands, Ecuador, which are directly along the equator. **Zoom** in over the equator line to an **Eye alt** of about 9 km (15 mi.), and turn the grid on and off. Ask students if they see any sign of the equator line on the islands when the grid is off.
- 6 **Zoom** out to a global view. Explain that the other lines are called latitude and longitude lines and they help us find things on globes and maps.
- 7 Have students draw some latitude and longitude lines on the globe on their activity sheets (question 2).
- 8 Use the **navigation tools** to rotate Earth to a polar view of Antarctica so that the globe fills the **3D viewer**. Discuss with students how the latitude and longitude lines look different at the pole than at the equator. Show students the lines on the globe as well.
- 9 Turn off the grid. **Zoom** in to North America until the lower 48 states are in view. Turn on **Borders and Labels** in the **Layers panel** and help students to find the borders of the United States. Turn the borders on and off to show students what the country looks like with and without the abstract lines. Ask students to think about why some of the lines are straight and others are not.
- 10 Point out to students that seacoasts define much of the U.S. border. **Zoom** in to see coastlines on the west, east, and southern borders. Ask students if these borders are straight.
- 11 **Zoom** in to the border between Texas and Mexico. Ask students what makes this border and if this border is a straight line. Have students draw a section of the border between Texas and Mexico (question 3).
- 12 **Zoom** in to the four corners area between Arizona, Colorado, New Mexico, and Utah. Ask students if they can see any natural feature that makes these borders. Then ask whether these borders are straight. Have students draw the borders in the four corners area (question 4).
- 13 Investigate the borders of your state to see if they are defined by natural features such as a river or coastline. Have students sketch the outline of their state and label any natural features that make up the borders (question 5).

### Extension Activity

Have students research the early history of your state to find out how the borders were determined.



## Overlaying Abstract Features *(cont.)*

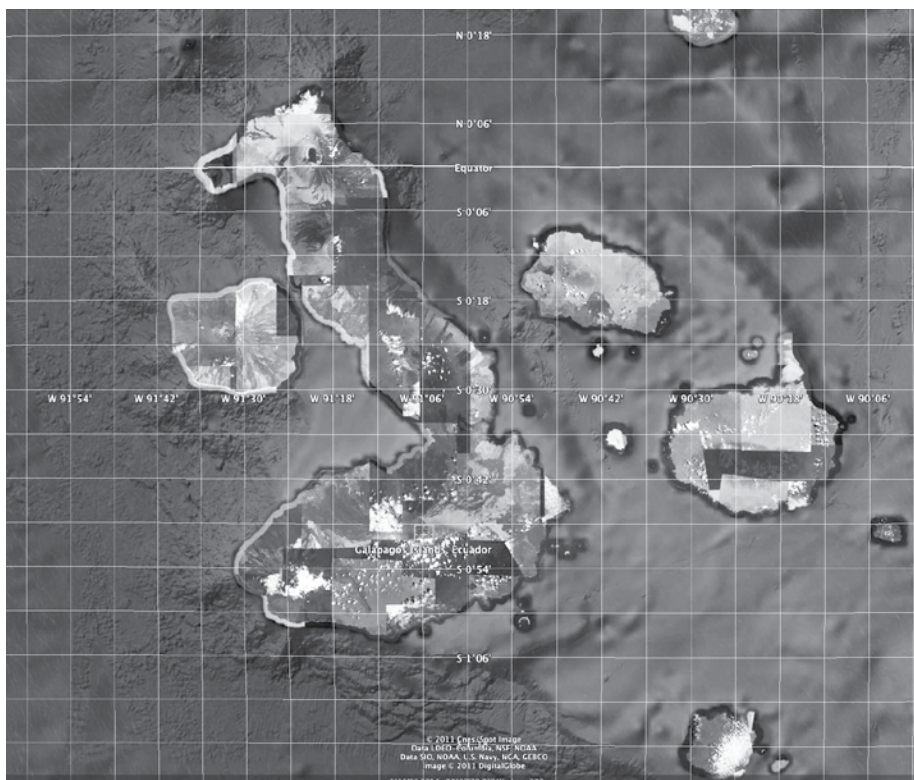
### Did You Know?

Between the Tropic of Cancer and the Tropic of Capricorn, the Sun shines directly overhead at least some of the year. North of the Tropic of Cancer and south of the Tropic of Capricorn, the Sun always shines at an angle. Like the Tropic of Cancer, the Antarctic Circle tells students something about how the Sun shines. Below this latitude line, there are days when the Sun never appears over the horizon.

### User Tip

Specific latitude and longitude points are useful for finding a location that does not have a name. To find a general area, only degrees of latitude and longitude are needed. For example, type, 24 S 15 E (be sure to include the spaces), in the **Fly to box** to find the Namib Desert in Namibia. To find a region with a specific type of dunes, you would need to type: 24 22 S 15 09 E (degrees and minutes). To find a very specific dune, you would need to include seconds: 24 42 35 S 15 26 31 E. The latitude and longitude of the location (or **lat/long**) of the cursor is always displayed in the **Status bar**.

### Screenshot



DATA LDEO COLUMBIA, NSF, NOAA, DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO, IMAGE © 2011 DIGITALGLOBE © GOOGLE

Galapagos Islands at the Equator

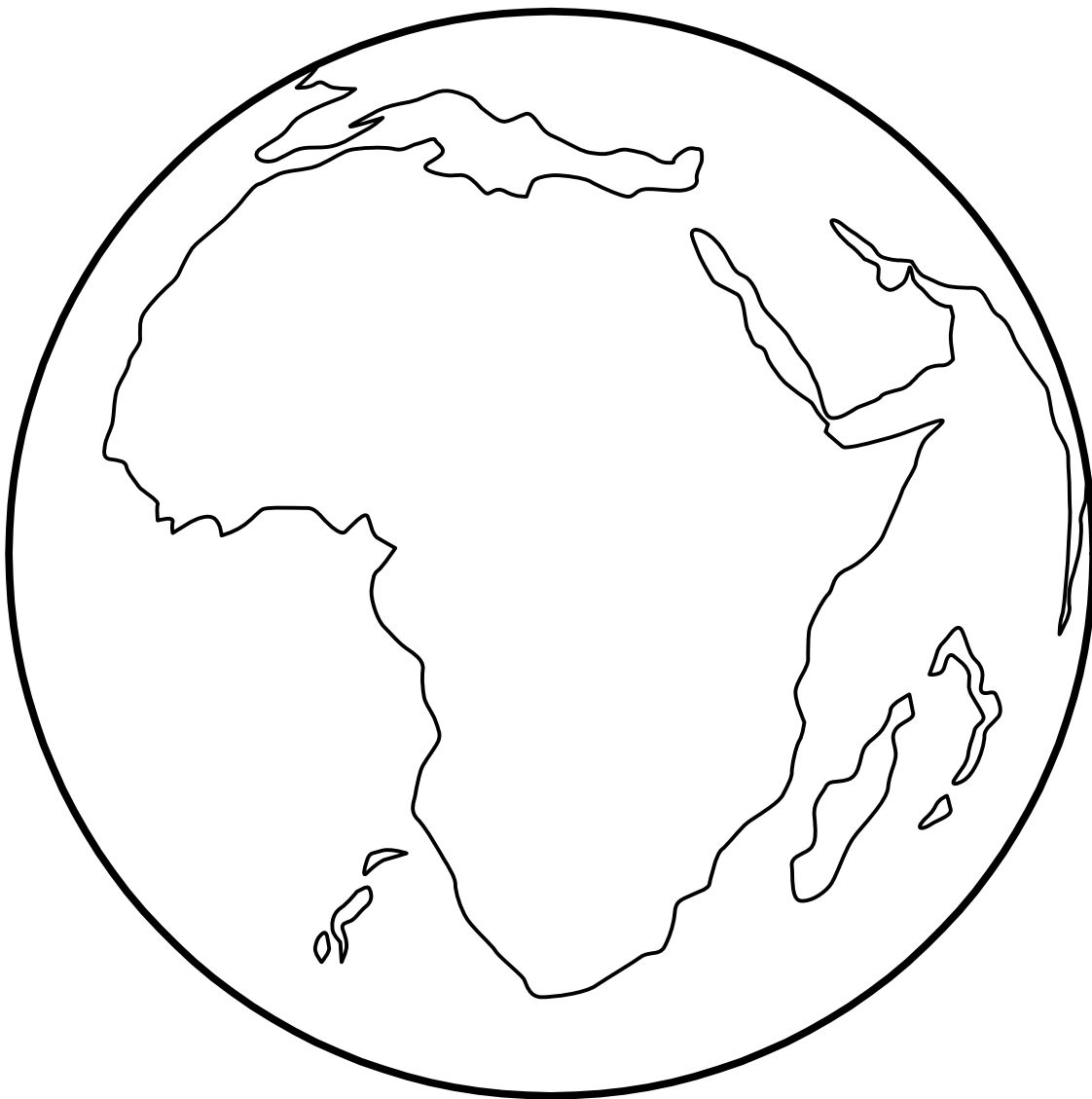




Name \_\_\_\_\_ Date \_\_\_\_\_

## Reading Between Earth's Lines

- 1 Draw the equator on the globe below.
- 2 Draw some latitude and longitude lines on the globe as well.

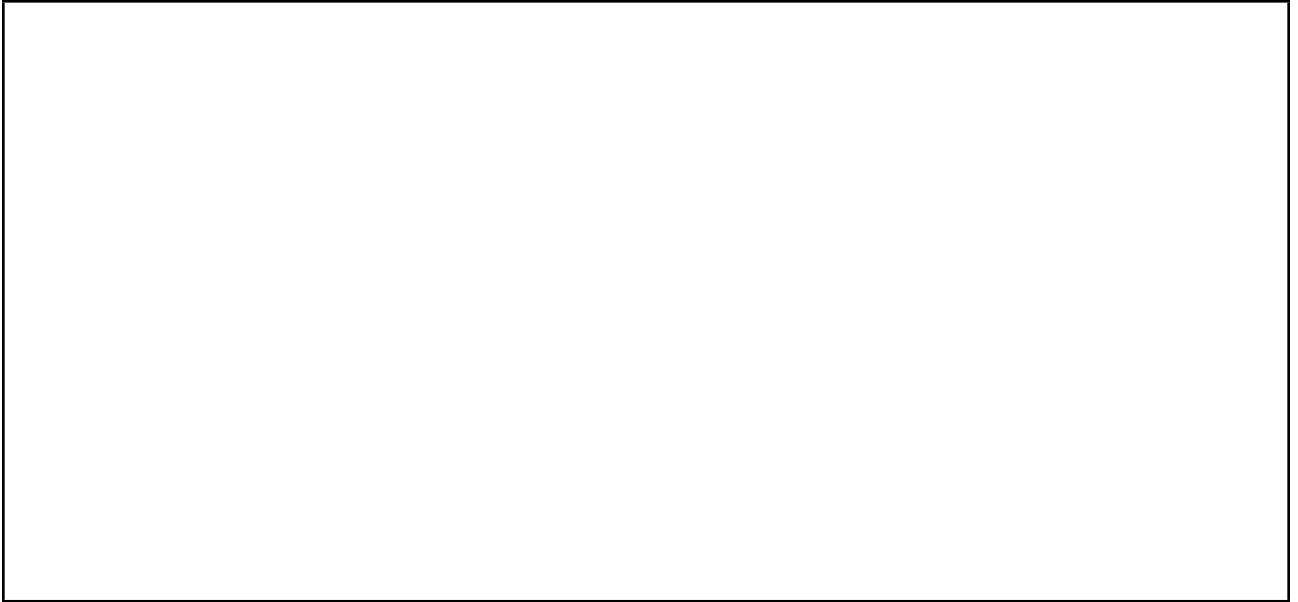




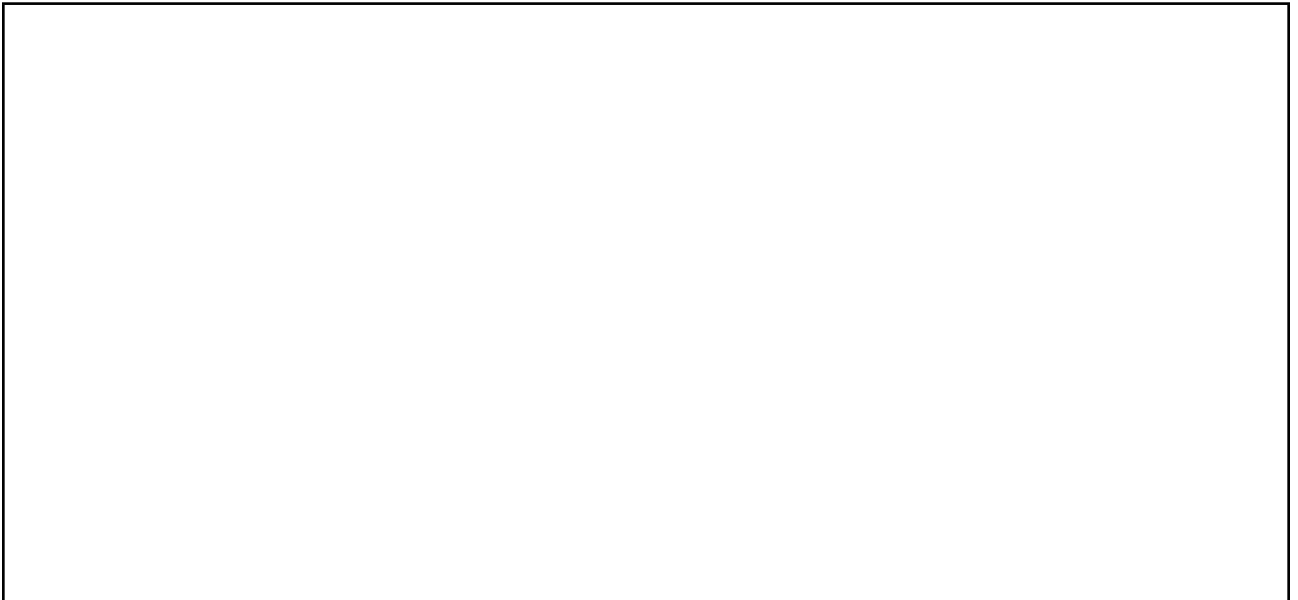
## Reading Between Earth's Lines *(cont.)*

**3**

Draw a section of the border between Texas and Mexico.

**4**

Draw the area where the borders of Arizona, Colorado, New Mexico, and Utah meet.





## Reading Between Earth's Lines *(cont.)*

- 5 Draw the shape of your state. Write the names of any natural features that form the borders.

A large, empty rectangular box with a thin black border, intended for a student to draw the shape of their state and write the names of natural features that form its borders.

## Creating Reference Scales

Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).

- Toolbar: Ruler\*
- View: Scale Legend\*

Students will develop a reference scale that will allow them to compare places with very different spatial scales.

- reference scale
- scale

- *Comparing Sizes* activity sheets (pages 76–78)
- 3" x 5" cards
- *Zoom* (Banyai 1995) (optional)

**1** Before beginning the lesson, read a book like *Zoom* (Banyai 1995) and discuss the idea of scale. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Distribute copies of the *Comparing Sizes* activity sheets (pages 76–78) to students.

**2** Ask students to look at something tall (e.g., a building or a tree). Have students hold up one of their hands, close to their eyes. Can they make the object disappear behind their hands? Have students extend their hands toward the object. Ask them what happened. Explain that objects seem bigger when they are closer and smaller when they are farther away, even though they do not actually change size.

**3** Remind students of places they have already visited using Google Earth. Ask students if they think the Golden Gate Bridge is bigger than their school. Have students draw the Golden Gate Bridge on their activity sheets and draw the general shape of their school next to it (question 1). How big do they think the school should be?

\* Tool introduced in this lesson



## Creating Reference Scales *(cont.)*

### Procedure *(cont.)*

**4** Explain to students that in Google Earth, using **zoom** does more than just let you see things closer or farther away—it changes the height of your eye above the surface, and therefore changes the scale. A famous building may seem huge, but it is really not much bigger than your school, or a landscape feature may look small, but your city would fit into it.

**5** Open Google Earth. Click **View** in the **Menu Bar**, and select **Scale Legend**. Show students the scale that appears in the lower-left corner of your **3D viewer** and tell them that it will help them see how big things are in Google Earth.

**6** Navigate to a view of your school in which the scale reads as close as possible to 300 m (1,000 ft.). Hold an index card up to your computer screen (or a piece of paper if you are using an interactive whiteboard or large projection screen) and mark the approximate length of your school on the edge of the card. Write “Our school at 300 m scale” on the card. Explain to students that this card will be a reference scale they can use to visualize the sizes of objects in Google Earth. **Note:** If your school is too large or too small at 300 m scale, choose an appropriate scale and use it for the rest of the lesson.

**7** **Fly to** the Golden Gate Bridge again and set the view so the scale reads as close as possible to 300 m (1,000 ft.). Hold up the index card and compare the size of your school to the size of the bridge. On their activity sheets, have students draw a second picture showing the bridge and your school in the correct scale (question 2).

**8** With the index card held up to the screen, **zoom** in and out on the Golden Gate Bridge. **Zoom** out until the bridge is significantly smaller than your school. Ask students if this makes sense. **Zoom** way in until your school fits across the bridge. Does this make sense? Tell students that the card only shows the size of your school correctly if the scale is set to 300 m (1,000 ft.).

**9** **Fly to** some other landmarks students are familiar with (e.g. Disneyland, the Statue of Liberty, Beaumaris Castle). Set the scale in each view as close as possible to 300 m (1,000 ft.). Hold up the index card reference scale and have students compare the size of their school to the size of each landmark. On their activity sheets, have students list four of the landmarks and circle whether their school would fit inside each one (question 3).





## Creating Reference Scales (cont.)

10

Use the **ruler tool** to measure the size of your school. Click on the **ruler tool** in the **Toolbar**. In the **Ruler window**, choose feet or meters for the units. Using the cursor, click once on one side of your school and then on the other side. You will see a line and the measurement will be displayed in the **Ruler window**. Close the **ruler tool** by clicking the X in the corner. **Fly to** the Golden Gate Bridge and measure its length and width. Discuss with students how the measurements compare.

### Extension Activity

Have students make their own reference scale cards and search Google Earth for more man-made features to compare to the size of their school. Remind students to set the scale before comparing.



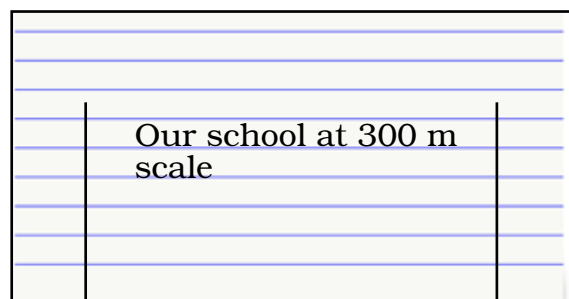
### Screenshots



Scale Legend in View menu



Scale Legend in 3D viewer





Name \_\_\_\_\_ Date \_\_\_\_\_

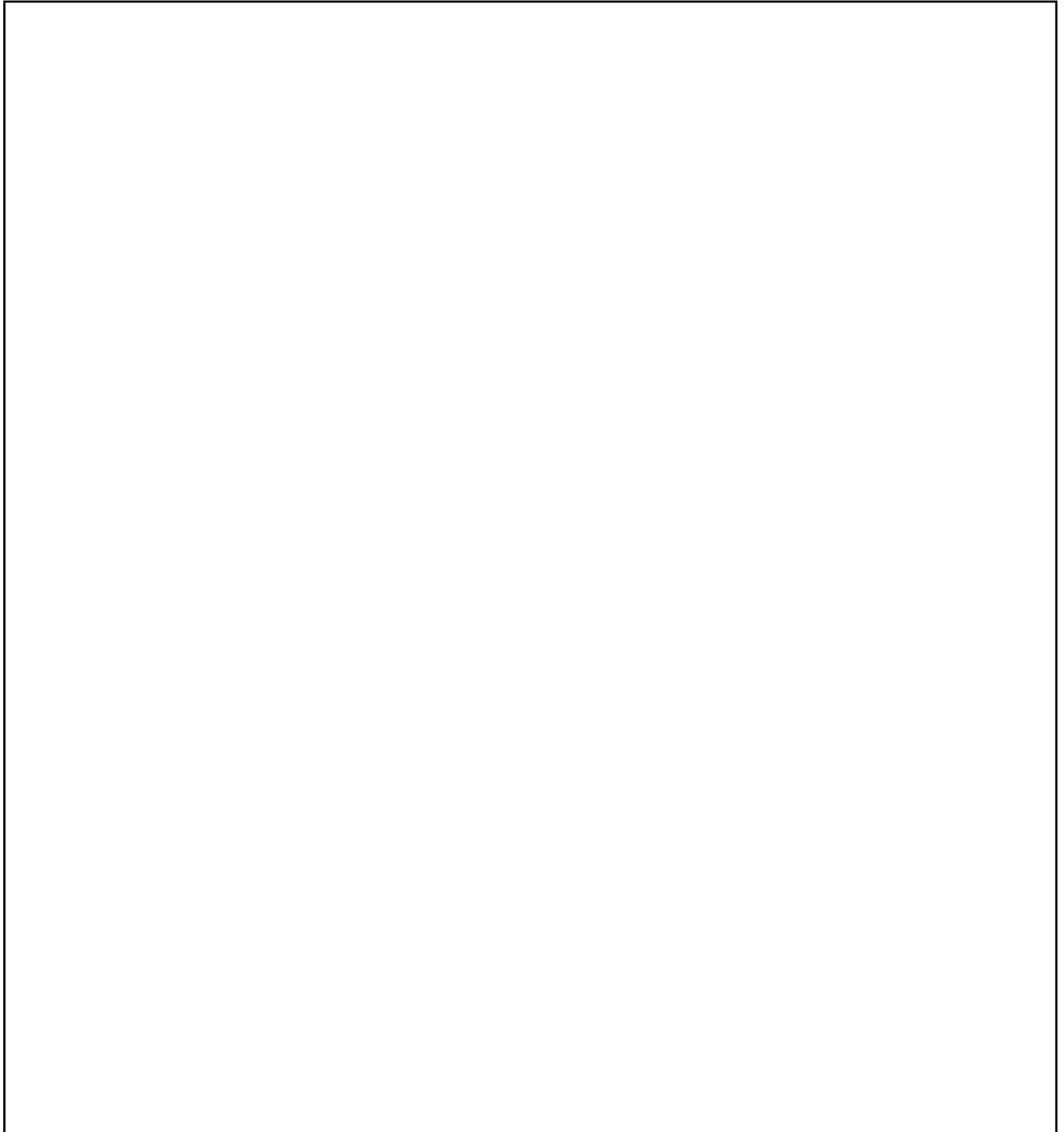
## Comparing Sizes

- 1 Sketch the Golden Gate Bridge in the box below. Draw your school on or next to the bridge. Make the school the size you think it would be if you actually moved it to the bridge.



## Comparing Sizes *(cont.)*

- 2** Draw the Golden Gate Bridge and your school again. Use what you learned in Google Earth to make them the right scale.





## Comparing Sizes *(cont.)*

- 3** Write the name of each landmark that you see in Google Earth. Will your school fit inside? Circle yes or no.

Landmark	Will your school fit?
	yes      no
	yes      no
	yes      no
	yes      no



## Placemarking Our Discoveries

### Standard

Students know the physical and human characteristics of the local community (e.g., neighborhoods, schools, parks, creeks, shopping areas, airports, museums, sports stadiums, hospitals).

### Google Earth Tools

- Toolbar: Placemark\*

### Overview

Students will continue to learn basic Google Earth navigation tools and will create placemarks for locations in their school.

### Vocabulary

- placemark
- shape

### Materials

- *Pin the Placemark on My School* activity sheets (pages 82–84)
- construction paper
- glue or paste
- large white paper
- pencils and crayons
- scissors
- your school's address
- *A Fine, Fine School* (Creech 2003) (optional)

### Procedure

- 1 Before beginning the lesson, read a book about school, such as *A Fine, Fine School* (Creech 2003). (See the Recommended Literature List in Appendix F, page 242, for more titles.)
- 2 If possible, take a walk around your school and point out the buildings, the playground, the parking lot, and the surrounding homes or buildings. Ask students to think about how their school would look from overhead.
- 3 In class, help students list some of the features of your school that might be seen from above (e.g., playground, field, lunch area).
- 4 Distribute copies of the *Pin the Placemark on My School* activity sheets (pages 82–84) to students. Have students list two features of their school on their activity sheets and draw what shape they think each feature will be when they see it in Google Earth (question 1).
- 5 Open Google Earth. **Fly to** your school and **zoom** until you can see the entire school and schoolyard. Ask students to compare the predictions they made in question 1 to what they see now. Have students sketch a quick map of your school (using simple shapes) on their activity sheets (question 2).

\* Tool introduced in this lesson





## Placemarking Our Discoveries *(cont.)*

### Procedure *(cont.)*

- 6 Click on the **placemark tool** (a yellow thumbtack) in the **Toolbar**. A yellow thumbtack, or **placemark icon**, with a flashing square around it will appear in the **3D viewer**, along with a **placemark window**.
- 7 Using the cursor, drag the **placemark icon** to a location in the center of the school. Type the name of your school in the name box in the **placemark window** and click **OK** in its lower right corner. In the **3D viewer**, you will see a yellow thumbtack with the name of your school.
- 8 **Placemark** different areas of the school such as the playground, the lunch area, and your classroom. Point out to students that after you set each placemark they can see a thumbtack (icon) and the name of the location (label) in the **3D viewer**.
- 9 Have students draw placemarks and labels in their drawing of the school (question 3).
- 10 On their activity sheets, have students draw a simple map of your classroom and add icons for features such as their desk or seat, the sink, the pencil sharpener, the teacher's desk, etc. (question 4).

### Extension Activities

- In small groups or individually, have students cut shapes from construction paper and glue them onto larger white paper to make a shape map of their school. Using colored pencils or crayons, have students draw in details, placemarks, and labels.
- **Fly to** the following elementary schools using Google Earth:
  - Navajo Elementary School, Scottsdale, Arizona
  - Beverly Cleary School, Portland, Oregon (the setting in many of the Ramona Quimby books)
  - St. Michael's Primary School, Winterbourne, England (JK Rowling's school).
  - Bolinger Canyon Elementary School, San Ramon, California
 Have students compare their school to these schools. How can they tell these are all schools?



## Placemarking Our Discoveries *(cont.)*

### Did You Know?

The City Montessori School in Lucknow, India, is the world's largest primary school by population with over 32,000 students. The largest university by enrollment is Indira Gandhi National Open University with over 3.5 million students. Universities have similar features to elementary schools but are usually much bigger. **Fly to** Stanford University, Princeton University, and Massachusetts Institute of Technology for examples.

### User Tips

If you need to make a change to a **placemark**, right-click (or control-click) the **placemark** (either the thumbtack in the **3D viewer** or the placemark in the **Places panel**) and click **Get Info** (Mac) or **Properties** (PC) to open the **Placemark window**.

**Note:** You can only move a **placemark** when the **placemark window** is open.

Sometimes when you name a **placemark**, it reverts to **Untitled Placemark** after you save it. To avoid this, click once in the **Description box** after typing the name of the **placemark**.

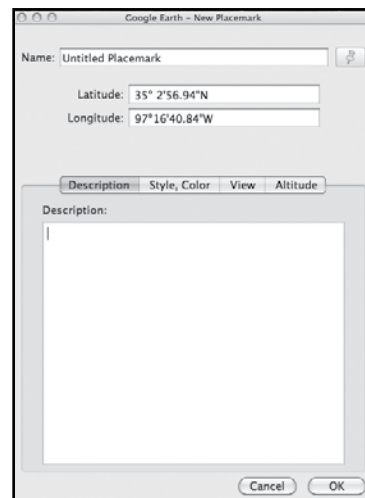
To save a **placemark**, drag it from the **Search panel** to the **My Places folder** in the **Places panel**.

### Screenshots



© GOOGLE

Placemark icon



© GOOGLE

Placemark window



© GOOGLE

School with placemark



Name \_\_\_\_\_ Date \_\_\_\_\_

## Pin the Placemark on My School

- 1 Write two parts of your school that you might see in Google Earth and draw what shapes you think they are.

\_\_\_\_\_

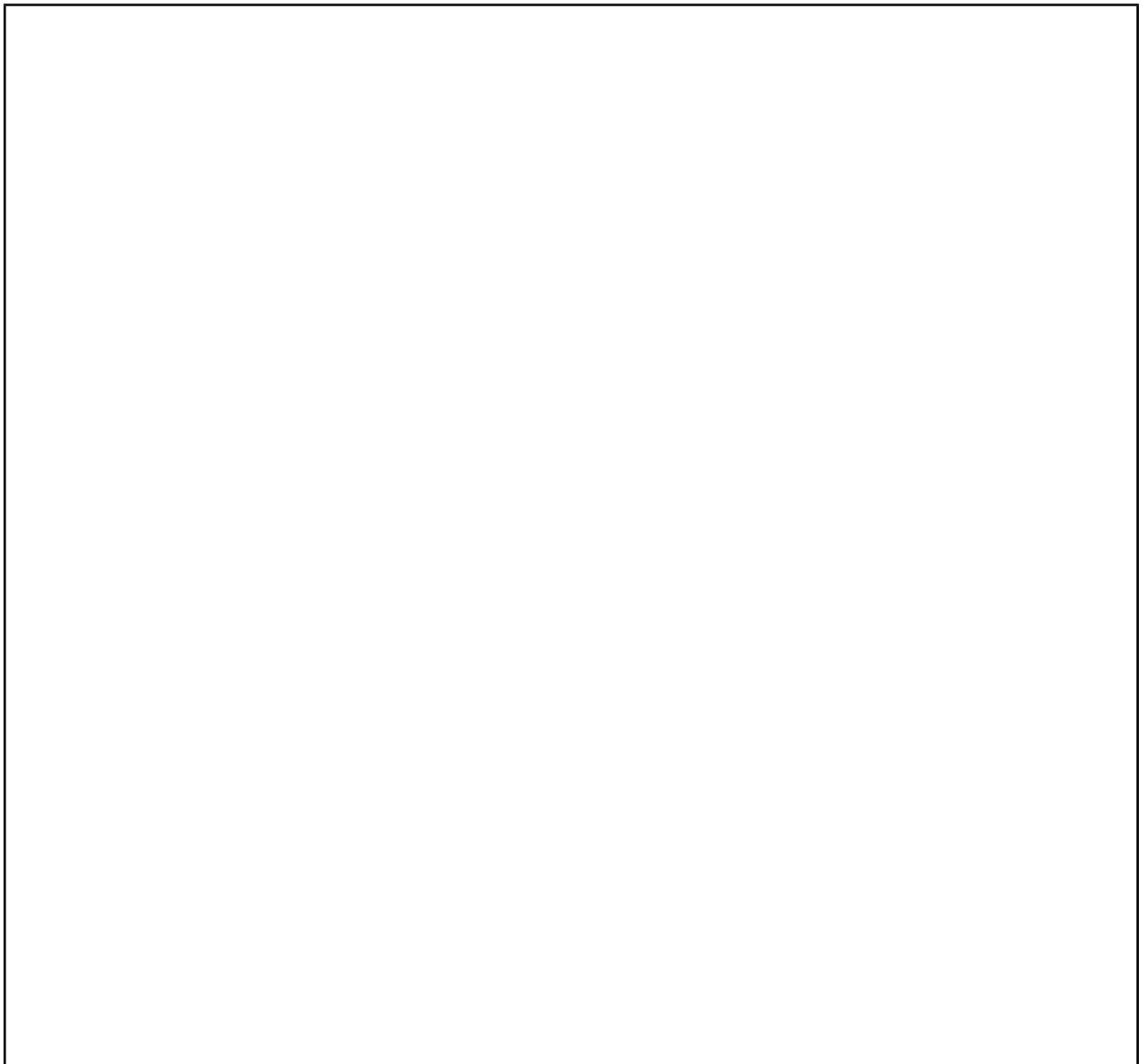
\_\_\_\_\_



## Pin the Placemark on My School *(cont.)*

- 2 Use simple shapes to draw what your school looks like in Google Earth.
- 3 Draw placemarks on the different parts of your school and label them.

### My School in Google Earth

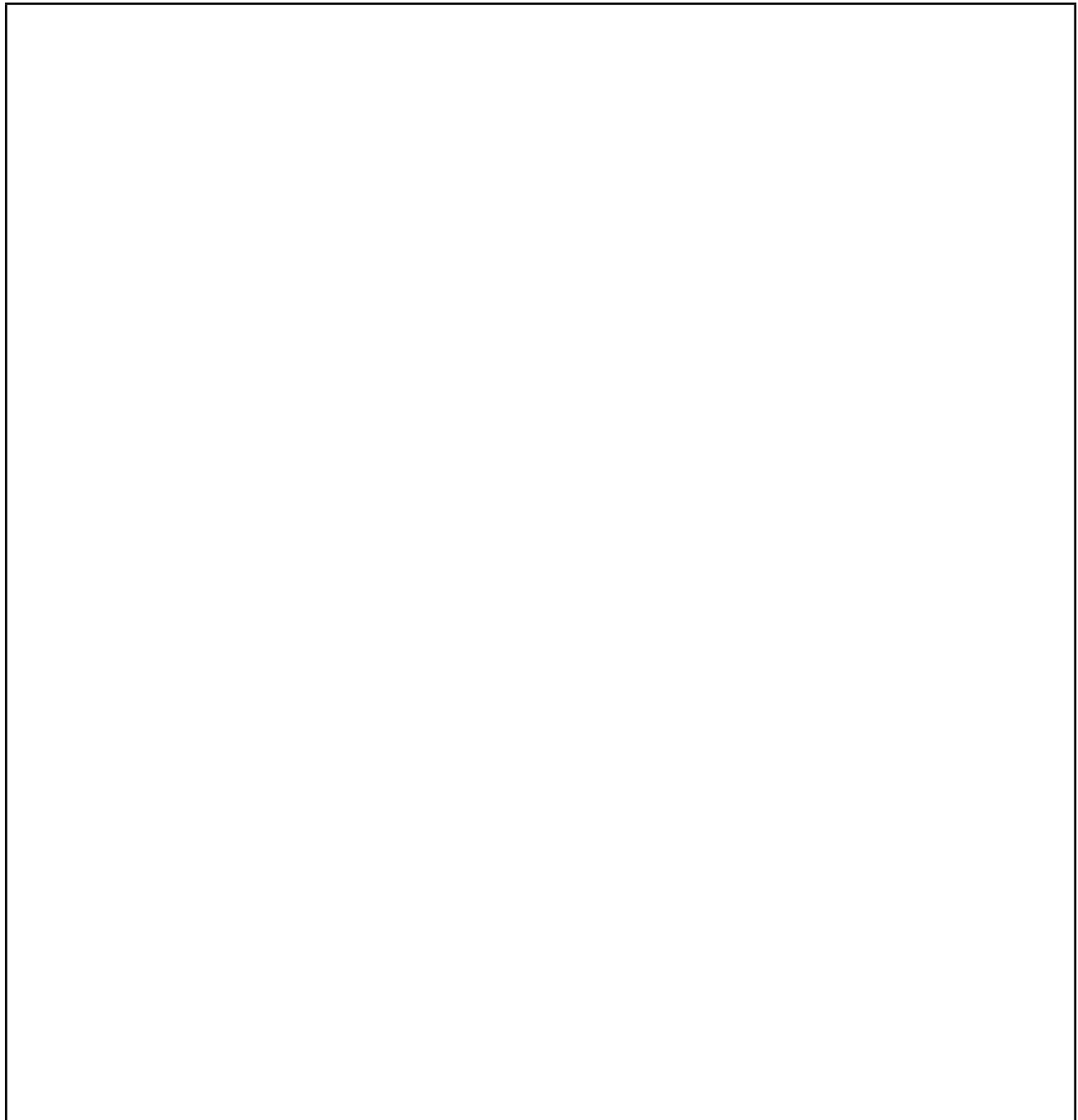




## Pin the Placemark on My School *(cont.)*

- 4 Draw a map of your classroom and add icons to show some special parts of your classroom.

### My Classroom







## Saving Our Places

### Standard

Students know the physical and human characteristics of the local community (e.g., neighborhoods, schools, parks, creeks, shopping areas, airports, museums, sports, stadiums, hospitals).

### Google Earth Tools

- Layers panel: Places\*
- Places panel: Folders\*
- Toolbar: Placemark

### Overview

Students will use Google Earth tools to make folders in which they can collect and organize places they visit.

### Vocabulary

- icon
- landmark
- location

### Materials

- *Neighborhood Knowledge* activity sheets (pages 88–90)

### Procedure

1

Distribute the *Neighborhood Knowledge* activity sheets (pages 88–90) to students and open Google Earth. Show students the **Places panel** and tell them that this is where you will organize and keep all the placemarks that the class will make together.

2

Tell students that the first folder you make will be to keep all the places that are about your class, like your school and other places in your neighborhood. Right-click on **My Places** and select **Add**, and then select **Folder**. In the **New Folder window**, name the folder something like *Room 8* or *Mrs. B's Class*, and then click **OK**. Have students write the name of the folder on their activity sheets (question 1).

3

Center the **3D viewer** over your town or neighborhood, with your school in the center and **zoom** until the town or neighborhood around your school fills the **3D viewer**. Turn on the **Places layer** in the **Layers panel**. Tell students that an icon on a map is a picture that shows you what kind of place is there. Ask students to guess what some of the different **place icons** mean.

\* Tool introduced in this lesson



## Saving Our Places *(cont.)*

### Procedure *(cont.)*

**4** Help students find a familiar building or park near your school. If the location has an icon, right-click on the icon and select **Save to My Places**. If this familiar location does not already have an icon, add a **placemark** and a label. In the **Places panel**, drag the **placemark** or **place icon** into the folder you created in step 2. Tell students to write the name of this place on the top line of the folder on their activity sheets (question 2).

**5** **Zoom** in on different areas around your school and help students identify four other places they recognize, such as parks, shopping areas, hospitals, rivers, lakes, freeways, airports, golf courses, or other landmarks. Save each location in the folder you created in step 2. As students view each place, have them write the location in the folder on their activity sheets and create an icon that represents the place (question 2).

**6** With students, brainstorm some community helpers that work at the different locations students wrote in their folders. Have students draw and describe a community helper (question 3).

**7** Tell students to write their names on the second folder on their activity sheet. This folder will be for places that they have been or want to visit (question 4).

**8** Ask students to think of at least three places they have been to (a relative's house, a favorite vacation spot, their favorite park or restaurant), write the names of the places in the folder, and draw an icon for each (question 5).

### Extension Activities

- Have students create their own folders in Google Earth, then **Fly to, placemark**, and save the locations they listed on their activity sheets.
- Has your class been on a field trip or are you planning to go on one? If so, **Fly to** that location in Google Earth, **placemark** it, and save it in your class folder. Navigate around and look for places of interest on the road to and from your field trip destination.

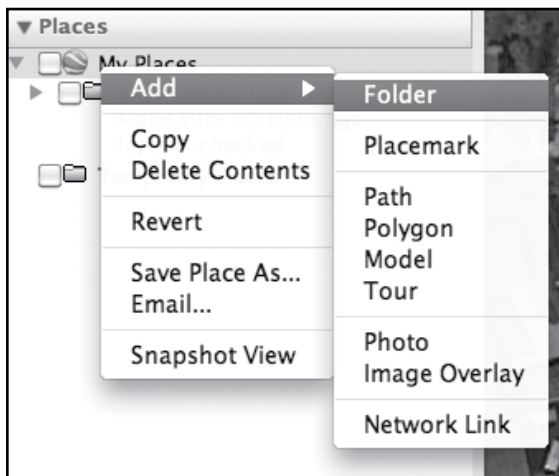


## Saving Our Places *(cont.)*

### User Tip

Students will probably want to look for their own homes. This could raise privacy and security issues, so be sure to follow school policy and use professional discretion.

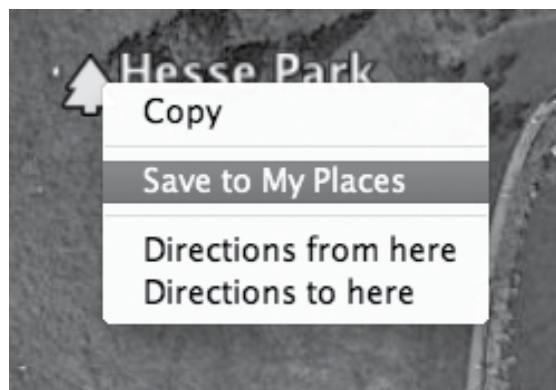
### Screenshots



Adding a folder in the Places panel



Place icons



Saving an icon to the My Places folder



Name \_\_\_\_\_ Date \_\_\_\_\_

## Neighborhood Knowledge

- 1 On the first line of the folder below, write the name of the folder where your teacher will keep all the placemarks for your class.
- 2 As you find each location in Google Earth, write its name on the folder and draw an icon for it.

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## Neighborhood Knowledge *(cont.)*

- 3 Draw a community helper who works in your neighborhood and write a sentence about how they help.

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## Neighborhood Knowledge *(cont.)*

- 4 Write your name on the first line on the folder below.
- 5 On your folder, write three places you have been or would like to visit and draw icons for them.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Making Literature Connections

### Standard

Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).

### Google Earth Tools

- Layers panel: 3D Buildings\*
- Places panel: Folders
- Toolbar: Placemark

### Overview

Students will use Google Earth to explore the setting of a book and begin to build a folder for keeping book settings in Google Earth.

### Vocabulary

- 3D view
- ground-level view

### Materials

- *Places in Books* activity sheets (pages 94–96)
- *Madeline* (Bemelmans 1939)

### Procedure

1

Tell students that today you will make a Google Earth folder to save places students see in books. In the **Places panel** under **My Places**, create a folder titled, *Our Books*, *Room 9's Books*, or something similar.

2

Read *Madeline* (Bemelmans 1939) to students. Tell students that this story takes place in the city of Paris, France. Ask students to pay attention to the illustrations and look for places they might be able to find in Google Earth. Right-click on the books folder and add a subfolder for *Madeline*.

3

Distribute copies of the *Places in Books* activity sheets (pages 94–96) to students and open Google Earth. **Fly to** Paris, France. Turn on the **3D Buildings layer** in the **Layers panel**. Use the **Fly to box** to go to the following locations from the story:

- "Opera Garnier" ("They smiled at the good")
- "Place Vendome" ("and frowned at the bad")
- "Cathedrale Notre-Dame de Paris" ("in rain")
- "Jardin du Luxembourg" ("or shine")
- "Eiffel Tower" ("In a car with a red light..." and book cover)

\* Tool introduced in this lesson



## Making Literature Connections *(cont.)*

### Procedure *(cont.)*

- 4 At each landmark, **zoom** all the way in to **ground-level view**. Use the top arrow on the **Look joystick** to tilt your view up at the buildings, then use the right and left arrows to look around. Students can see a view as if they were standing right in front of the Eiffel Tower or in the Jardin du Luxembourg. **Placemark** each location and add it to the *Madeline* folder.
- 5 Have students choose one location from the story and draw it on their activity sheets. They will draw the overhead Google Earth view and the **ground-level** 3D view (questions 1 and 2).
- 6 Have students compare the two views and write about how they are the same (question 3) and different (question 4).
- 7 Have students write “My Books” on the folder on their activity sheets and list some other places from books they have read that they would like to visit in Google Earth (question 5).

### Extension Activities

- Let students play with Google Earth’s **3D Buildings** layer. Can they land on top of the Eiffel Tower? Use the **Look joystick** to get a 360-degree view of Paris. Try going inside Notre Dame to view the beautiful architecture.
- Have students **Fly to** and visit some of the places from books that they listed on their activity sheets. Some other options include:
  - *A Bear Called Paddington*, Paddington Station, London, England
  - *The Cricket in Times Square*, New York City

### Did You Know?

**Street View** and the **3D Building layer** are realistic and offer an excellent opportunity for students to relate something they are familiar with to a map. Always return to a view from above after exploring at the street level to insure students continue to learn about maps and regions.





## Making Literature Connections *(cont.)*

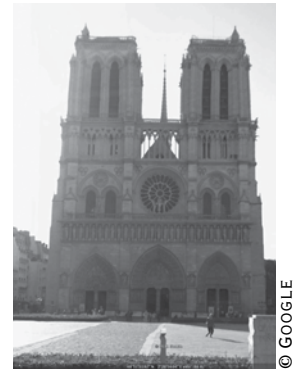
### User Tip

With the **3D Buildings layer** on, you can see a computer-modeled **ground-level view**. You can also see a photographic **Street View** (where available). Drag the orange **pegman icon** (above the **zoom slider**) and drop it where you want to see a **ground-level view**. To return to regular navigation, click **Exit Street View** or **Exit ground-level view**. Hit the "u" key on your keyboard to return to an overhead view.

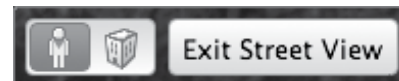


3D Buildings view

GRAY BUILDINGS © 2011 CYBERCITY,  
IMAGE © 2011 AERODATA INTERNATIONAL  
SURVEYS, IMAGE © 2011 DIGITALGLOBE,  
IMAGE © 2011 IFN-FRANCE, © GOOGLE



Street View



### Screenshot



IMAGE © 2011 AERODATA INTERNATIONAL SURVEYS © GOOGLE

Paris, France



Name \_\_\_\_\_ Date \_\_\_\_\_

## Places in Books

- 1 Draw a place from the story as you saw it from overhead in Google Earth.





## Places in Books *(cont.)*

- 2 Draw what the same place looked like in the ground-level view on Google Earth.



## Places in Books *(cont.)*

3 Write one thing that is the same in the pictures you drew.

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4 Write one thing that is different in the pictures you drew.

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5 Write "My Books" as the title of this folder. List some places from books that you want to look for in Google Earth.

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## Building History Connections

### Standard

Students know ways in which people depend on the physical environment (e.g., food, clean air, water, mineral resources).

### Google Earth Tools

- Layers panel: 3D Buildings
- Layers panel: More: Wikipedia\*
- Places panel: Folders
- Toolbar: Placemark

### Overview

Students will use the Wikipedia layer to learn about Egypt and create a *Things We Learned* folder to save placemarks related to their learning.

### Vocabulary

- pyramid
- sphinx

### Materials

- *Learn About Egypt* activity sheets (pages 100–102)

### Procedure

- 1 Distribute copies of the *Learn About Egypt* activity sheets (pages 100–102) to students and open Google Earth. Tell students that today you will make a folder to keep interesting places that the class learns about in Google Earth. Create a folder in the **Places panel** called *Things We Learned*.
- 2 **Fly to** the Great Pyramid of Giza, Egypt. Show students an overhead view of the pyramids and the Sphinx. **Placemark** the pyramids and the Sphinx and add them to the folder you created. On their activity sheets, have students draw the overhead view of the pyramids (question 1).
- 3 Ask students to think of two questions they have about the pyramids or the Sphinx and write them on their activity sheets (question 2).
- 4 Turn on the **3D Buildings layer** in the **Layers panel** and **zoom in** to explore the pyramids and the Sphinx with students. Ask students to choose a 3D view and draw it on their activity sheets (question 3).

\* Tool introduced in this lesson



## Building History Connections *(cont.)*

### Procedure *(cont.)*

- 5 In the **Layers panel**, open the **More layer** and turn on the **Wikipedia layer**. You will see **Wikipedia icons** appear in the **3D viewer**. Click each icon to open a **Wikipedia window** giving information about that location. View a few of these with students, read information that students might find interesting, and view photographs.
- 6 On their activity sheets, have students write two things they learned about Egypt using Google Earth (question 4).
- 7 Ask students to name places they learned about previously in Google Earth (e.g., the Statue of Liberty, Hawaii, Golden Gate Bridge, Mt. Taranaki). **Fly to** these places, **placemark** them, and add them to the *Things We Learned* folder. Use the **Wikipedia icons** to learn one new fact about each place.
- 8 On their activity sheets, have students sort the places they have visited in Google Earth by drawing lines from the place names to the folders. Remind students that some places may go in more than one folder (question 5). Have them write two more places of their own choice that are not on the list and sort them into the folders.

### Extension Activity

Another famous place in Egypt is the Aswan High Dam. **Fly to** it and navigate to a view that highlights the dam. Use the cursor and the **elev** display in the **Status bar** to find the difference in levels of the river on each side of the dam. Turn on the **Wikipedia layer** and read about the Aswan High and Low Dams.



### User Tips

Another layer with information about some places is the **National Geographic Magazine layer** in the **Gallery layer**. Open this layer and turn on the **Feature Article & Photographs layer** to see yellow boxes that indicate an article in National Geographic magazine. **Fly to** the Great Pyramid of Giza, Egypt, and click the **National Geographic icon** titled **Ancient Marvels**. A **National Geographic window** will appear. Click on **Read more...** and the **3D viewer** will be replaced by an **Internet viewer** with the complete article. To return to the **3D viewer**, click on **Back to Google Earth** at the top left of the **Internet viewer**.



## Building History Connections *(cont.)*

### Screenshots



IMAGE © 2011 DIGITALGLOBE © GOOGLE

### Giza Necropolis, Egypt



IMAGE © 2011 GEOEYE, IMAGE © 2011  
DIGITALGLOBE, © GOOGLE

### Sphinx in 3D View

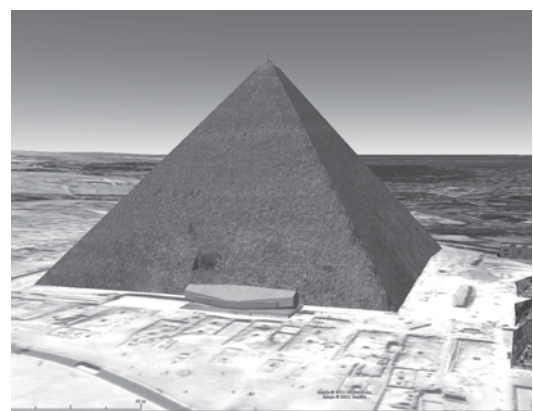
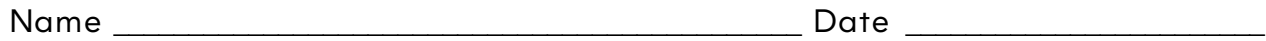



IMAGE © 2011 GEOEYE, IMAGE © 2011  
DIGITALGLOBE, © GOOGLE

### Pyramids in 3D View





1 Draw the overhead view of the pyramids that you see in Google Earth.



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- 
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-





## Learn About Egypt *(cont.)*

- 3 Draw either a pyramid or the Sphinx as you see it in Google Earth 3D View.

- 4 Write two things you learned about Egypt on Google Earth.

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## Learn About Egypt *(cont.)*

- 5** Draw a line from each place listed below to the folder(s) you think it should go in. Then, write two more places you have seen or want to see in Google Earth and draw lines to the folder(s) you think they should go in.

My School

Great Pyramid of Giza

Golden Gate Bridge

The Eiffel Tower

My Neighborhood

The Sphinx

---

---

About Me

My Books

Things I Know



## Exploring the Setting of a Book

### Standards

Students use descriptive words to convey basic ideas, and uses adjectives in written compositions.

Students know areas that can be classified as regions according to physical criteria.

### Google Earth Tools

- Layers panel: Borders and Labels
- Layers panel: Photos\*
- Places panel: Folders
- Toolbar: Placemark

### Overview

Students will explore the settings of *One Morning in Maine* in Google Earth as a means of further understanding the story.

### Vocabulary

- harbor
- landing
- shoreline

### Materials

- *Into the Book* activity sheets (pages 106–108)
- crayons
- *One Morning in Maine* (McCloskey 1952)

### Procedure

1

Tell students that the setting of a book is where the story takes place. Ask students if all settings in books are real. Ask students to name some imaginary settings in books that cannot be found in Google Earth (e.g., Oz, Neverland, Mr. McGregor's Garden).

2

Show students the cover of the book *One Morning in Maine* (McCloskey 1952) and ask them what they can predict about where the story takes place from the title and cover illustration. Ask students if they can tell what state the story will take place in. Also ask students whether they think the story will happen in the mountains of Maine or along the seashore.

3

Distribute copies of the *Into the Book* activity sheets (pages 106–108) to students and open Google Earth. **Fly to** Maine and **zoom** to an **Eye alt** of about 1,000 km (700 mi.) and turn on the **Borders and Labels layer**. Point out the state boundaries and the part of the state that is seashore. Ask students to trace the shoreline of Maine on the map on their activity sheet (question 1) and have them write three adjectives to describe the shoreline (question 2).

\* Tool introduced in this lesson



## Exploring the Setting of a Book *(cont.)*

### Procedure *(cont.)*

**4** Read the first page of *One Morning in Maine* and ask students if they now know exactly where in Maine the story takes place. **Fly to** Buck's Harbor, Machiasport, Maine, and tell students that this story takes place in a real location called Buck's Harbor. Ask students whether this location is in the mountains or along the seashore. Explain to students that a harbor is a place where ships dock and can find protection from rough seas. **Placemark** Buck's Harbor and add it to a new subfolder in your books folder named *One Morning in Maine*. **Zoom** in and out to help students draw an X on their maps where Buck's Harbor is located (question 3).

**5** Read the rest of the book and show students the illustrations. Call students' attention to the pictures in the book that show what Sal's island looks like. Ask students if they see cities, trees, rivers, beaches, or crops. **Zoom** out to an **Eye alt** of about 2.5 km (8,000 ft.) and look for Bar Island, the real-life inspiration for Sal's island. **Placemark** Bar Island and add it to the *One Morning in Maine* folder. **Zoom** in closer to see the different parts of the island. Ask students to color in the map of Bar Island using blue for the ocean, tan for the beaches, and green for the forested land (question 4).

**6** As Sal goes down to help her father dig for clams, she meets several animals: a fish hawk, a loon, a seal, a sea gull, and a baby clam. Look at Sal's island and the surrounding water and help students determine the island habitat where Sal found each animal. Have students draw one animal in each habitat on their activity sheets (question 5). Placemark these animals and add them to the *One Morning in Maine* folder.

**7** Read aloud the following excerpt from the book:

*The harbor was full of boats, and Sal's father rowed their boat among them, up to a landing, and tied it so it would not drift away while they were at the store.*

Ask students to use the context of the sentence to define the words *harbor* and *landing*. Help students identify Buck's Harbor and its landing using Google Earth.

**8** Turn on the **Photos layer** and look for **photo icons** in Buck's Harbor. Click on one to see what the boats look like from Sal's view. These are photos that people who have visited Buck's Harbor have taken and posted in Google Earth.

**9** On their activity sheets, have students write the names of three books whose settings might be found in Google Earth (question 6).



## Exploring the Setting of a Book *(cont.)*

### Extension Activity

**Zoom** out to about 24 km (15 mi.) and look for other **photo icons**. Click on them to show students what the Maine seashore would look like if they were visiting, and then click the photo off to see the fish hawk's view. Ask students if "rocky" or "sandy" would best describe the Maine seashore. Ask students to think of more describing words.

### Did You Know?

Robert McCloskey spent many of his summers on Scott Island in Maine with his wife and daughters, Sally and Jane. Scott Island was the setting for *Blueberries for Sal*. Mr. McCloskey also spent time in Boston, which inspired his most famous book, *Make Way for Ducklings*.

### Screenshot

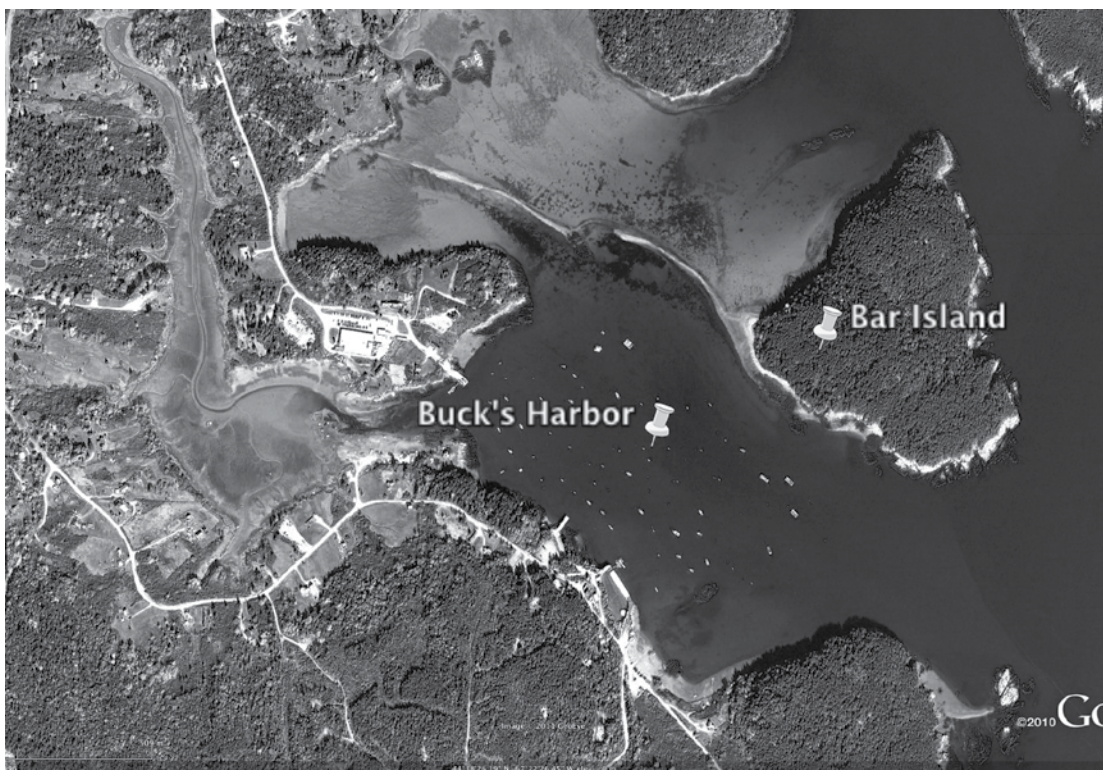


IMAGE © 2011 GEOEYE, © GOOGLE

**Buck's Harbor and Bar Island, Maine**

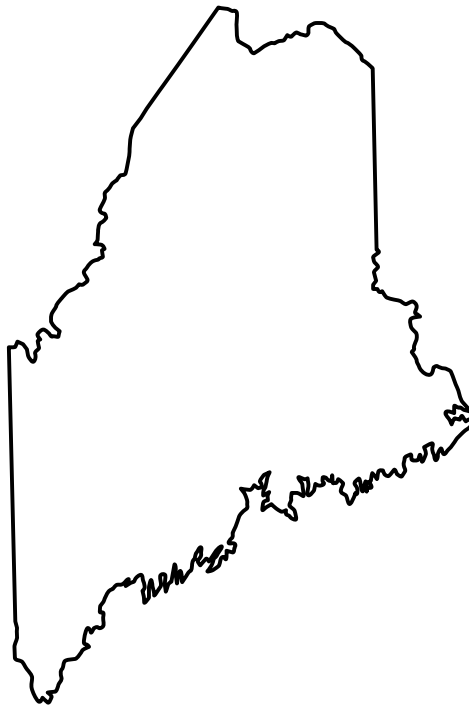


Name \_\_\_\_\_ Date \_\_\_\_\_

## Into the Book

- 1 Trace the shoreline of Maine.

**Maine**



- 2 Write three adjectives that describe the shoreline of Maine.

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- 3 Put an X on Buck's Harbor on the map.

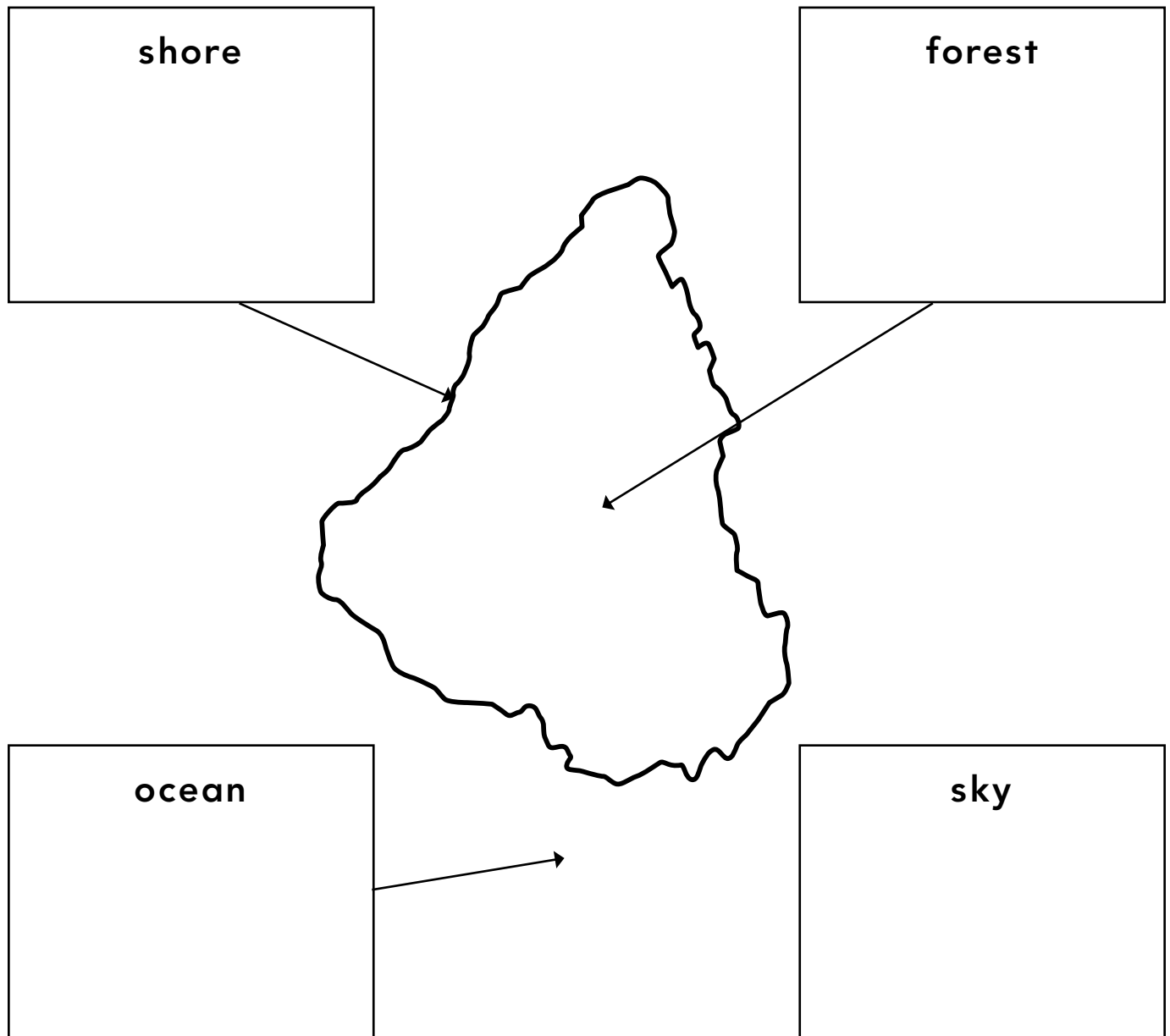




## Into the Book *(cont.)*

**4** Color the map of Sal's island below to show the ocean, the beaches, and the forest.

**5** Draw one of the animals that Sal saw in each habitat.





## Into the Book *(cont.)*

- 6 Write the names of three books that happen in places you might find in Google Earth.

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## Mapping the Setting of a Book

### Standards

Students know setting, main characters, main events, sequence, narrator, and problems in stories. Students know the absolute and relative location of a community and places within it (e.g., parks, stores, landmarks).

### Google Earth Tools

- Layers panel: Photos
- Toolbar: Path\*
- Toolbar: Placemark

### Overview

Students will create a path in Google Earth to show the movements of characters in a story.

### Vocabulary

- park
- square
- statehouse

### Materials

- *Mapping a Book* activity sheets (pages 112–114)
- *Make Way for Ducklings* (McCloskey 1941)

### Procedure

1

Read *Make Way for Ducklings* (McCloskey 1941) aloud to students. As you read, have students help you make a list of the sites that the ducks pass over in their search for a home that “looks like just the right place to hatch ducklings.”

2

Distribute copies of the *Mapping a Book* activity sheets (pages 112–114) to students and open Google Earth. **Fly to** Public Garden, Boston, Massachusetts. **Zoom** in to the Public Garden and use the **navigation tools** and **Photos layer** to investigate the pond. On their activity sheets, have students check off the features from the book that they find in the Public Garden (question 1). When students have finished, turn off the **Photos layer**.

3

Create a new folder called *Make Way for Ducklings* in your books folder. **Placemark** the Public Garden pond. **Fly to** and **placemark** the Massachusetts Statehouse and Louisburg Square (a tree-covered oval park). Using the view in Google Earth, discuss what a park, a statehouse, and a square are with students, and why these were not good places for ducks to lay eggs. Have students write labels for all three **placemarks** on the map on their activity sheets (question 2).

\* Tool introduced in this lesson



## Mapping the Setting of a Book *(cont.)*

### Procedure *(cont.)*

- 4 **Fly to** Longfellow Bridge. **Zoom** in to an **Eye alt** of about 450 m (1,500 ft.) so students can see the bridge in more detail. Does it look like the bridge in *Make Way for Ducklings*? Have students look for a nearby island. **Placemark** the island and have students label the placemark on the map on their activity sheets (question 2).
- 5 **Zoom** out to about 2 km (1.2 mi.). Click the **path tool** in the **Toolbar**. You will see a **Path window** and a square **path cursor** in the **3D viewer**. Name the **path** *Ducks' Flight*. Place the **path** cursor over the Public Garden pond **placemark** in the **3D viewer** and click once to start the path. Move the cursor to the State House and click again. You will see a line connecting the two places. Click on Louisburg Square and then the ducks' little island. Click **OK** in the **Path window**. Ask students to draw a similar path on the map on their activity sheet (question 3).
- 6 You will see a *Ducks' Flight* path in either the **Places panel** or the **Search panel**. Drag it to the *Make Way for Ducklings* folder.
- 7 Review with students the **path** the ducks flew while looking for a nesting place. Have students move their finger along the **path** they drew on their activity sheet as you move the along the **path** in Google Earth. At each place the ducks investigated, discuss with students why it is not a good place to raise ducklings. When you reach the island, talk about why Mrs. Mallard chose this spot for her nest.
- 8 Have students pretend they are Mr. or Mrs. Mallard and write about what they saw as they flew over Boston looking for a place to build their nest (question 5).

### Did You Know?

Beacon Hill is actually an area in Boston, not a hill. The State House and Louisburg Square are in the Beacon Hill area. Beacon Hill is bounded by Beacon Street to the south, Somerset Street to the east, Cambridge Street to the north, and Storrow Drive along the riverfront to the west. Beacon Hill was once a real hill, but the hill was taken away to make Boston bigger by filling in the bay.



## Mapping the Setting of a Book *(cont.)*

### Extension Activities

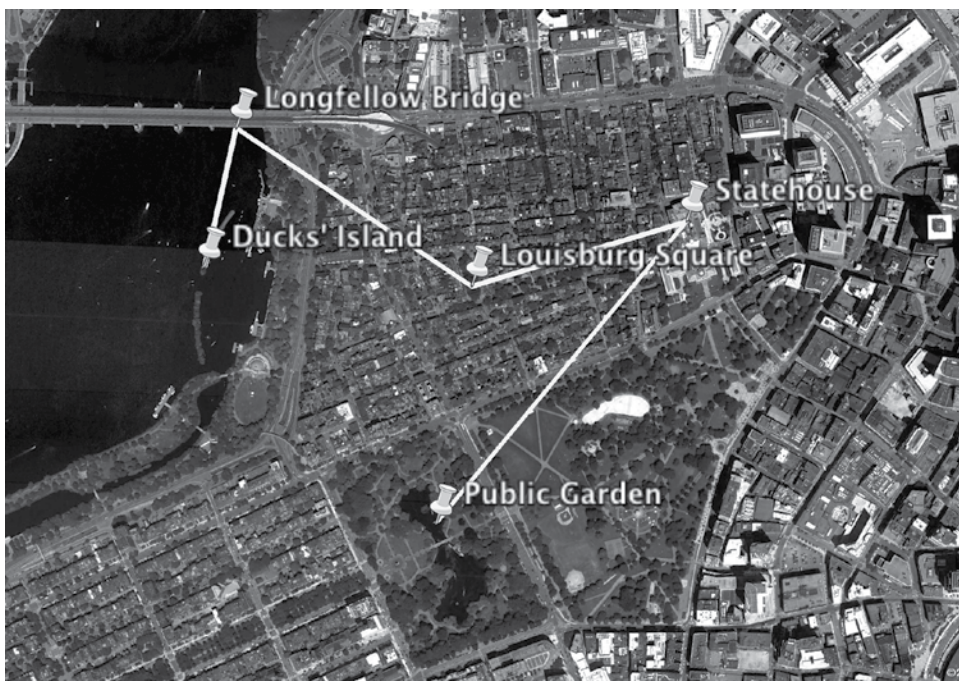
- With students, set **placemarks** and build a **path** showing the route Mrs. Mallard and the ducklings took on their walk from the river to the pond.
- Determine how far the ducks flew using the **ruler tool**. Measure the distances between each **placemark** and add them together to get the total distance. Look under the **Measurement tab** in the **Path window** to see the total distance of the **path**.

### User Tip

When you are creating a **placemark** or **path**, click once on the **folder** where you want to save it to highlight it. Then, when you set the **placemark** or **path**, it will automatically be saved in that folder.

When setting a **path**, be sure to use the **navigation tools** to move around to avoid adding unwanted points on the **path**. To delete a point, right-click on it and select **Delete**. To change a **path** after you have set it, right click on the path in the **Places panel** and choose **Get Info** (Mac) or **Properties** (PC) to open the **Placemark window**.

### Screenshots



Path tool

Ducks' flight path over Boston, Massachusetts



Name \_\_\_\_\_ Date \_\_\_\_\_

## Mapping a Book

- 1** On the chart below, check off each place or thing from the story as you find it in Google Earth.

<i><b>Make Way for Ducklings</b></i> places	<i><b>I found it! ✓</b></i>
Ducks' island	
Swan boats	
Lagoon bridge	
Swan boathouse	
<i>Make Way for Ducklings</i> statue	



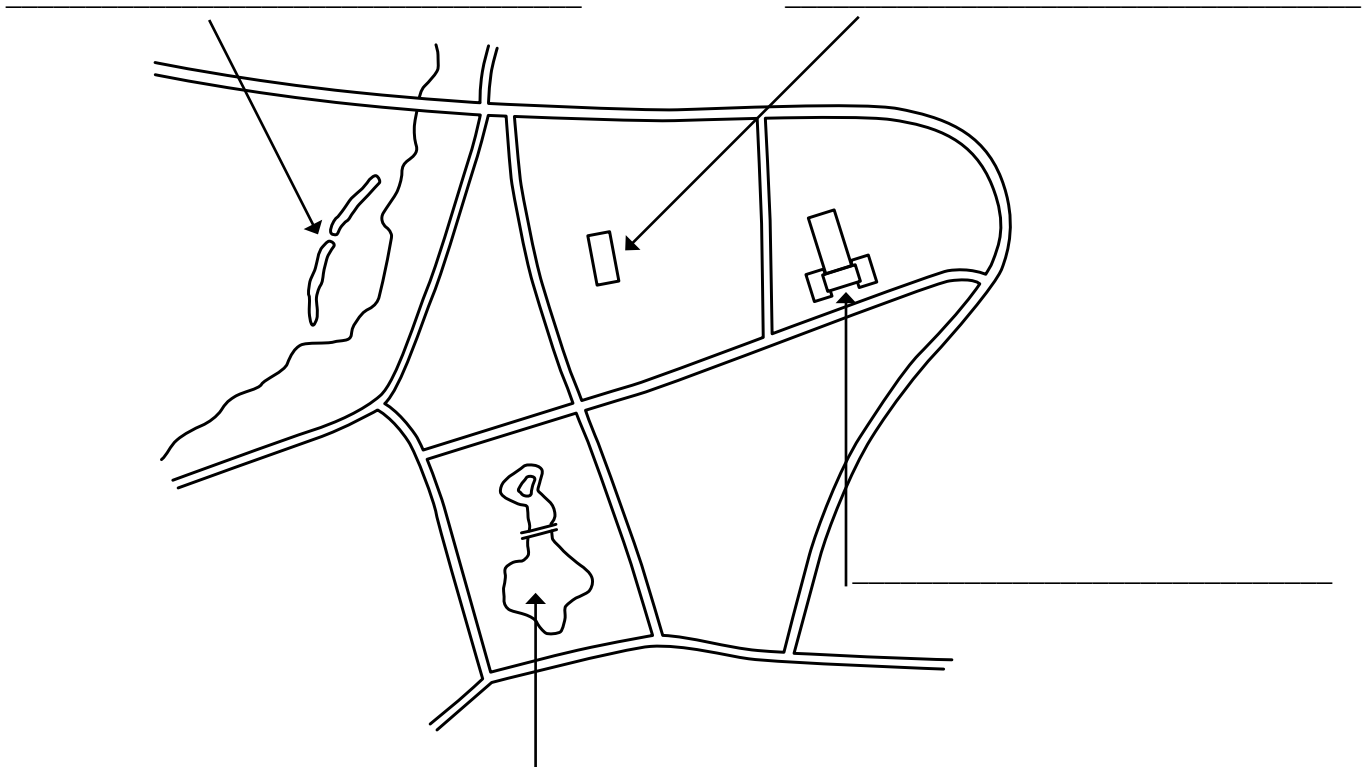


## Mapping a Book *(cont.)*

**2** On the map of Boston below, write labels for these places:

- The Public Garden Pond
- The Statehouse
- Louisburg Square
- Ducks' Island

**3** Draw lines to connect the places in the order the ducks flew from place to place.





## Mapping a Book *(cont.)*

- 5 Pretend you are Mr. or Mrs. Mallard. Write about what you saw as you flew over Boston looking for a place to build your nest.

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## Touring a Book

### Standards

Students know setting, main characters, main events, sequence, narrator, and problems in stories. Students know the role that resources play in our daily lives.

### Google Earth Tools

- Status bar: Eye alt
- Toolbar: Placemark
- Toolbar: Tour\*

### Overview

Students will illustrate the main theme of a story by touring the settings of a book.

### Vocabulary

- crop
- field
- plantation

### Materials

- *Book Tour* activity sheets (pages 118–120)
- *How to Make an Apple Pie and See the World* (Priceman 1994)

### Procedure

1

Read aloud *How to Make an Apple Pie and See the World* (Priceman 1994) to students. Distribute copies of the *Book Tour* activity sheets (pages 118–120) to students and open Google Earth. Create a new subfolder in your books folder called *How to Make an Apple Pie*.

2

**Fly to** and **placemark** each country that the girl visits in the story. For each **placemark**, choose a view that highlights what the girl found for her apple pie or the mode of transportation she used to get to her destination. Add the placemarks to the *How to Make An Apple Pie* folder. **Fly to:**

- Sabbioneta, Italy, to look for wheat crops.
- Gare de Lyon, Paris, France: This is one of the largest train stations in Paris.
- Mirissa Beach, Sri Lanka: **Zoom** out to an **Eye alt** of about 3 km (10,000 ft.) and look north of the beach about 7 miles for the tree-dotted hills of a cinnamon plantation.
- Dairyland Farm World, Cornwall, England: Look for pastures where dairy cows feed.
- Spring Plain, Jamaica: Look to the east about 1 mile for circular sugar cane fields.
- Happy Valley Orchard, Middlebury, VT: Look for rows of apple trees.

\* Tool introduced in this lesson



## Touring a Book *(cont.)*

### Procedure *(cont.)*

- 3 Have students draw the ingredient the girl found at each place on the map on their activity sheets, and draw a line from each box to the correct place on the map (question 1).
- 4 Tell students that when they have several **placemarks** that tell a story, they can make a **tour** of their **placemarks**. Use the cursor to drag and drop the **placemarks** in your *How to Make an Apple Pie* folder to put them in the order they appear in the book. Double-click on the first **placemark**.
- 5 Click the **tour tool** in the **Toolbar**. You will see a **record-tour panel** in the lower-left of the **3D viewer** that looks similar to DVD player controls. To start recording a tour, click the **start/stop button**, which will turn red. Wait a second and then double-click on the second **placemark** in the folder. The **3D viewer** will navigate to this **placemark**. Double-click each **placemark** in the folder in order, pausing at each place, until you reach the last **placemark**. Click the **start/stop button** to end the tour.
- 6 A **play-tour panel** will appear and the **tour** will automatically start playing. The **play-tour panel** includes (from the left) **go back**, **play**, and **fast forward buttons**, a **tour slider**, an indicator of the **current time** of the **tour**, a **repeat button**, and a **save button**.
- 7 Play the **tour** by double-clicking on it in the **Places panel**. As the **tour** moves from place to place, ask students to look at the chart on their activity sheets and see what method of transportation the girl used on each leg of her journey (question 2).
- 8 Discuss with students each mode of transportation the girl used and whether it was the best choice. For example, could you go in a car from Sri Lanka to England? Would a bus be the best way to get from Vermont to your hometown? On their activity sheets, have students write the mode of transportation they would use for each leg of the journey in the third column of the chart (question 2). Have students write a story about part of their journey (question 3).



## Touring a Book *(cont.)*

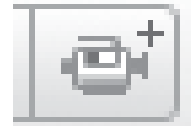
### Extension Activity

Have students research the origins of ingredients in their favorite foods and use Google Earth to find where they come from. Create a **tour** showing the path this food took to get to your students.



Sri Lanka cinnamon plantation

### Screenshots

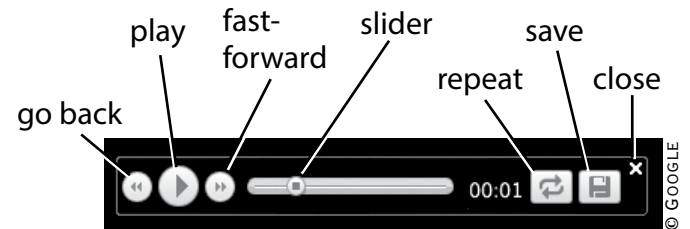


© GOOGLE

Tour tool



record-tour panel buttons



Play-tour panel



Jamaica sugar plantation



Name \_\_\_\_\_ Date \_\_\_\_\_

## Book Tour

- 1 On the map below, write or draw the ingredient found at each place in the story. Draw a line from each box to the correct place on the map.

**England****France****Italy****Vermont****Jamaica****Sri Lanka**





## Book Tour *(cont.)*

- 2** How would you travel to get the ingredients for your apple pie? Fill in the chart below.

Trip	How did the girl travel?	How would you travel?
Home to Italy	ship	
Italy to France	train	
France to Sri Lanka	sailboat	
Sri Lanka to England	car	
England to Jamaica	banana boat	
Jamaica to Vermont	airplane	
Vermont to Home	bus	



## Book Tour *(cont.)*

- 3 Choose two parts of the journey from the chart. Write an imaginary story about traveling and finding ingredients for your own apple pie.

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## Narrating a Book

### Standards

Students read aloud familiar stories, poems, and passages with fluency and expression.

Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).

### Google Earth Tools

- Layers panel: 3D Buildings, Borders and Labels
- Toolbar: Placemark: Snapshot View\*
- Toolbar: Tour: Audio\*

### Overview

Students will narrate a story and record it in Google Earth to share with their class.

### Vocabulary

- lighthouse
- microphone
- storyboard

### Materials

- *Put the Story in Order* activity sheets (pages 124–126)
- *The Little Red Lighthouse and the Great Gray Bridge* (Ward 1942)
- reference scale index card (from *Creating Reference Scales* lesson, pages 73–75)

### Procedure

- 1 Read *The Little Red Lighthouse and the Great Gray Bridge* (Ward, 1942) to your students.
- 2 Distribute the *Put the Story in Order* activity sheets (pages 124–126) to students and open Google Earth. **Fly to** George Washington Bridge, New York. **Placemark** the bridge, name the **placemark** *The Great Gray Bridge*, and save it in a new subfolder in your books folder called *The Little Red Lighthouse and the Great Gray Bridge*.
- 3 Look on the east shore at the base of the tower for the little red lighthouse. **Zoom** in and **placemark** it. Use your reference scale card (from the *Creating Reference Scales* lesson, pages 73–75) to compare the bridge and the lighthouse to your school, and have students sketch all three to scale on their activity sheets (question 1).
- 4 Turn on the **3D Buildings layer** and **zoom** in to the lighthouse. Using the **Look joystick**, ask students to pretend they are the lighthouse and look up at the bridge looming overhead.

\* Tool introduced in this lesson



## Narrating a Book *(cont.)*

### Procedure *(cont.)*

- 5 Turn off the **3D Buildings layer** and turn on the **Borders and Labels layer**. **Zoom** out to find out what two states the bridge connects. Ask students to think about how people got across the Hudson River before they built this bridge. Have students name ways to cross a river without a bridge. Have students look along the riverbanks south of the bridge for boats.
- 6 Read the book again and ask students to choose **placemark** views that show what is happening in each scene as you go through the story. To change the view of **placemarks** you have already made, navigate to the view you want, right-click on the **placemark** in the **3D viewer**, and select **Snapshot View**. The new view will be attached to that **placemark**.
- 7 As you create **placemarks** to go with the story, have students choose four scenes and draw each view in order on the storyboard on their activity sheets (question 2).

- 8 Locate the microphone on your computer (see the *User Tip* on the next page). Click on the **start/stop button** in the **record-tour panel** to start the tour. Click the **microphone button** to record students' voices as they read each part of the story into the microphone while you move from **placemark** to **placemark**. Push the **record button** again to stop the **tour**. Play the **tour** from the **play-tour panel** to hear students' voices narrating the story.

### Extension Activity

Break students into groups and have each group search for and placemark a lighthouse from the list below, along with at least three natural and man-made features near the lighthouse. Have each group make a tour using the microphone to tell a story about their lighthouse. Show all the tours to your class.

- Tower of Hercules, Spain (northern end of the peninsula)
- Cape Reinga, New Zealand
- Sambro Island, Halifax, Nova Scotia, Canada
- Cape L'Agulhas, South Africa



## Narrating a Book *(cont.)*

### Did You Know?



After the George Washington Bridge was completed, the Little Red Lighthouse was decommissioned and scheduled to be dismantled. The plan resulted in a public outcry, mostly by fans of *The Little Red Lighthouse* and *The Great Gray Bridge*. The city of New York decided to instead preserve the lighthouse, and it is now a New York City landmark.

### User Tip

Desktop computers usually use external microphones so you will have to connect a microphone to your computer.

Laptop computers usually have built-in microphones that are on the top or in the front and are often identified with a picture of a microphone next to a small hole.

### Screenshot



George Washington Bridge and the Little Red Lighthouse, New York



Name \_\_\_\_\_ Date \_\_\_\_\_

## Put the Story in Order

- 1 Draw the bridge and the lighthouse. Draw your school under the bridge. Try to make your school the right size.







## Put the Story in Order *(cont.)*

- 2 Draw four scenes from *The Little Red Lighthouse and the Great Gray Bridge* in the right order.



## Put the Story in Order *(cont.)*



## Going Back in Time

### Standards

Students understand changes in community life over time.  
Students know how areas of a community have changed over time.

### Google Earth Tools

- Layers panel: 3D Buildings
- Toolbar: Clock\*

### Overview

Students will use Google Earth to view changes over time in major construction projects.

### Vocabulary

- construction
- timeline

### Materials

- *Old and New* activity sheets (pages 130–132)
- tape
- ten pieces of paper
- stickers
- *Ballpark: The Story of America's Baseball Fields* (Curlee 2008) (optional)

### Procedure

**Note:** Before beginning this lesson, have students help create a 10-decade timeline by taping ten pieces of paper together lengthwise. Mark one decade per sheet (1920–1929, 1930–1939, 1940–1949, 1950–1959, 1960–1969, 1970–1979, 1980–1989, 1990–1999, 2000–2009, 2010–2019), with the oldest decade on the left and the most recent on the right. Hang the timeline in front of the class.

1

Read a few pages and show some pictures from *Ballpark* (Curlee 2008) or another book about baseball. (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Distribute copies of the *Old and New* activity sheets (pages 130–132) to students. Show students that each sheet of paper on the large timeline they created is ten years, which corresponds to the marks on the timeline on their activity sheets. Help each student find the year they were born on the large timeline and place a sticker on that year. Then, have students draw a star or happy face on the year they were born on the timeline on their activity sheets (question 1).

\* Tool introduced in this lesson



## Going Back in Time *(cont.)*

### Procedure *(cont.)*

- 3** Open Google Earth and **Fly to** Yankee Stadium, Bronx, New York. Adjust the view to show both the present Yankee Stadium and the field to the southwest that once held the old Yankee Stadium. Be sure the **3D Buildings layer** is off. Tell students that this is Yankee Stadium, where the New York Yankees baseball team plays. Ask students to describe the stadium.
- 4** Click on the **clock tool** in the **Toolbar**. Call students' attention to the **timeline slider** in the upper-left corner of the **3D viewer** and tell them that each vertical bar represents an image that was taken at a different time.
- 5** Use the cursor to move the marker on the **timeline slider** back in time to the first available date at the left side of the bar. Tell students this shows Yankee Stadium in 1995. Tell students that Yankee Stadium was built in 1923, but they cannot see it in Google Earth because satellites did not exist to take photos of it back then. Write "Original Yankee Stadium Built" near 1923 on the large timeline. Have students draw the shape of the original Yankee Stadium in the box on their activity sheets (question 2).
- 6** Move the **timeline slider** slowly up in time, stopping on each vertical line on the **timeline slider** to watch what happens to Yankee Stadium. On the large timeline, mark the year students can see construction starting on the new stadium (2008), and the year the old stadium was torn down (2010).
- 7** Have students draw the shape of the new Yankee Stadium in the box on their activity sheets (question 3). Help students determine, using the timelines, whether they are older or younger than the original and new Yankee Stadiums (questions 4 and 5).
- 8** Think of some landmarks in your town or neighborhood that have changed over the last ten years. Try sports stadiums, golf courses, housing tracts, shopping malls, or anything recent that is large enough to be seen by satellite. Look at those locations in Google Earth and use the **timeline slider** to investigate the changes.
- 9** **Zoom** in on familiar places, such as your school. As you move the **timeline slider**, ask students to look for changes. Have students draw or write about one change that they observed in their school or neighborhood using the **timeline slider** in Google Earth (question 6).



## Going Back in Time *(cont.)*

### Extension Activity

**Fly to** and look at Beijing National Stadium, Beijing, China and FNB Stadium, Johannesburg, South Africa. Use the **timeline slider** to see the progress of construction at each site.



### Screenshots



Clock tool



Timeline slider



IMAGE U.S. GEOLOGICAL SURVEY, © GOOGLE

Old and New Yankee Stadiums, Bronx, New York



Name \_\_\_\_\_ Date \_\_\_\_\_

## Old and New

**Directions:** Follow the directions below to complete the timeline on the next page.

- 1 Draw a star or happy face near the year you were born.
- 2 In the first box, draw the shape of the original Yankee Stadium.
- 3 In the second box, draw the shape of the new Yankee Stadium.
- 4 Are you older or younger than the original Yankee Stadium?  
\_\_\_\_\_
- 5 Are you older or younger than the new Yankee Stadium?  
\_\_\_\_\_





## Old and New *(cont.)*

1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020
------	------	------	------	------	------	------	------	------	------	------

**Original Yankee Stadium,  
built in 1923**

**New Yankee Stadium,  
built in 2009**



## Old and New *(cont.)*

- 6 Draw one thing you saw in your school or neighborhood that changed.

**Before**

**After**



# Mapping Columbus

## Standards

Students know the journeys of Marco Polo and Christopher Columbus, the routes they took and what happened as a result of their travels.

Students know the modes of transportation used to move people, products, and ideas from place to place.

## Google Earth Tools

- Status bar: Eye alt
- Toolbar: Path, Tour
- Toolbar: Placemark: Placemark icon\*

## Overview

Students will use Google Earth to explore social studies by following the route of Columbus's first voyage.

## Vocabulary

- explorer
- voyage

## Materials

- *From Coast to Coast* activity sheets (pages 136–138)
- chart paper and markers
- crayons
- *Columbus* by D'Aulaire (1992) (optional)

## Procedure

1

Read aloud *Columbus* by D'Aulaire (1992) or another book about Columbus. (See the Recommended Literature List, Appendix F, page 242, for more titles.) As you read, record on chart paper the locations where Columbus stopped. The locations from the D'Aulaire book are:

- Palos de la Frontera, Spain
- Canary Islands, Spain
- San Salvador, The Bahamas
- Cuba
- Haiti

2

Distribute copies of the *From Coast to Coast* activity sheets (pages 136–138) to students. Review Columbus's journey with students. On their activity sheets, have students list the places Columbus went on his first voyage (question 1).

3

Open Google Earth. **Fly to** the first location on Columbus's journey, and **placemark** it. Click on the yellow thumbtack in the upper right of the **Placemark window** to change the **placemark icon**. Select the sailboat and then click **OK**. Click **Style, Color tab** in the **Placemark window**. Choose a color and scale for both the label and the icon. Leave the opacity at 100%. Name the **placemark** and click **OK**.

\* Tool introduced in this lesson



## Mapping Columbus *(cont.)*

### Procedure *(cont.)*

**4** **Placemark** the rest of the stops on Columbus's journey. Have all students draw the icons on the map on their activity sheets to show the stops on Columbus's first journey (question 2).

**5** **Zoom** out to a view that shows Columbus's entire path from Spain to America. Use the **path tool** to connect the **placemarks** in order and show Columbus's route. Customize the **path** by changing the color and width using the **Style, Color tab** in the **Path window**.

**6** Have students draw Columbus's route on the map on their activity sheet using the color of their choice (question 3).

**7** Arrange all the Columbus **placemarks** in order in a *Columbus* folder in your *Things We Learned* folder. Double-click on the first **placemark** in the folder, and then click the **tour tool**. The **record-tour panel** will open near the bottom left of the **3D viewer**. Click the **start/stop button** once to start recording. Double-click on each **placemark** in the folder to move the **tour** from one **placemark** to the next. When you have returned to Spain, click the **start/stop button** again to finish the **tour**. Save the **tour** to the *Columbus* folder.

**8** Replay the **tour** and have students pretend their finger is Columbus's ship by "sailing" their finger along the route on their map along with the tour. As they sail along, ask them what direction they are traveling in and have them answer questions 4 and 5 on their activity sheets.

**9** **Zoom** in to the middle of the Atlantic Ocean along Columbus's path at an **Eye alt** of 160 km (100 mi.). Use the top arrow of the **Look joystick** to find the horizon. Use the left and right arrows to look in all directions. Have students color Columbus's Ship (question 6) and write about how they would feel if they were a crew member on that ship in the middle of the ocean (question 7).

### Did You Know?



The Canary Islands were an important stopping point for explorers from Spain. The islands were Spain's southernmost and westernmost territory and provided a convenient location for repairs and restocking before setting off to the west or south.



## Mapping Columbus *(cont.)*

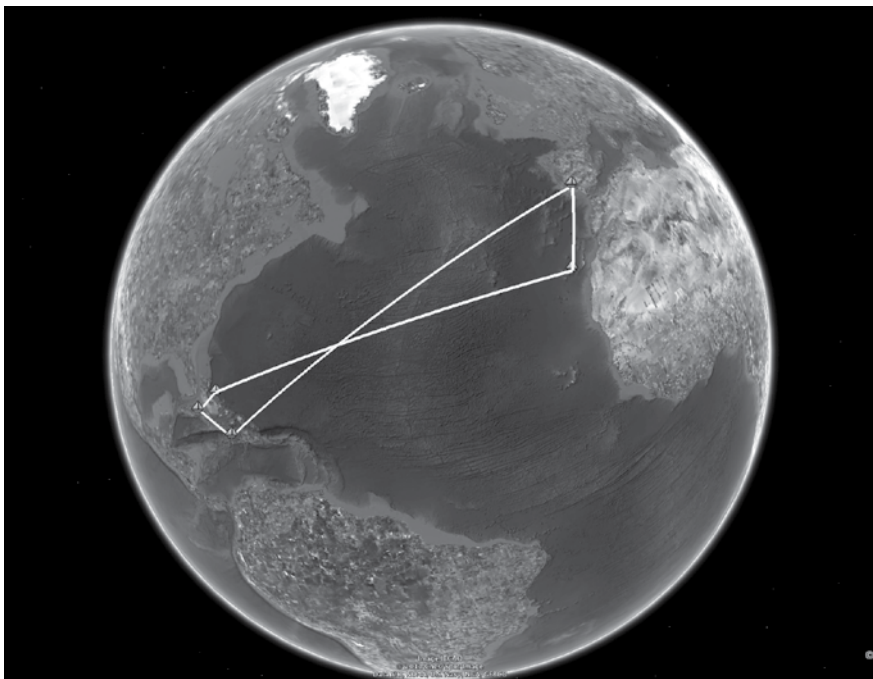
### Extension Activity

Have students investigate the journey the Pilgrims took. Read a book (or social studies text) that tells where the Pilgrims went on their journey. As you read the book, make a list of the places the Pilgrims started and stopped. Have students use Google Earth to **placemark** the Pilgrim's voyage and create a **path** showing their route. Encourage students to use a variety of icons to illustrate their path.

### User Tip

After you have created a **placemark** or **path**, edit or customize it by right-clicking or control-clicking on it and selecting **Get Info** (Mac) or **Properties** (PC) to open the **Placemark window**.

### Screenshots



DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO, © 2011 CNES/SPOT IMAGE, IMAGE IBCAO, IMAGE © 2011 TERRAMETRICS, © GOOGLE

Columbus's path



Name \_\_\_\_\_ Date \_\_\_\_\_

## From Coast to Coast

1

List the places Columbus visited on his first voyage.

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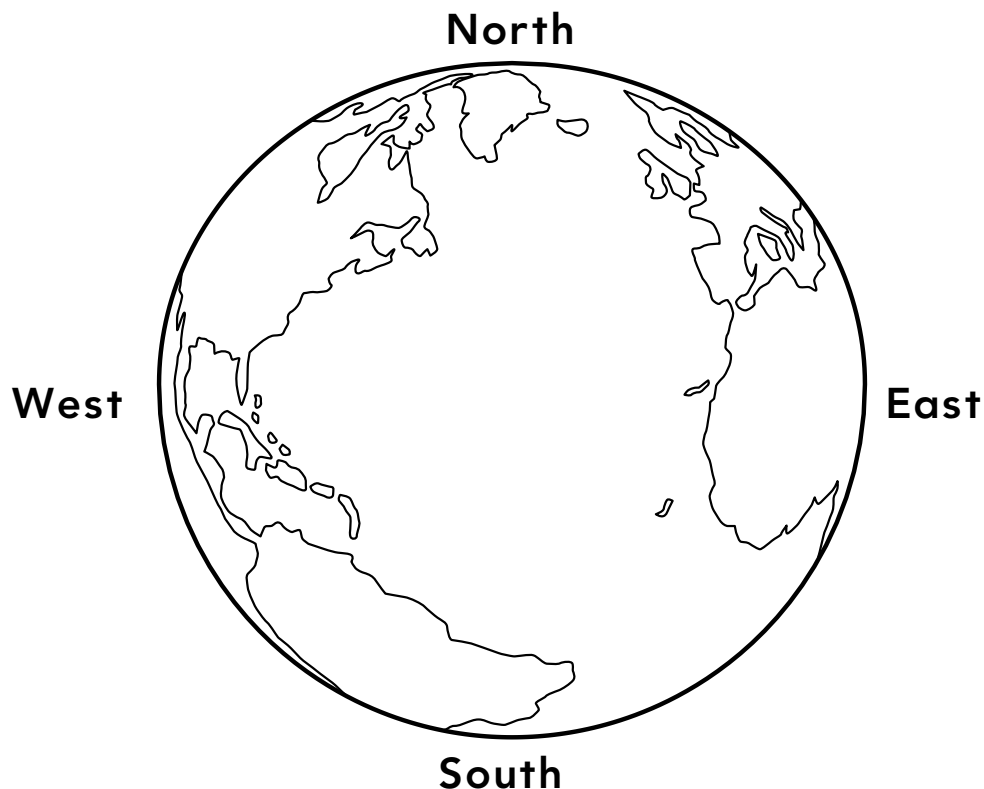
## From Coast to Coast *(cont.)*

- 2 Draw placemarks on the map below to show the places where Columbus went during his first voyage.
- 3 Draw a colored line connecting the placemarks to show Columbus's route.
- 4 In which direction did Columbus sail when he went from Spain to The New World?

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- 5 In which direction did Columbus sail when he returned to Spain?

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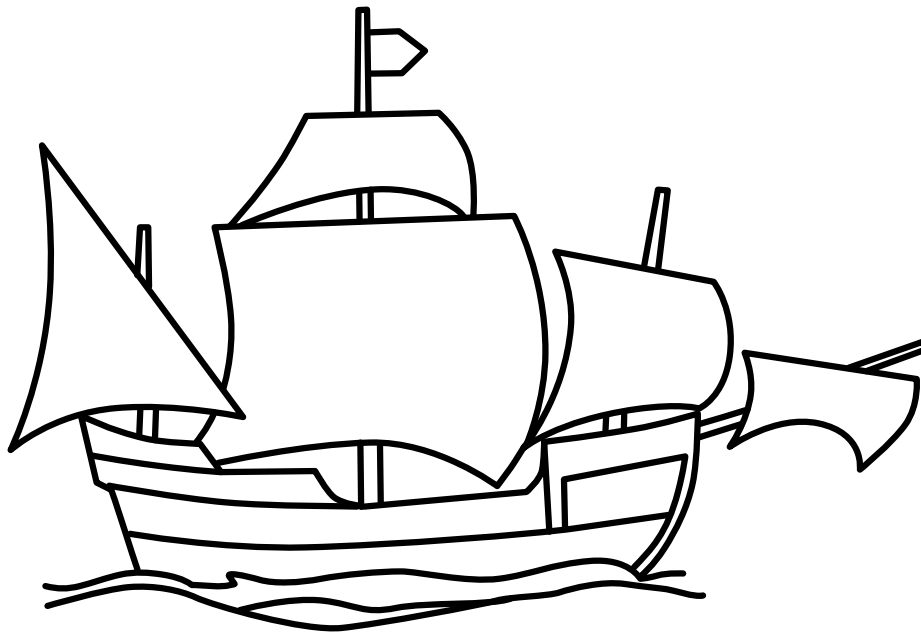




## From Coast to Coast *(cont.)*

**6**

Color this picture of Columbus's ship.

**7**

Write about how you would feel if you were a sailor on this ship at sea for many months.

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## Coming to America

### Standards

Students know why important buildings, statues and monuments (e.g., the White House, Lincoln Memorial, Statue of Liberty, Ellis Island, Angel Island, Mt. Rushmore, veterans' memorials) are associated with state and national history. Students know the basic components of culture.

### Google Earth Tools

- Layers panel: 3D Buildings
- Toolbar: Path, Placemark
- Zoom: Global, Regional, and Local view\*

### Overview

Students will explore national monuments and memorials and use the zoom power of Google Earth to explore the global, regional, and local view to help explain why these places are special.

### Vocabulary

- history
- immigration

### Materials

- *Immigration Stations* activity sheets (pages 142–144)
- reference scale card (*Creating Reference Scales* lesson, pages 73–75)
- *The Memory Coat* (Woodruff 1999) (optional)

### Procedure

1

Read *The Memory Coat* (Woodruff 1999) or another book about people coming to America. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Ask students if anyone in their families came here from another country. Tell students that between 50 and 100 years ago, many people came to America from Europe and Asia by boat, looking for a better life.

2

Tell students that when people from other countries came to live in America during those times, they had to pass through immigration to answer questions and explain why they wanted to live in America. The government of the United States chose Ellis Island in New York for people coming from Europe to go through immigration.

3

Distribute copies of the *Immigration Stations* activity sheets (pages 142–144) to students and open Google Earth. **Fly to** Ellis Island, New York, and **placemark** it in your *Things We Learned* folder. **Zoom** out and rotate the globe so Ellis Island and Europe are both in the **3D viewer**. Ask students to draw a possible **path** across the ocean from Europe to Ellis Island on the map on their activity sheets (question 1).

\* Tool introduced in this lesson



## Coming to America *(cont.)*

### Procedure *(cont.)*

**4** **Zoom** in to Ellis Island at an **Eye alt** of about 110 km (40 mi.). Tell students that it was a good first stop for immigrants because it is sheltered from waves and is close to the largest city in America, New York City.

**5** **Zoom** in to an **Eye alt** of about 8 km (26,000 ft). What would people coming to Ellis Island have seen as they arrived in New York Harbor? Explain to students that the Statue of Liberty faces the entrance to the harbor and she “greeted” immigrants as they sailed in. Turn on the **3D Buildings layer** in the **Layers panel**, **zoom** in, and use the **Look joystick** to simulate the view that immigrants would have seen as they entered the harbor.

**6** Return to an overhead view and **zoom** in until Ellis Island fills the **3D viewer**. Ask students to sketch the island and the main immigration building on their activity sheets (question 2). Use your reference scale card (from the *Creating Reference Scales* lesson, pages 73–75) to compare the main building on Ellis Island to your school.

**7** People coming to America from Asia also had to pass through immigration. **Zoom** to a global view and rotate Earth to see where Asia is compared to Ellis

Island. Ask students why Ellis Island would not be the best place for Asian immigrants to enter America.

**8** Tell students that people coming from Asia to America had to stop at Angel Island, California, in San Francisco Bay. **Fly to** Angel Island, California, and **placemark** it in the *Things We Learned* folder. On the map of the United States on their activity sheets, have students draw an icon and label Angel Island and Ellis Island (question 3).

**9** **Zoom** out to show all of San Francisco Bay. Do students recognize it from a previous lesson? With your cursor, trace the route boats would sail from Asia to Angel Island. Tell students that Angel Island was used for immigration from 1910 to 1940 and the Golden Gate Bridge was built between 1933 and 1937. Ask students to describe what people coming to Angel Island might have seen when their boat arrived in San Francisco Bay. Have students write one reason that made Ellis Island and Angel Island good first stops for immigrants (question 4).



## Coming to America *(cont.)*

### Procedure *(cont.)*

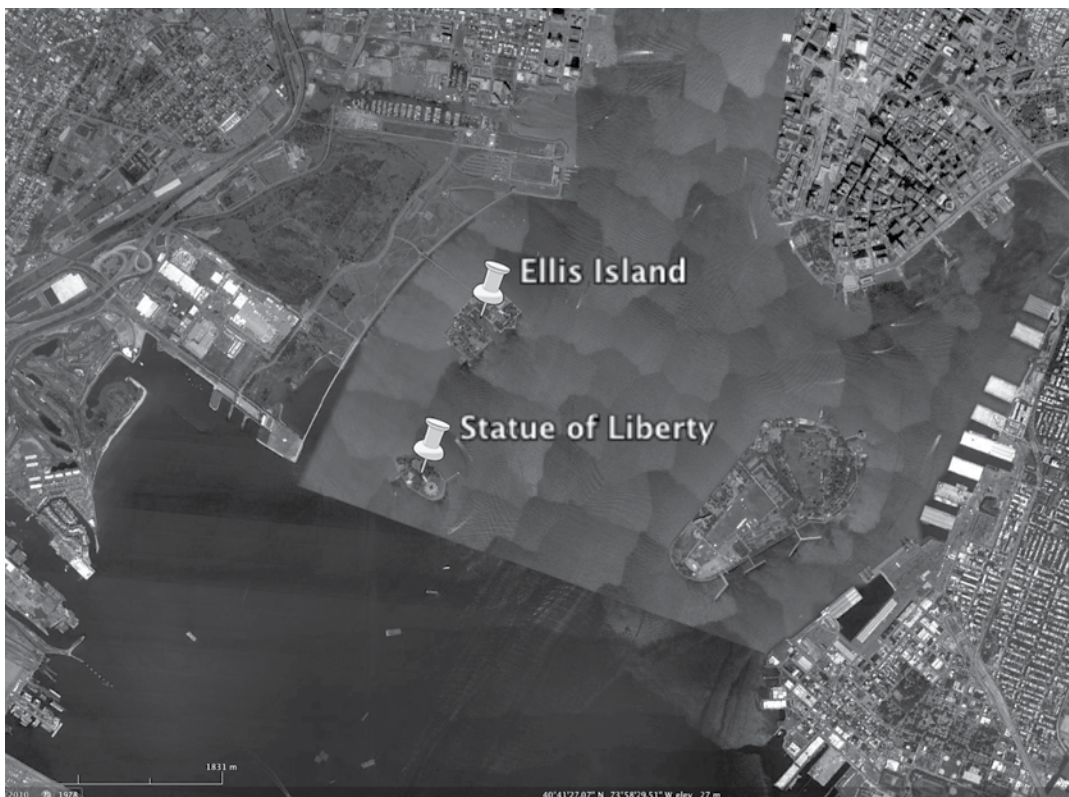
**10** Ellis Island and Angel Island are important places because they remind us of a part of American history. **Fly to** these other national monuments and memorials and talk about why they are important to Americans:

- Lincoln Memorial, Washington, DC
- Wright Brothers National Memorial, North Carolina
- Mount Rushmore, South Dakota
- The White House, Washington DC

### Extension Activity

**Fly to** some of these important world places, explore them in Google Earth, and have students research why they are important to the country in which they stand: Angkor Wat, Cambodia; Ayers Rock, Uluru-Kata Tjuta National Park, Australia; Blue Mosque, Istanbul, Turkey; Colosseum, Rome, Italy; Forbidden City, Beijing, China; Machu Picchu, Peru; Taj Mahal, Agra, India.

### Screenshots



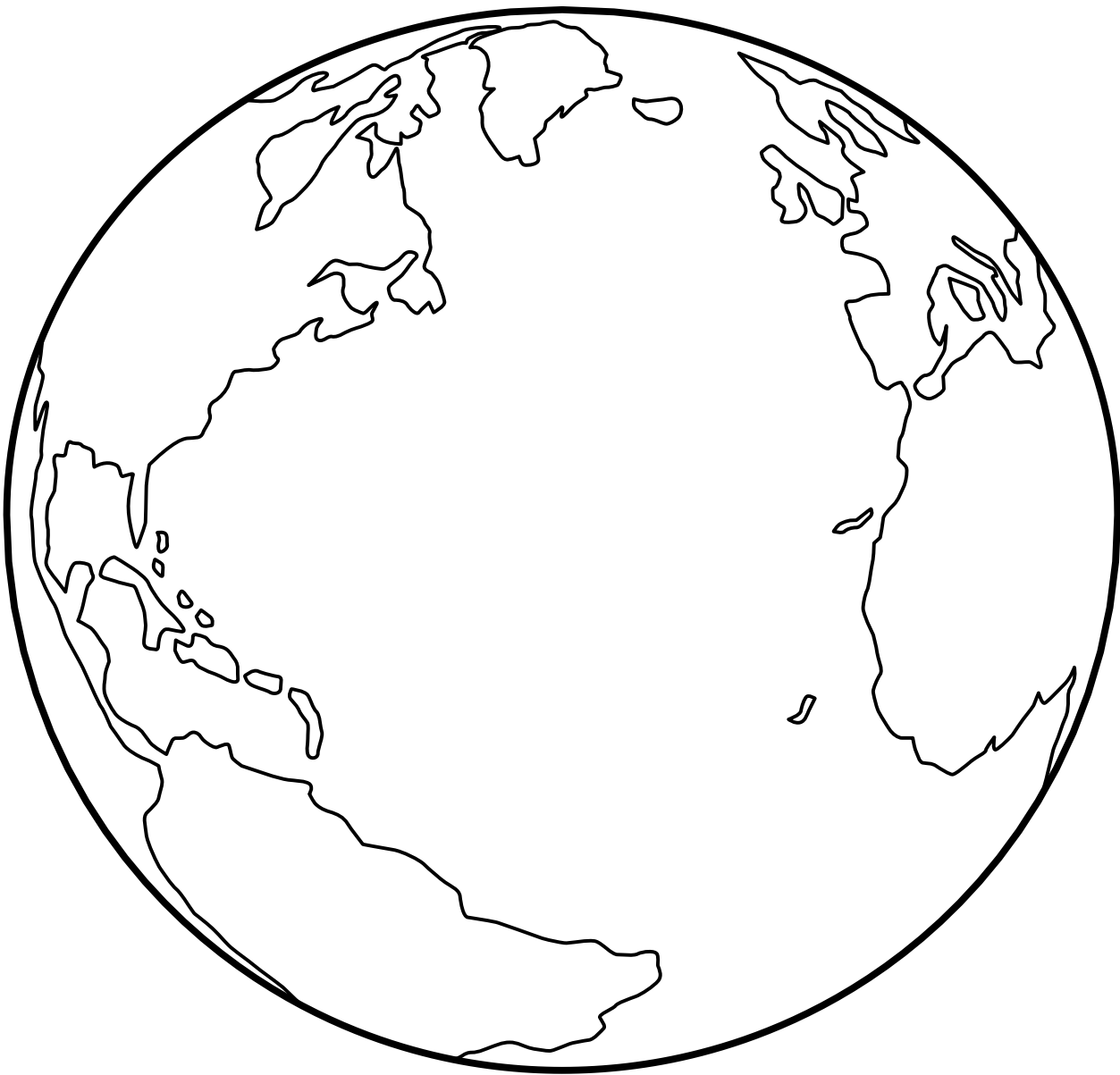
Ellis Island in NY Harbor



Name \_\_\_\_\_ Date \_\_\_\_\_

## Immigration Stations

- 1 On the map below, draw a route that immigrants might have taken from Europe to Ellis Island.



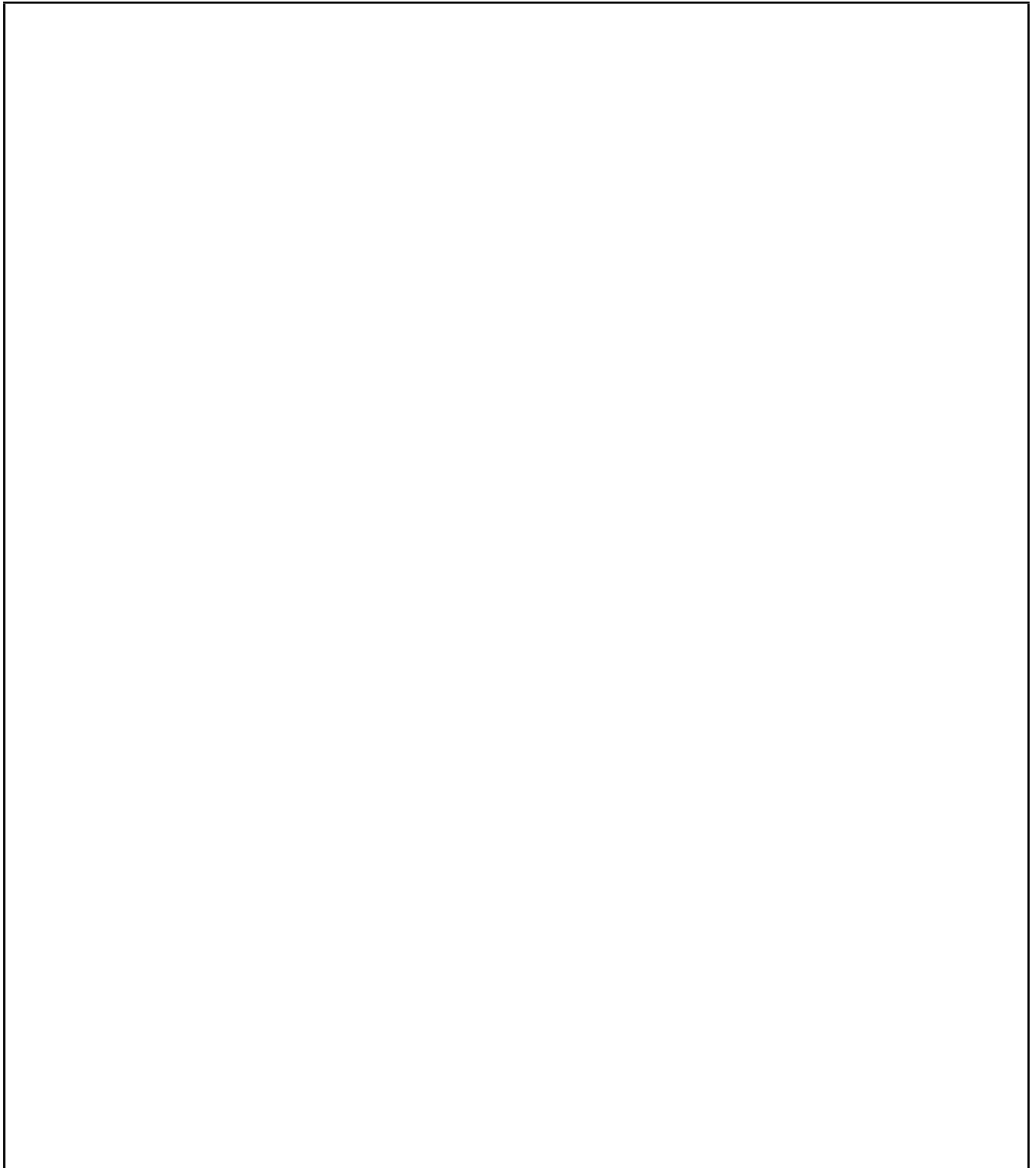




## Immigration Stations *(cont.)*

2

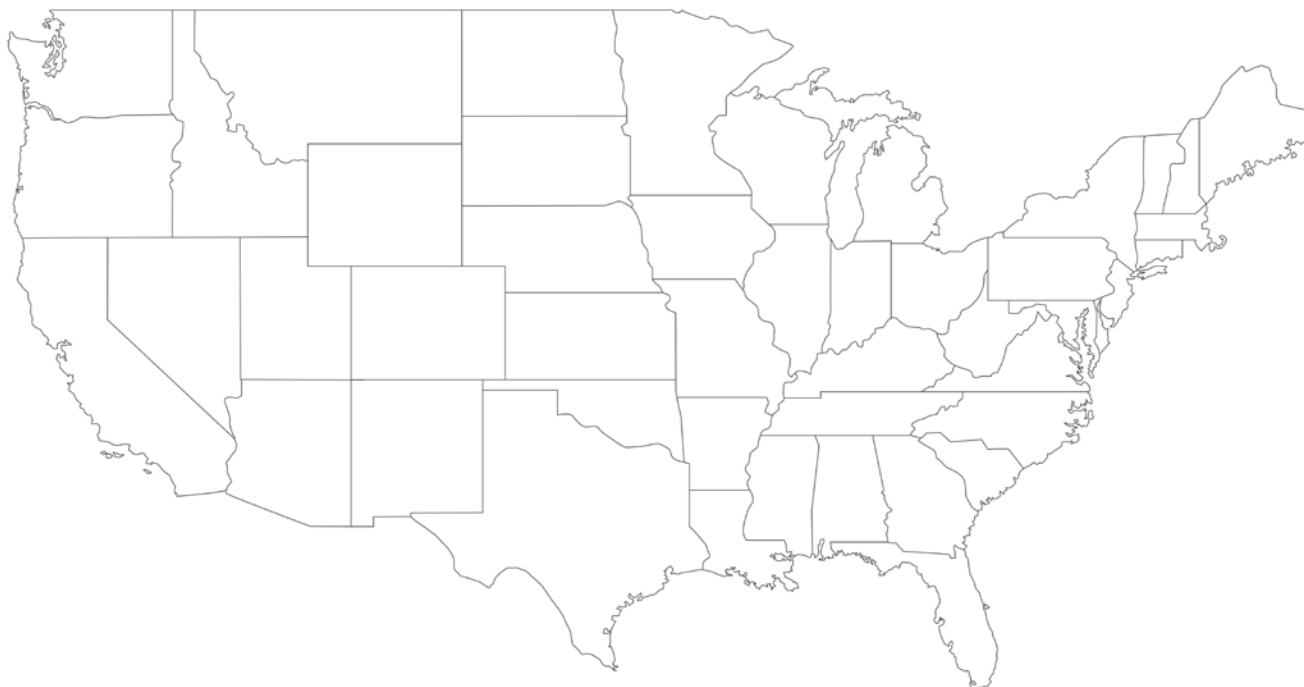
Draw Ellis Island and the main immigration building.





## Immigration Stations *(cont.)*

- 3 On the map below, draw an icon and label for Ellis Island and Angel Island.



- 4 Write one reason why Ellis Island and Angel Island were good places for immigrants to enter America.

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# Celebrating American Holidays

## Standards

Students understand reasons that Americans celebrate certain national holidays.  
Students know the basic components of culture.

## Google Earth Tools

- Toolbar: Placemark: Description\*
- Toolbar: Tour

## Overview

Students will use Google Earth to explore and describe places associated with American holidays.

## Vocabulary

- holiday
- memorial
- monument

## Materials

- *Celebrate America* activity sheets (pages 148–150)
- chart paper and markers

## Procedure

- 1 Ask students to help you make a list of holidays that they celebrate. Record the list on the board or a sheet of chart paper.
- 2 Have students describe the holiday traditions they enjoy, including songs, food, decorations, or customs and rituals. Distribute copies of the *Celebrate America* activity sheets (pages 148–150) and have students draw themselves celebrating their favorite holiday (question 1) and write at least one sentence describing why it is their favorite.
- 3 Review the list created in step one and place a star next to any holidays that are celebrated only in America. As a class, add other American holidays to the list, if desired.
- 4 Open Google Earth and in your *Things We Learned* folder, create a *Holidays* subfolder.

\* Tool introduced in this lesson



## Celebrating American Holidays *(cont.)*

### Procedure *(cont.)*

- 5** **Fly to** and **placemark** the sites in the chart at the bottom of this page that are associated with uniquely American holidays and add them to your *Holidays* folder. Discuss why each place is associated with a holiday. In each **Placemark window**, have students dictate or record what they know about the holiday to put in the **Description box**. Discuss major ideas that students are not familiar with to add to the description, and include the month in which the holiday occurs.
- 6** As each site is placemarked, instruct students to write the name of each holiday in the correct month on the calendar on their activity sheets (question 2).

- 7** Using the calendar on their activity sheets, have students help you create a **tour** of important American holidays in the order they occur during the year.
- 8** Once students have viewed the **tour**, instruct them to write about two things they learned from viewing the **tour** (question 3).

### Extension Activity

Ask students to **Fly to** and **placemark** the places where they celebrate their holidays, then, in the **Description box** in the **Placemark window**, add the names of the people who usually celebrate with them.

Holiday	Location	Month
Independence Day	Independence Hall, Philadelphia, Pennsylvania	July
Martin Luther King, Jr. Day	Martin Luther King, Jr. Memorial, Washington, DC	January
Washington's Birthday	George Washington's home, Mt. Vernon, Virginia	February
Memorial Day	Arlington Cemetery, Virginia	May
Thanksgiving	Plimoth Plantation, Plymouth, Massachusetts	November
Flag Day	Fort McHenry, Maryland	June
Columbus Day	San Salvador, The Bahamas	October



## Celebrating American Holidays *(cont.)*

### Did You Know?

Francis Scott Key wrote the poem “Defence of Fort McHenry” after witnessing the Battle of Fort McHenry in the War of 1812. This poem was later set to a popular tune of the time and became “The Star-Spangled Banner,” our national anthem. The original 15-star and 15-stripe Star-Spangled Banner flag that Key saw flying over Fort McHenry “by the dawn’s early light” is on display at the National Museum of American History, part of the Smithsonian Institution.

### Screenshots



© GOOGLE

**Plimoth Plantation, Massachusetts**



© GOOGLE

**Fort McHenry, Maryland**



Name \_\_\_\_\_ Date \_\_\_\_\_

## Celebrate America

1 Draw yourself celebrating your favorite holiday.

Write about why this is your favorite holiday.

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## Celebrate America *(cont.)*

2

Write each holiday in the correct month.

Word Bank	
Independence Day	Martin Luther King, Jr. Day
Washington's Birthday	Memorial Day
Thanksgiving	Flag Day
Columbus Day	New Year's Day

January	February	March
April	May	June
July	August	September
October	November	December



## Celebrate America *(cont.)*

- 3 Write two things you learned from viewing the tour of American holidays.

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# Tracking Ocean Animals

## Standards

Students know that living things are found almost everywhere in the world and that distinct environments support the life of different types of plants and animals.

Students know areas that can be classified as regions according to physical criteria.

## Google Earth Tools

- Layers panel: Ocean: Animal Tracking\*
- Status bar: elev, Eye alt
- Toolbar: Tour
- Toolbar: Ruler

## Overview

Students will use their Google Earth skills to learn about ocean animals.

## Vocabulary

- migrate
- ocean
- tracking

## Materials

- *Ocean Life* activity sheets (pages 154–156)
- crayons
- *Hello Ocean* (Ryan 2001) (optional)

## Procedure

1

Read *Hello Ocean* (Ryan 2001) or another book about the ocean. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Have students describe some features of the ocean and write their ideas on chart paper.

2

Distribute copies of the *Ocean Life* activity sheets (pages 154–156) to students and open Google Earth. **Zoom** out to show the whole globe centered on North America. Have students color the globe on their activity sheets (question 1). Ask students which color they used the most. Ask students why they think Earth is so blue.

3

Explain that almost three quarters of Earth is covered by oceans. Use the cursor or **Move joystick** to rotate Earth and look at all the oceans. Ask students if the oceans are separated from each other or if they are connected.

4

**Fly to** the Bahamas and **zoom** out to an **Eye alt** of about 800 km (500 mi.). Ask students to write down on their activity sheets how many different colors of blue they see (question 2).

\* Tool introduced in this lesson



## Tracking Ocean Animals *(cont.)*

### Procedure *(cont.)*

**5** Ask students why they think the ocean is different shades of blue. Explain that in Google Earth, the ocean appears lighter where it is shallower and darker where it is deeper. **Fly to** Guam (**Eye alt** 600 km or 1,000 mi.). Place the cursor over the ocean and move it from light to dark blue. Have students observe the **elev** display. Have students write the shallowest and deepest underwater elevations they can find (questions 3 and 4). Remind students to use a negative sign in front of each elevation to show that it is below sea level.

**6** **Fly to** San Diego, California and **zoom** to an **Eye alt** of about 1,600 km (1,000 mi.). In the **Layers panel**, open the **Ocean layer** and turn on **Animal Tracking**. **Zoom** in to look for the **animal icons** that appear along the coast of California and Mexico.

**7** Click on each of these **animal icons** to bring up a pop-up window and then click on the **Animal Facts tab** to see information about the animal. Have students use this information to write brief descriptions of two of the animals (question 5).

**8** Each of these animals has a tracking tag. In each animal's pop-up window, click **Download Track** to see where each animal has traveled.

Download the tracks of some of the different animals: sea lion, fin whale, bluefin tuna, white shark, humpback and blue whales southwest of Mexico, sperm whale in the Gulf of Mexico. Have students compare the different animal tracking paths.

**9** Use the **ruler tool** to measure roughly how far each animal traveled. Use the **Path tab** to click along the animal's track (this may be difficult with an animal like the sea lion) or use the **Line tab** to measure the farthest distance traveled in a straight line.

**10** Have students choose three animals and fill in the chart on their activity sheets with information about each animal, including the distance each animal traveled (question 5). Then, have students identify which animal traveled the farthest and which went the shortest distance (questions 6 and 7).

**11** Discuss with students the reasons that an ocean animal might migrate (e.g., searching for food, breeding, escaping predators, ocean temperature). Have students write two reasons an ocean animal might migrate (question 8).



## Tracking Ocean Animals *(cont.)*

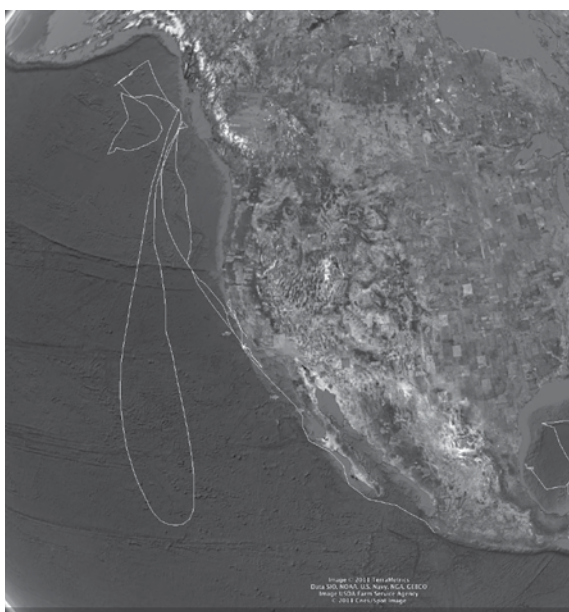
### Extension Activity

Have students use the information in the animal tracking pop-ups to compare the sizes of the animals. Ask them to identify which is the largest and which is the smallest.

### User Tip

Google Earth is building an amazing set of ocean exploration tools at <http://earth.google.com/ocean/showcase>. You can view each **tour** as a video by clicking **Play Tour** or download each **tour** into Google Earth.

### Screenshots

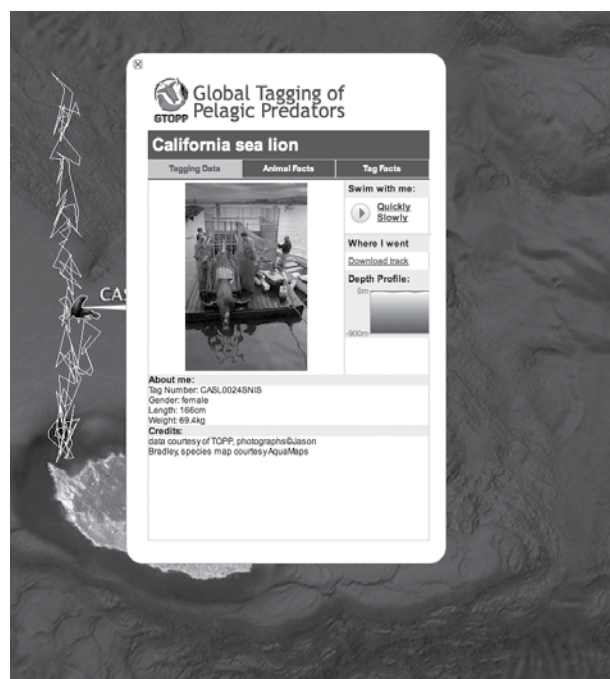


Animal tracking

DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO, IMAGE © 2011 TERRAMETRICS, © 2011 CNES/SPOT IMAGE, IMAGE USDA FARM SERVICE AGENCY, © GOOGLE

### Did You Know?

Open the **Ocean layer**, then open **State of the Ocean** and double-click **Sea Surface Temperature**. Click on the **Sea Surface Temperature icon** and click on **Download & View the Map** in the **Sea Surface Temperature window** that appears. The oceans will be colored according to how warm or cold they are. The redder the color, the warmer the ocean. Blue colors indicate colder oceans. Look for the areas that are very red—these are areas where hurricanes (and typhoons) are most likely to occur, as hurricanes need warm water to form.



Animal tracking

DATA SIO, NOAA, U.S. NAVY, NGA, GEBCO, IMAGE © 2011 DIGITALGLOBE, DATA LDEO-COLUMBIA, NSF, NOAA, © GOOGLE



Name \_\_\_\_\_ Date \_\_\_\_\_

## Ocean Life

- 1 Color Earth to match what you see in Google Earth.



- 2 How many shades of blue do you see in the ocean around the Bahamas?

\_\_\_\_\_

- 3 Write the shallowest ocean elevation you found.

\_\_\_\_\_

- 4 Write the deepest ocean elevation you found.

\_\_\_\_\_





## Ocean Life *(cont.)*

- 5 Choose two ocean animals that you saw in Google Earth. Write a brief description of each animal in the second column. In the third column, write how far each animal traveled.

Animal	Description	Distance Traveled



## Ocean Life *(cont.)*

6 Which animal traveled the farthest from where it started?

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7 Which animal traveled the shortest distance from where it started?

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8 Write two reasons why an ocean animal might travel.

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## Following the Sun

### Standards

Students know basic patterns of the Sun and Moon.

Students understand the globe as a representation of Earth.

### Google Earth Tools

- Toolbar: Sun\*

### Overview

Students will use Google Earth to observe the shadow patterns the Sun makes on Earth.

### Vocabulary

- day
- night
- shadow

### Materials

- *Shadows on Earth* activity sheets (pages 160–162)
- ball
- flashlight
- sticker
- *Sun Up, Sun Down* (Gibbons 1987) (optional)

### Procedure

1

Read *Sun Up, Sun Down* (Gibbons 1987) or another book about the Sun. (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Turn off the lights and shine a flashlight on a ball. Ask students to describe what they see. How much of the ball is in shadow? How much is in the light? Tell students that the ball represents Earth and the flashlight represents the sun. The sun is always shining on half of Earth and the other half is always in shadow.

3

Open Google Earth. **Zoom** out to a full Earth view with north up. Call students' attention to the fact that Earth in the **3D viewer** is always in daylight. Ask students if this is what Earth really looks like. Click on the **sun tool** in the **Toolbar**. The **sun slider** will appear in the upper-left corner of the **3D viewer**. Move the **sun slider** to show students how, as Earth rotates, the light and dark areas change.

\* Tool introduced in this lesson



## Following the Sun *(cont.)*

### Procedure *(cont.)*

- 4 Distribute copies of the *Shadows on Earth* activity sheets (page 160–162) to students. Have students complete the sentences about day and night (question 1). Have students look at the drawing of the sun and Earth on their activity sheets and tell them to color Earth to show where it is day and where it is night (question 2). Use the ball and flashlight to illustrate if needed.
- 5 Place a sticker on the ball and tell students that it represents your city or town. Rotate the ball slowly as you shine the flashlight on it. Have students call out when it is day in your town and when it is night.
- 6 On their activity sheets, have students draw and color one activity they do at night and one activity they do in the daytime (question 3).
- 7 In Google Earth, **Fly to** your school and **zoom** in until your school fills the **3D viewer**. In the **sun slider panel**, click the small (+) or (–) magnifying glasses until the slider displays a time span of one day (see the *User Tip* on the next page). Click the **wrench button** to open the **Date and Time Options window** and set the date to sometime in mid-winter. Drag the **sun slider** slowly through the day and have students mark the approximate times of sunrise and sunset on the winter timeline on their activity sheets (question 4).
- 8 Use the **Date and Time Options window** to change the date to midsummer, and drag the **sun slider** slowly through the day again. Have students mark the approximate times of sunrise and sunset on the summer timeline (question 4).
- 9 Have students compare the length of a summer day and the length of a winter day (question 5).
- 10 **Zoom** out to show the whole globe roughly centered on your town. Use the **sun slider** to again move from day to night to illustrate how day and night change across Earth. As you move the **sun slider**, have students call out when it is daytime and nighttime in your town.

### Extension Activity

**Zoom** to a global view and rotate the globe so the North pole is in view. Repeat the procedures in Step 7 using this view.





## Following the Sun *(cont.)*

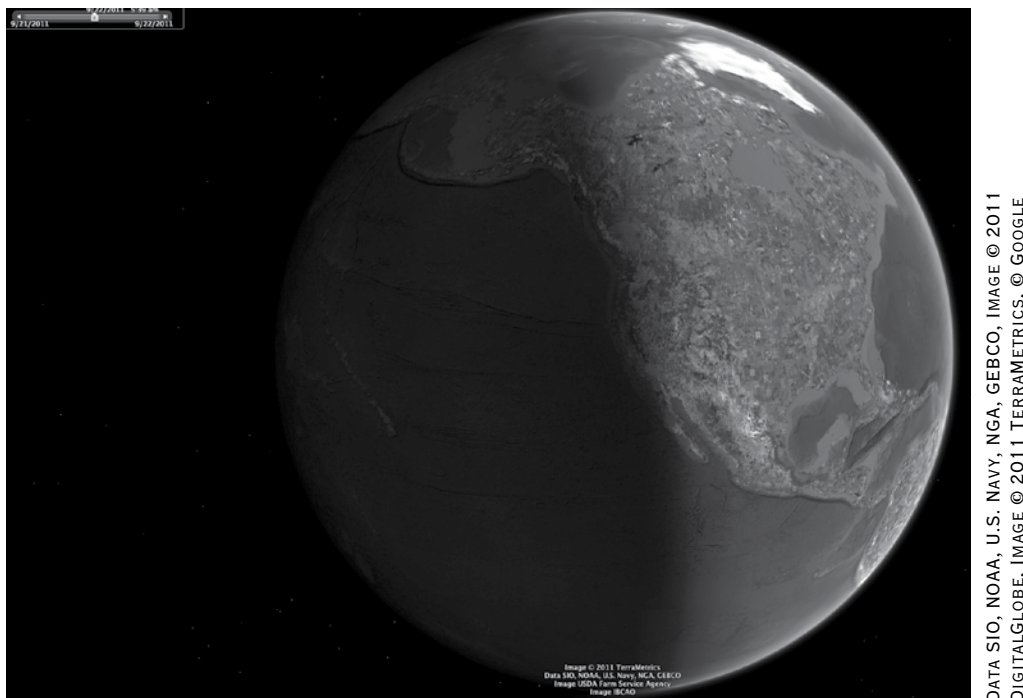
### Did You Know?

In Google Earth, it appears as though the sun revolves around Earth, when in reality, Earth revolves around the sun in a year and around its own axis in a day.

### User Tip

Click the (+) or (–) magnifying glasses in the upper left corner of the **sun slider** to change the time span that the slider displays (one hour, one day, one month, one year). Click the **wrench button** in the upper right corner of the **sun slider** to manually change the date and time.

## Screenshots



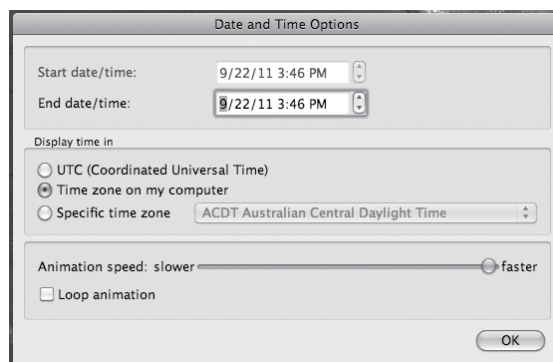
### Shadows on Earth



© GOOGLE Sun tool



© GOOGLE Sun slider panel



© GOOGLE Date and Time Options window



Name \_\_\_\_\_ Date \_\_\_\_\_

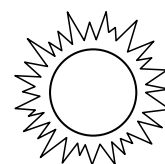
## Shadows on Earth

1 Circle the correct word to complete each sentence.

Where the sun is shining on Earth, it is:    day        night.

Where Earth is in shadow, it is:                    day        night.

2 Look at the Sun and Earth below. Color Earth to show where it is day and where it is night.







## Shadows on Earth *(cont.)*

- 3 Draw and color one activity you do at night and one activity you do in the day.

**Day**

**Night**

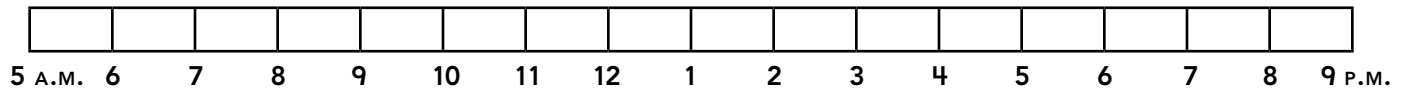


## Shadows on Earth *(cont.)*

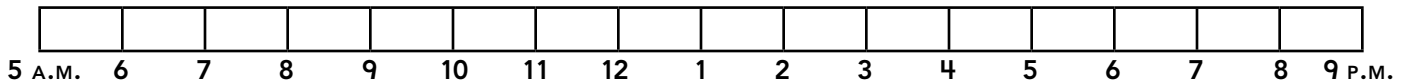
**4**

Make an X on the sunset and sunrise times below. Color in between the Xs to show the length of a day.

### Winter



### Summer

**5**

Circle the correct word to complete each sentence.

In the winter, the days are:            shorter            longer.

In the summer, the days are:            shorter            longer.



## Observing Weather

### Standards

Students know that short-term weather conditions (e.g., temperature, rain, snow) can change daily, and weather patterns change over the seasons. Students know the role that resources play in our daily lives.

### Google Earth Tools

- Layers panel: Borders and Labels
- Layers panel: Weather: Clouds, Radar, Conditions and Forecast\*
- Toolbar: Placemark

### Overview

Students will explore weather in Google Earth by observing clouds, rain, and temperature readings.

### Vocabulary

- radar
- temperature

### Materials

- *Where Is the Weather?* activity sheets (pages 166–168)
- cotton balls
- crayons
- glue or paste
- *Sector 7* (Wiesner 1999) (optional)

### Procedure

**Note:** This is a great lesson to do on a rainy day or on a day when there is a hurricane somewhere on the planet. If neither of these events is occurring, find a city that your students are familiar with where it is raining and focus on that location.

1

Read *Sector 7* (Wiesner 1999) or another book about clouds. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Lead a discussion about clouds and rain. Ask students the following questions: How are clouds and rain related? Is it always raining below a cloud? Are there always clouds above rain? Can clouds be seen from space? Can rain be seen from space?

2

Distribute copies of the *Where Is the Weather?* activity sheets (pages 166–168) to students and open Google Earth. Navigate so all of Africa is in view. Ask students where they think they will see clouds in Africa, and where they will definitely not see clouds. Remind them that clouds are needed to have rain and rain is needed for green vegetation.

\* Tool introduced in this lesson



## Observing Weather *(cont.)*

### Procedure *(cont.)*

**3** Open the **Weather layer** in the **Layers panel** and turn on the **Clouds layer**. On most days, there will be clouds over the central regions of Africa, and there will almost never be clouds over the northern deserts. Discuss with students where the clouds are relative to the deserts and forests. Ask students to color the map of Africa on their activity sheets tan and green depending on where the vegetation and deserts are. Distribute cotton balls to students, and have students pull the cotton apart and then paste or glue cotton wisps on their map to show where the clouds are (question 1).

**4** Click on the **placemark** for your hometown. Ask students if Google Earth is telling them there are clouds overhead today. Invite students to check if there are really clouds when they go out for recess, or ask students to look out the window for clouds.

**5** Rain cannot be seen in images taken by satellites, but instruments on the ground called radars can measure rain. **Zoom** out to a view of your entire continent and turn on the **Radar layer**. Look for the green areas where the radar is measuring rain. Is it raining in your town today? If not, **zoom** out until you see a place where it is raining. **Zoom** in on the rainy area until

you are below the green layer. Let students experience the rain animation that simulates an actual rainstorm.

**6** Navigate back to your town. Ask students if it is hot or cold today. Ask students to guess the temperature. Then turn on the **Conditions and Forecast layer** and find out what the actual temperature is today. Ask students to color the thermometer on their activity sheet red to indicate the temperature outside (question 2).

**7** **Fly to** places where it is very cold or very hot like McMurdo Sound, Antarctica, and Nelson Island, Antarctica, for cold temperatures, and the Sahara Desert (May–September) or Australia’s interior (October–April) for hot temperatures. On their activity sheets, have students record locations where the temperature is over 100 degrees, or less than 30 degrees (questions 3 and 4).



## Observing Weather (cont.)

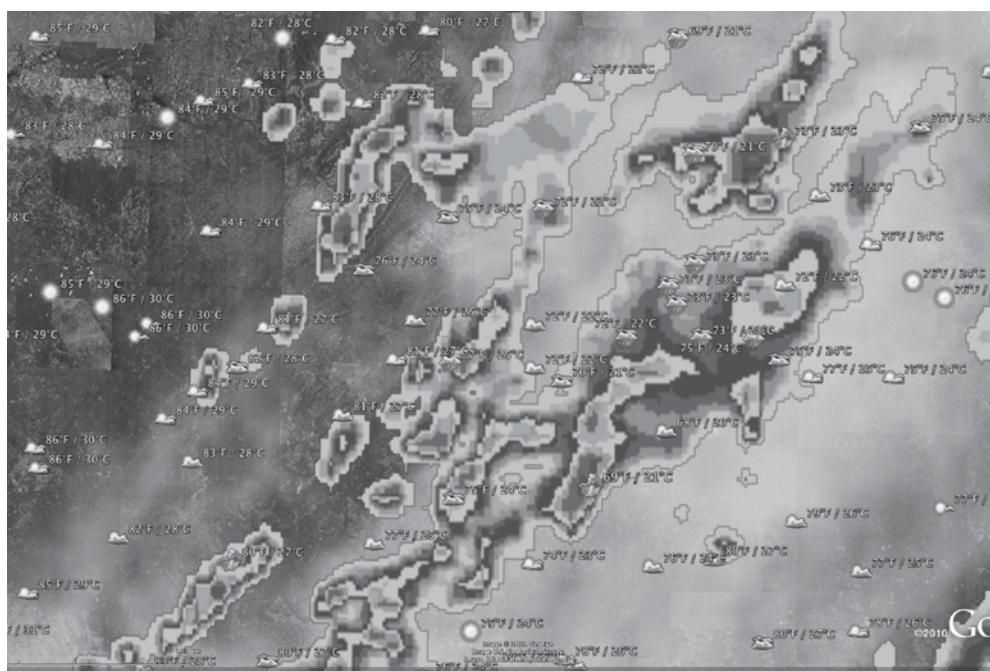
### Extension Activities

- If there is a hurricane on Earth, navigate to that part of the world. Turn on the **Clouds layer**. Look for the eye of the hurricane. Turn on the **Borders and Labels layer** and look for countries or states to help students get a feeling for how big the hurricane is.
- Track the temperature, rain, and clouds over your school for a week, a month, or a school year. Compare students' observations with what they observe on Google Earth.

### Did You Know?

Google Earth presents weather data from the *National Oceanic and Atmospheric Administration* (NOAA) and Weather.com (The Weather Channel). NOAA and NASA have many satellites dedicated to measuring clouds, rain, temperature, and other parameters that are used in predicting weather. NOAA and Weather.com send up-to-date maps of clouds, temperature, and rain to Google Earth, which is what you see in the **Weather layer**.

### Screenshot



Radar layer in 3D viewer



Name \_\_\_\_\_ Date \_\_\_\_\_

## Where Is the Weather?

- 1 Color the map of Africa to match what you see in Google Earth. Glue cotton where you see clouds.

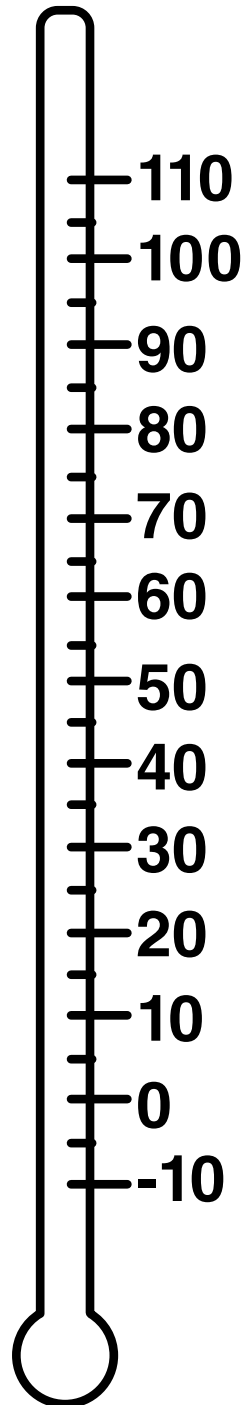






## Where Is the Weather? *(cont.)*

- 2** Color the thermometer to show the temperature in your town today.





## Where Is the Weather? *(cont.)*

- 3 Using Google Earth, find two places where it is over 100 degrees. Write the names of the places and the temperatures.

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- 4 Using Google Earth, find two places where it is less than 30 degrees. Write the names of the places and the temperatures.

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## Analyzing Ice

### Standards

Students know that water can be a liquid or a solid and can be made to change from one form to the other. Students know that places can be defined in terms of their predominant human and physical characteristics.

### Google Earth Tools

- Fly to box: lat/long\*
- Layers panel: Ocean: State of the Ocean: Arctic Sea Ice\*
- Status bar: Eye alt
- Toolbar: Clock

### Overview

Students will use Google Earth to observe glaciers, icebergs, sea ice, and snow to begin to appreciate where and why ice forms on our planet.

### Vocabulary

- glacier
- iceberg
- sea ice

### Materials

- *Ice Is Nice* activity sheets (pages 172–174)
- reference scale card (*Creating Reference Scales* lesson, pages 73–75)
- *Icebergs and Glaciers* (Simon 1999) (optional)

### Procedure

1

Read *Icebergs and Glaciers* (Simon 1999) or another book about snow, glaciers, and ice. (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Distribute copies of the *Ice Is Nice* activity sheets (page 172–174) to students and open Google Earth. **Fly to** Egmont National Park, New Zealand, and use the **clock tool** to display the image taken on 7/15/2009 in which there is snow. Use the **timeline slider** to look for other days when there is no snow.

3

Ask students why there is snow sometimes and not at other times. Ask them to think about why there is snow only on the top of Mt. Taranaki and not all the way down. Lead students to understand that snow and ice can only exist in cold temperatures; in warmer temperatures it turns to liquid water. Look for streams and rivers of melted snow running down the sides of Mt. Taranaki.

4

Tell students that in some places it is so cold all year long that the snow never melts. Each year, more snow comes and piles on top of last year's snow, so the snow gets thicker. These areas are called glaciers. **Fly to** Skaftafell National Park, Iceland, and **zoom** to an **Eye alt** of about 32 km (20 mi.).

\* Tool introduced in this lesson



## Analyzing Ice *(cont.)*

### Procedure *(cont.)*

**5** Explain that the snow piling up on the top of a glacier gets so heavy that it pushes the ice down the mountain like a very slowly flowing river. These glaciers melt as they flow down the mountain because it gets warmer at lower elevations. Have a student walk across your classroom and roughly count how many seconds it takes. Tell students that it would take a glacier five years to flow that far. Have students draw an arrow on the picture on their activity sheets that shows which way the glacier is flowing (question 1).

**6** Specific latitude and longitude points are useful for finding locations that do not have names. Type the **lat/long** 64 29 30 S 60 13 19 W into the **Fly to box** to begin your search. **Zoom** to an **Eye alt** of about 25 km (16 mi.) and you will see several glaciers. Explain to students that in Antarctica, it is so cold that the glaciers flow all the way to the sea. Once the glaciers reach the sea, chunks of ice fall off into the ocean and float around for a while until they melt. These are called icebergs. **Zoom** in to the foot of one of the glaciers to see the icebergs. Use your reference scale card (from the *Creating Reference Scales* lesson, pages 75–80) to see if your school would fit on the biggest iceberg.

**7** Tell students that the North Pole and the South Pole are very different because the South Pole is on a continent, but the North Pole is in the ocean. Glaciers can form on the continent of Antarctica, but there is no place for them to form in the Arctic Ocean. Instead, the ocean water freezes into sea ice. Navigate to the North Pole. To view the sea ice in Google Earth, open the **Ocean layer** in the **Layers panel**, and open the **State of the Ocean layer**. Double-click on the **Arctic Sea Ice layer**. Google Earth will navigate to the Arctic Ocean and you will see an **Arctic Sea Ice icon** in the middle of the screen. Click the icon once and to open the **Sea Ice window**. Click on **Download & View the Layer**. Slide the **timeline slider** to the most recent date.

**8** Explain that the white area is where the sea ice is and that sea ice floats on the surface of the ocean and can be twice as thick as they are tall. Because it is floating, the ice is always moving, shifting, and cracking. Ask students to draw the outline of the sea ice on their activity sheets (question 2).

**9** Ask students to draw on their activity sheets a glacier, an iceberg, liquid water, and snow (question 3).



## Analyzing Ice *(cont.)*

### Extension Activity

Explain to students that the extent of the sea ice changes over a year. In the summer there is less ice because it melts around the edges, and in the winter, the extent of the sea ice is the greatest. Ask students to compare changes in the ice year after year in September using the **timeline slider** that is displayed while the **Arctic Sea Ice layer** is turned on. Explain to them that the extent of the sea ice is getting smaller as our planet is warming up.



### Did You Know?

Clouds can be mistaken for snow. A good place to see this is the Galapagos Islands, Ecuador. Look for the cloud shadows as a clue that these are clouds and not snow. A dry lakebed can also look like snow. The largest dry lakebed in the world is Salar de Uyuni, Bolivia. As with most dry lakebeds, the surface is covered in white, salty sand, which is left when the water in a lake evaporates.

## Screenshot

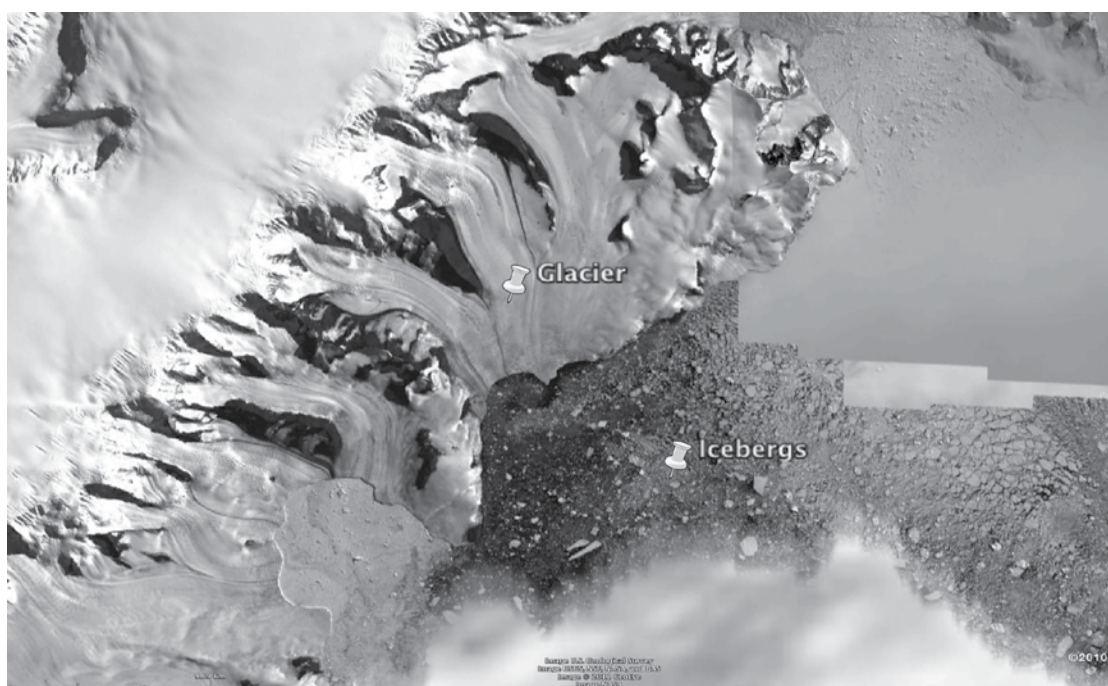


IMAGE USGS, NSF, NASA, AND BAS, IMAGE NASA, IMAGE U.S. GEOLOGICAL SURVEY, © GOOGLE

Glacier and icebergs, Antarctica

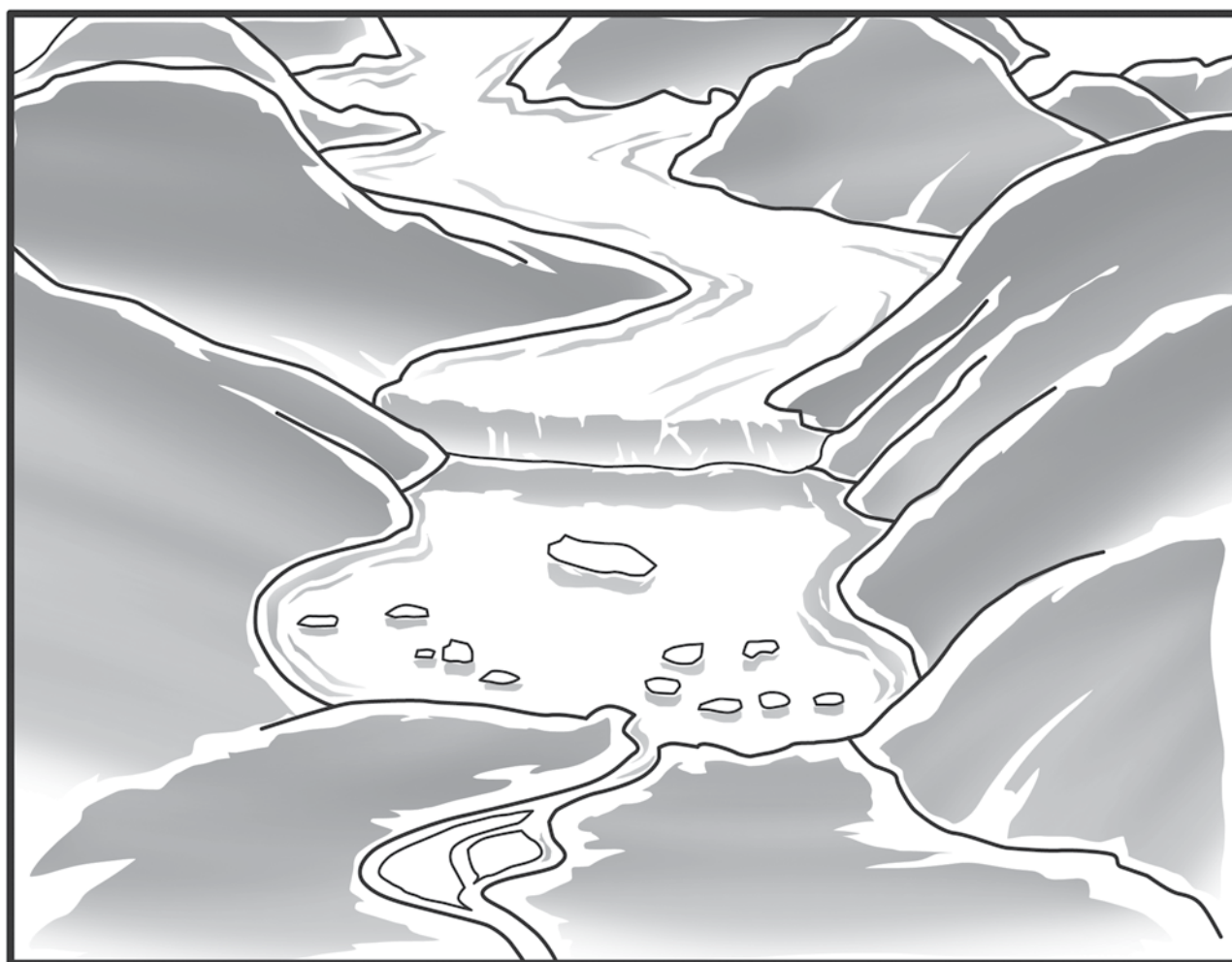




Name \_\_\_\_\_ Date \_\_\_\_\_

## Ice Is Nice

- 1 On the picture below, draw an arrow to show which way the glacier is flowing.







## Ice Is Nice *(cont.)*

- 2 Draw the outline of the Arctic sea ice.





## Ice Is Nice *(cont.)*

3

Draw each type of water found on Earth.

<b>glacier</b>	<b>iceberg</b>
<b>liquid water</b>	<b>snow</b>



# Shaping the Capital

## Standards

Students use the names of simple geometric shapes to represent and describe real-world situations. Students identify physical and human features in terms of the four spatial elements (location, line, area, volume).

## Google Earth Tools

- Layers panel: Photos, Places
- Status bar: Eye alt
- Toolbar: Placemark
- Toolbar: Polygon\*

## Overview

Students will identify shapes in the city of Washington, DC, and sort and classify those shapes by their attributes.

## Vocabulary

- corner
- shape
- side

## Materials

- *Shaping Up Washington, DC* activity sheets (pages 179–180)
- crayons
- *Of Thee I Sing: A Letter to My Daughters* (Obama 2010) (optional)

## Procedure

1

Read a book about Washington, DC, such as *Of Thee I Sing: A Letter to My Daughters* (Obama 2010) to help students become more familiar with the city. (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Distribute copies of the *Shaping Up Washington, DC* activity sheets (pages 179–180) to students and open Google Earth. **Fly to** Washington, DC. **Zoom** to an **Eye alt** of about 4 km (13,000 ft.) and move the view so that the Lincoln Memorial, the White House, and the Capitol building can all be seen. Have student volunteers come up and point out shapes created by the buildings, parks, and roads.

3

Turn on the **Places layer** in the **Layers panel**. **Placemark** the White House, the Lincoln Memorial, and the Capitol building. Turn on the **Photos layer** in the **Layers panel** to view photos of these famous landmarks and briefly discuss each one.

\* Tool introduced in this lesson



## Capital Shapes *(cont.)*

### Procedure *(cont.)*

- 4 Click the **polygon tool** in the **Toolbar**. Once the **Polygon window** is open, click once on the White House, then the Capitol, and then the Lincoln Memorial. This will connect the **placemarks** and fill in the space, revealing a shape. Ask students to name the shape.
- 5 Name the polygon you created *Triangle*, and, with students, write a description of the shape in the **Polygon window**. Click **OK** to save the polygon and have students view it in the **3D viewer**. Then, turn off the polygon in the **Places panel** to hide it.
- 6 On their activity sheets, ask students to draw lines to connect three of the houses on their maps to create a triangle (question 1).
- 7 Point out President's Park and the Ellipse, south of the White House. Tell students that President's Park is a large park facing the White House. Use the **polygon tool** to click on each corner of the rectangular block surrounding the park. Ask students what shape the block is. Ask how many corners and sides it has. Name the polygon *Rectangle*, and with students, write a description of the shape.
- 8 On their activity sheets, ask students to draw lines to connect four of the houses on their maps to create a rectangle (question 2).
- 9 Ask students to name another shape that has four corners and four sides. Ask students to find a square in Washington, DC and use the **polygon tool** to label and describe it. Turn off the rectangle and square polygons in the **Places panel** to hide them.
- 10 **Zoom** in on the Ellipse and ask students what shape it is. If students say it is a circle, point out that it is not perfectly round, but stretched slightly, so it is an oval. Tell students that the word *ellipse* means a type of oval.
- 11 Use the **polygon tool** to put many points around the outside of the Ellipse. **Zoom** in to show students that no matter how many points you make, there are still straight lines connecting two points. Have students find an oval or a circle on the map on their activity sheets and color them in (question 3).

## Capital Shapes *(cont.)*

## Procedure *(cont.)*

**12** Tell students that they will sort the shapes they found. On their worksheets, have students draw and write the name of each shape in the correct box according to the number of corners and sides it has (question 4).

## Extension Activity

Have students **Fly to**

- Canberra, Australia
- Forbidden City, China
- Palmanova Udine, Italy

Ask students to identify some shapes. Ask students to use the **polygon tool** to outline, label, and describe the shapes they see.

### User Tip

To create a shape, click on the **polygon tool** in the **Toolbar**. Click once on each point of your desired shape and the polygon will fill in automatically. Adjust the style and color of the polygon in the **Polygon window** using the **Style, Color tab**. Just for fun, you can make the polygon 3D. In the **Polygon window**, use the **Altitude tab** to change the **Altitude** to **Relative to Ground** from the pull-down menu, and then turn on **Extend sides to ground**. Use the slider to adjust the height of the shape.

## Did You Know?

Pierre Charles L'Enfant was asked by George Washington to design Washington, DC. He was a fan of math and used his math skills to make a very creative city with avenues radiating out from rectangles.





## Capital Shapes *(cont.)*

### Screenshots



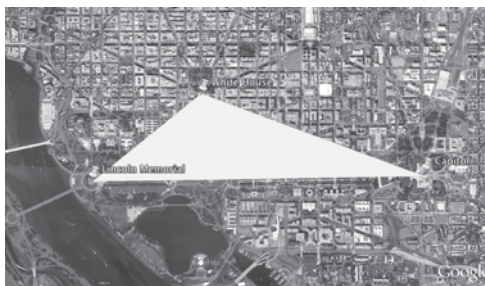
© GOOGLE

Washington, DC



© GOOGLE

Polygon tool



© GOOGLE

Triangle polygon



© GOOGLE

Rectangle and oval polygons

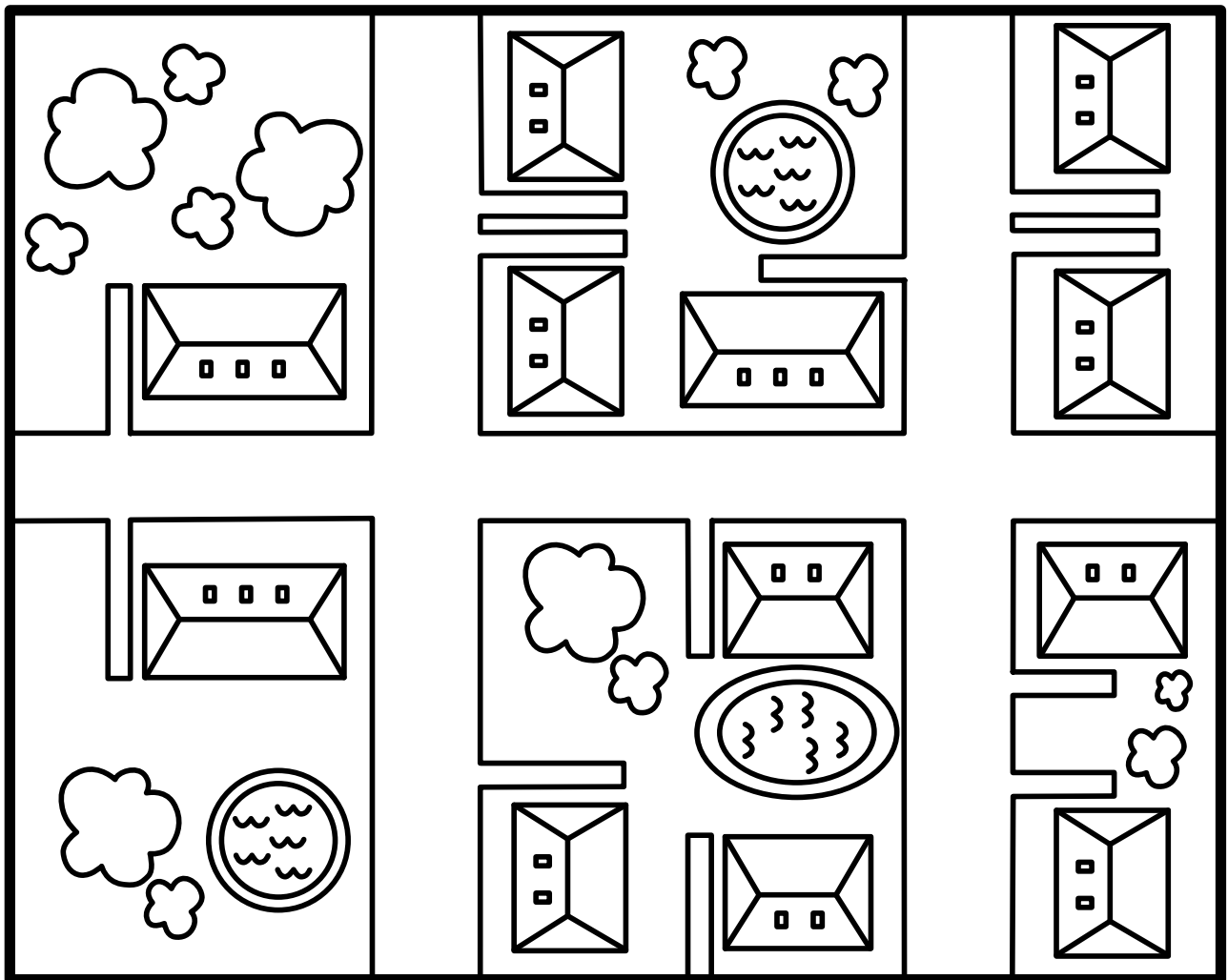




Name \_\_\_\_\_ Date \_\_\_\_\_

## Shaping Up Washington, DC

- 1 Draw lines to connect three houses to make a triangle.
- 2 Draw lines to connect four houses to make a rectangle.
- 3 Find an oval or a circle on the map and color it in.





## Shaping Up Washington, DC *(cont.)*

**4** Draw and label the shapes below in the correct place in the chart.

Word Bank				
square	circle	triangle	oval	rectangle

Shapes with 3 corners and 3 straight sides	Shapes with 4 corners and 4 straight sides	Shapes with infinite points and no straight sides



## Drawing Field Patterns

### Standards

Students understand that patterns can be made by putting different shapes together or taking them apart. Students know the role that resources play in our daily lives.

### Google Earth Tools

- Fly to box: lat/long
- Status bar: Eye alt

### Overview

Students will find and explore shape patterns in agricultural fields around the world using Google Earth.

### Vocabulary

- irregular
- irrigation

### Materials

- *Shape Up the Farm* activity sheets (pages 184–186)
- squares of white construction paper
- crayons or colored pencils
- *The Big Red Barn* (Brown 1989) (optional)

### Procedure

1

Read *The Big Red Barn* (Brown 1989) or another book about farms. (See the Recommended Recommended Literature List in Appendix F, page 242, for more titles.) As a class, talk about what is on a farm and what you might be able to see if you looked at a farm from above.

2

Distribute copies of the *Shape Up the Farm* activity sheets (pages 184–186) to students and open Google Earth. **Fly to** 36 17 12.26 N 120 05 25.20 W and **zoom** to an **Eye alt** of about 1.5 km (5,000 ft.) (**Note:** You must type the space between each set of digits. See the *User Tip* for more information.) Ask students to describe the shapes they see. Tell students that these are farm fields in the Central Valley of California. As a class, discuss why farmers might want their fields to be these shapes.

3

Ask students to look at how the squares are divided into smaller shapes. On their activity sheets, ask students to use what they see to help them draw lines dividing squares into rectangles and smaller squares in as many different ways as they can (question 1).



## Drawing Field Patterns *(cont.)*

### Procedure *(cont.)*

**4** **Fly to** 24 12 55.48 N 47 57 38.15 E and **zoom** to an **Eye alt** of about 10 km (31,000 ft.). Tell students that these are farm fields in Saudi Arabia. Explain to students that the fields are circular because the irrigation (water) sprinklers come from a pipe in the center of each circle and travel around that point. Discuss the circles and how they are divided. On their activity sheets, have students use what they see to help them draw lines to divide their circles into as many different shapes as they can (question 2). All their lines should pass through or touch the center points of the circles.

**5** **Fly to** 42 28 37.04 N 98 31 37.43 W in northern Nebraska and **zoom** to an **Eye alt** of about 16 km (10 mi.). Ask students to describe these circular fields and discuss the similarities and differences with the fields in Saudi Arabia.

**6** **Fly to** 45 12 59 N 74 34 08 W in eastern Canada and **zoom** to an **Eye alt** of about 4.5 km (16,000 ft.). Ask students what they notice about these fields compared to the ones they saw before. Discuss with students why these fields might be such irregular shapes. **Zoom** in and have a close look at the hills and streams that define the edges of some of the fields.

**7** On their activity sheets, have students draw shapes to extend each pattern (question 3).

**8** Give each student a square of white construction paper and ask them to color it to match a field they see in Google Earth. Tape all the squares together and display your field quilts.

### Extension Activity

Have students **Fly to** the following locations to see more field shapes. Discuss with students the environmental factors that influence each set of fields.

- 1 45 35.43 S 37 28 17.05 E, **Eye alt** 1.5 km (5,500 ft.): Dry, terraced fields in Africa
- 22 49 07.58 N 110 27 37.44 E, **Eye alt** 520 m (1,700 ft.): Winding orchards in China
- 23 29 09.86 S 148 19 06.58 E, **Eye alt** 12 km (40,000 ft.): A variety of field shapes in a small area of Australia



## Drawing Field Patterns *(cont.)*

### Did You Know?

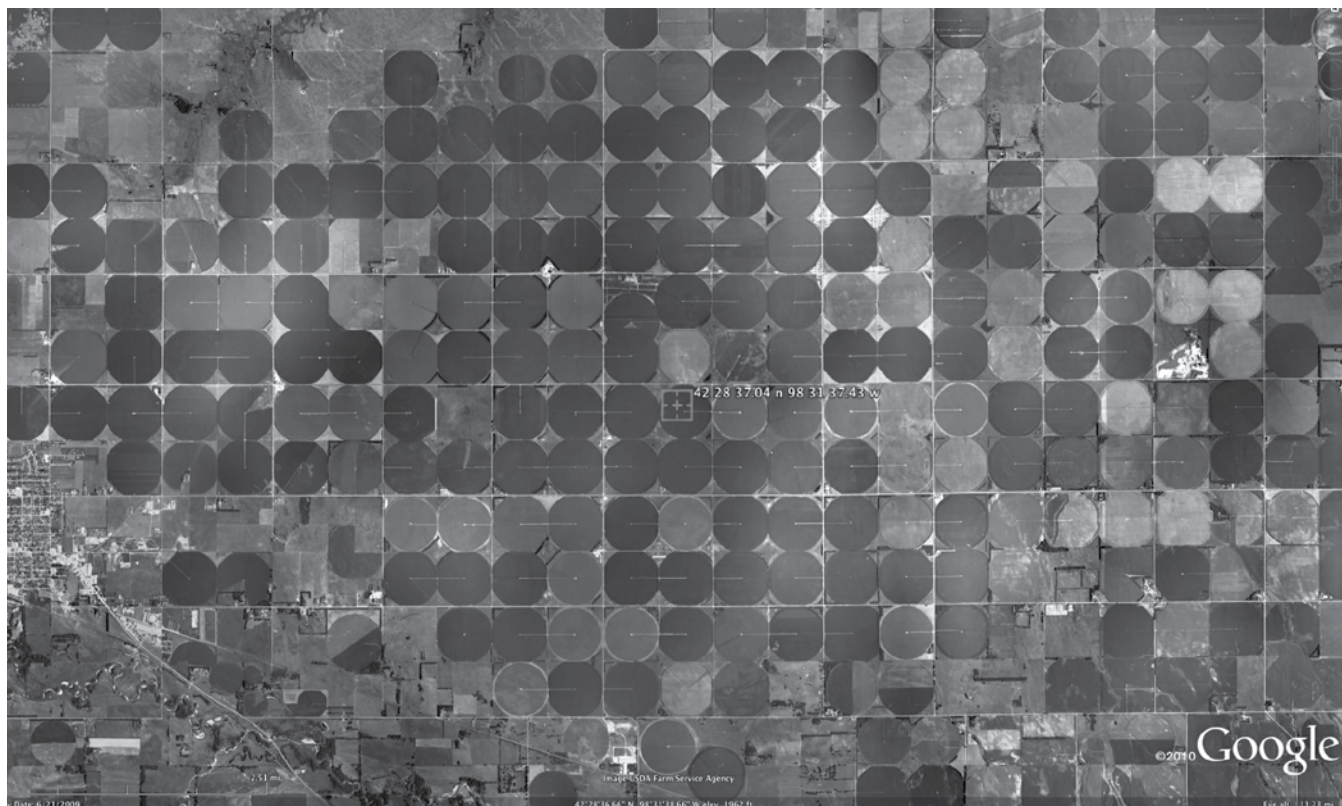


Center pivot irrigation is an excellent way to irrigate crops, especially when the water is coming from the ground. A pipe from underground can be placed in the middle of a field and used to feed water to a long sprinkler that rotates around the center point. The result is a round field.

### User Tip

The easiest way to enter lat/longs is to have one person read the location aloud while another person types, i.e., "Thirty-two, space, forty-six, space, twenty-five, space, letter S" and so on.

### Screenshot



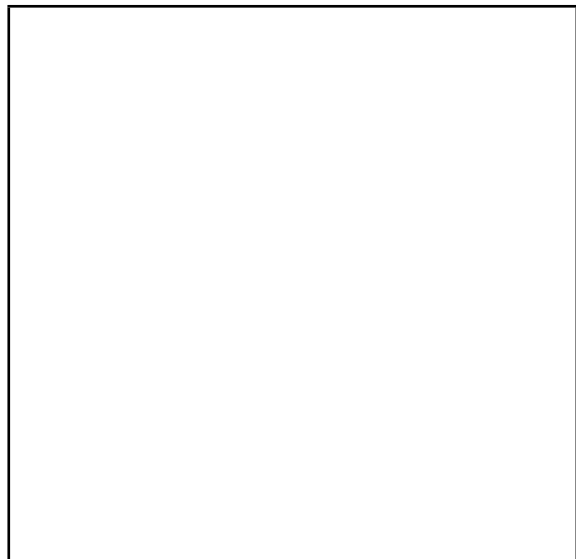
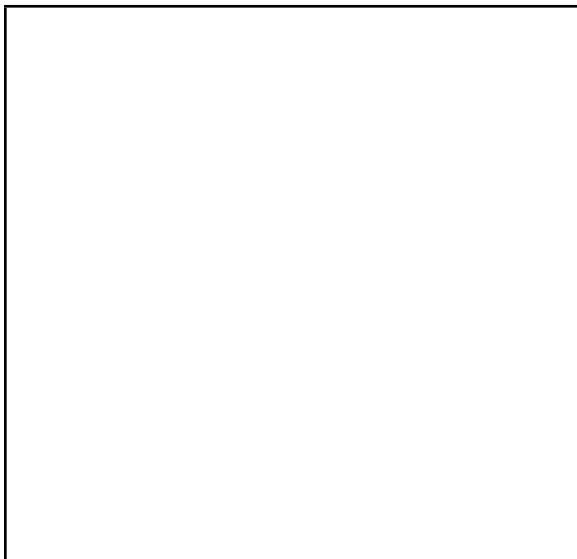
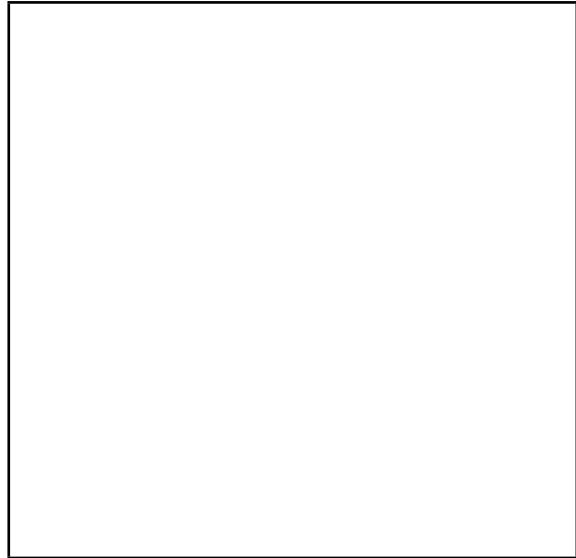
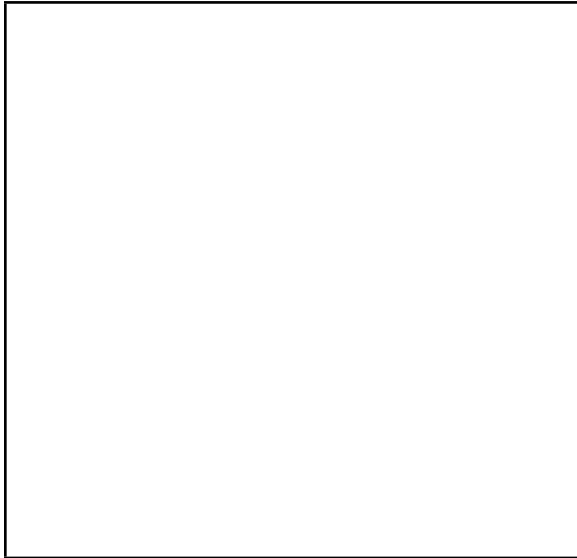
Pivot irrigation in Nebraska



Name \_\_\_\_\_ Date \_\_\_\_\_

## Shape Up The Farm

- 1 Using what you see in the farm fields, draw lines inside each square to divide it into smaller squares and rectangles. Make each square different.

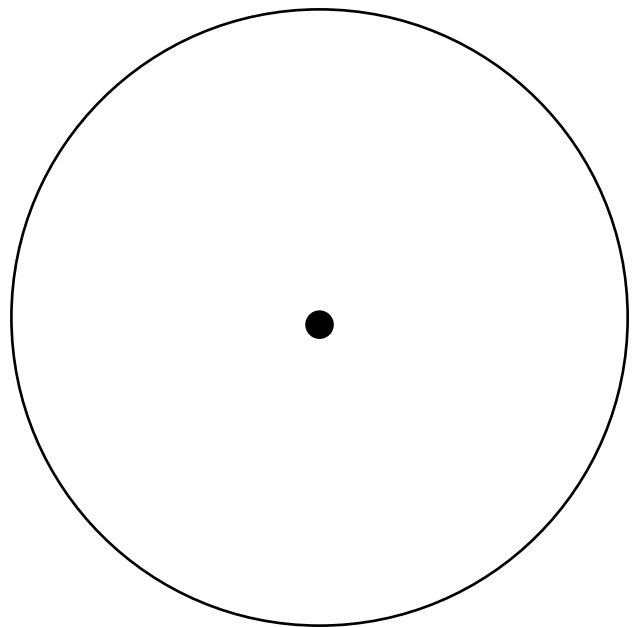
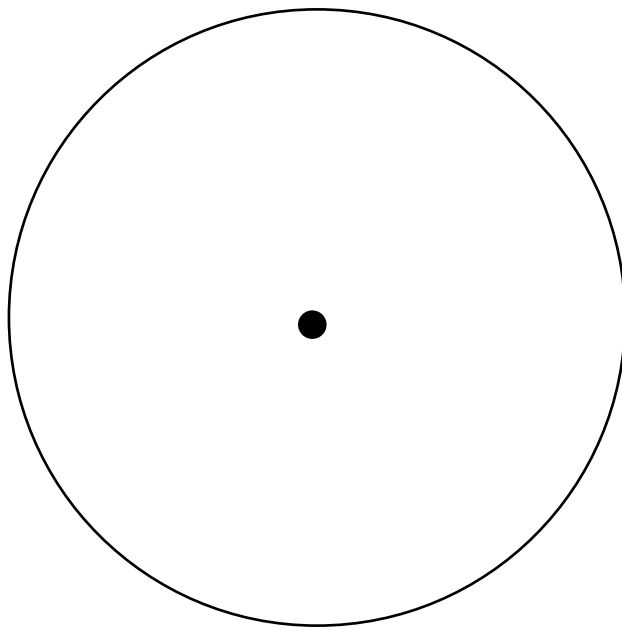
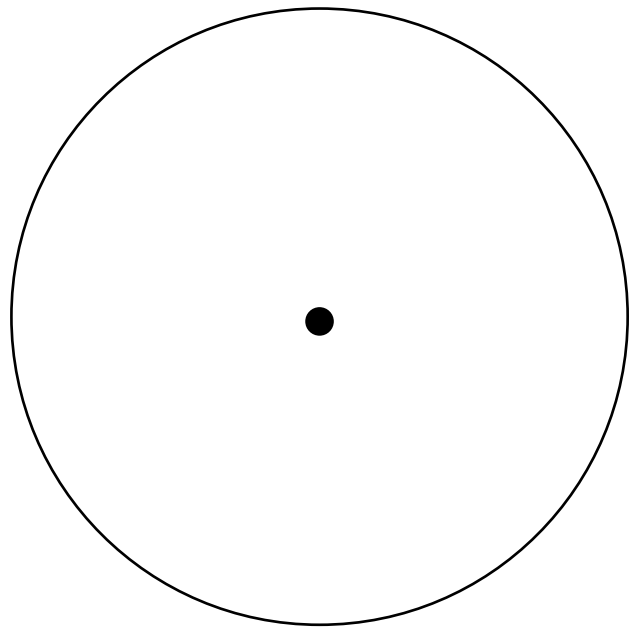
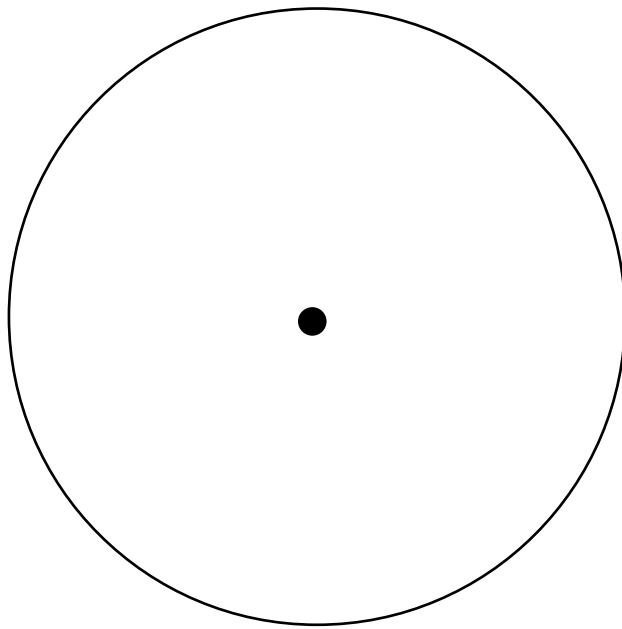






## Shape Up the Farm *(cont.)*

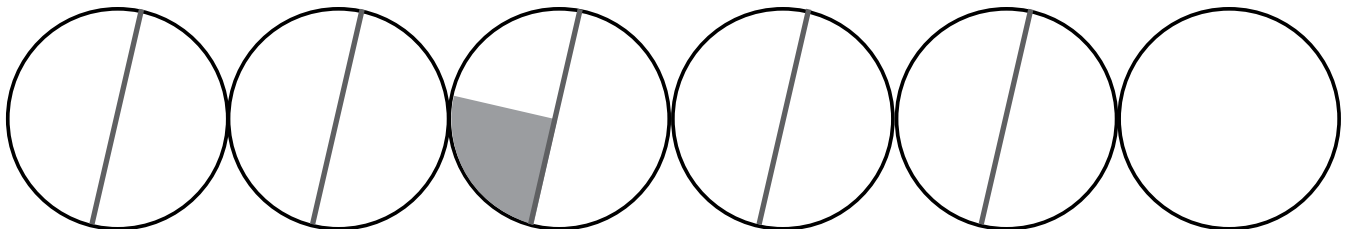
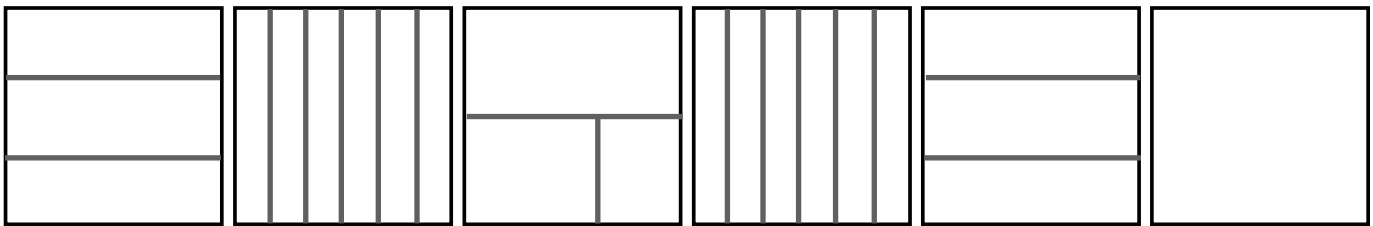
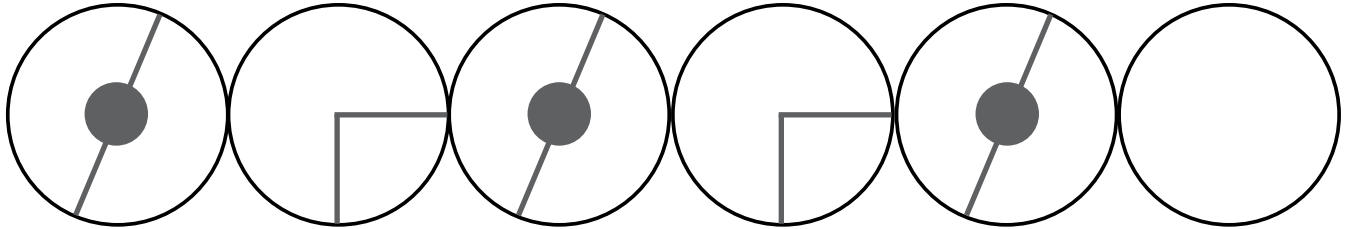
- 2** Using what you see in the farm fields, draw lines to divide each circle into different parts. Each line should touch the center of a circle.





## Shape Up the Farm *(cont.)*

3 Draw the field shape that comes next in each pattern.





# Measuring Animals

## Standards

Students understand the basic measures: length, width, height, weight, and temperature. Students know areas that can be classified as regions according to physical criteria.

## Google Earth Tools

- Fly to box: lat/long
- Layers panel: Gallery: National Geographic Magazine: Africa Megaflyover\*
- Status bar: Eye alt
- Toolbar: Placemark, Ruler

## Overview

Students will zoom in to high resolution photographs of African animals in their natural habitats and measure the animals, and then compare the sizes of the animals to the size of their classroom.

## Vocabulary

- herd

## Materials

- *Nose to Tail* activity sheets (pages 191–192)
- crayons
- tape measure
- plastic African animal toys
- Books about African animals (optional)

## Procedure

1

Ask students what kinds of animals live in Africa. Read some books about African animals. (See the Recommended Literature List, Appendix F, page 242, for suggested titles).

2

Set plastic African animals on the floor and ask students to describe what these animals look like from above. Ask students to predict whether each animal could fit inside your classroom.

3

Distribute copies of the *Nose to Tail* activity sheets (pages 191–192) to students and open Google Earth. **Fly to** 3 13 33.61 S 35 2 29.71 E. (**Note:** You do not need to enter the symbols, but you must type the space between each set of digits. See *User Tips* for more information.) **Zoom** to an **Eye alt** of 2 km (6,500 ft.) Tell students that usually animals are too small to be seen in Google Earth, but this picture was taken from a special airplane that flew all around Africa and took pictures of many animals and villages.

\* Tool introduced in this lesson



## Measuring Animals *(cont.)*

### Procedure *(cont.)*

**4** Ask students to describe what they see in this picture. In the first box on their activity sheets, have students draw the airplane that took this picture and the cows, as a person standing on the ground would see them (question 1).

**5** Navigate to a view of Africa. Open the **Gallery folder** in the **Layers Panel** and then open **National Geographic Magazine layer** and turn on the **Africa Megaflyover layer** and **zoom in** until **red plane icons** appear. Tell students that a photo taken from the airplane is at each **red plane icon**. Double-click on a few **red plane icons** to show that each represents a high-resolution **Megaflyover photo** and then **zoom in** on one of them to see that area in detail. Ask students to color the airplane in their drawing red (question 2).

**6** Tell students that there are animals in many of the **Megaflyover photos**, but they would have to click on a lot of red airplanes to find them. It is hard to find animals by typing in a city in the **Fly to box** because most of the animals are not near cities. The best way to find the animals is by typing in latitude and longitude. Show students how to type these coordinates into the **Fly to box**:  
15 17 40.12 N 20 28 47.47 E.

**7** **Zoom in** to see the herds of animals. Use the **ruler tool** to measure the length from head to tail of one of the animals (See the How-To Guide, Appendix D, p 234, for more information on using the **ruler tool**). **Placemark** this group of animals and add a description, including the length. Repeat this process with the following animal locations:

- Elephants:  
10 54 13.68 N 19 56 06.16 E
- Hippos:  
12 34 10.24 S 32 7 39.29 E
- Water buffaloes:  
14 04 11.53 S 25 38 46.81 E
- Gazelles:  
16 24 15.93 N 19 54 49.84 E

Have students write the name and length of each animal on their activity sheets (question 3).

**8** With students' help, use a tape measure to measure the length of your classroom. Have students enter the measurement on their activity sheets (question 4). Using the measurements of the animals, ask students to determine if each animal would fit in your classroom and circle Yes or No on their activity sheets (question 5).



## Measuring Animals *(cont.)*

### Extension Activity

If students would like to add more animals to their tour, more African animals can be found at these locations:

- |                              |                             |
|------------------------------|-----------------------------|
| • Egrets and water buffaloes | 18 43 40.48 S 35 55 58.10 E |
| • Flamingos                  | 21 50 36.23 S 35 27 00.48 E |
| • Hippos                     | 06 37 46.10 S 31 08 12.95 E |
| • Oryx                       | 24 57 18.52 S 15 51 30.56 E |
| • Seals                      | 18 26 45.50 S 12 00 44.20 E |

### User Tips

- The easiest way to enter lat/longs is to have one person read the location aloud while another person types, i.e., “Thirty-two, space, forty-six, space, twenty-five point seventy-one, space, letter S” and so on.
- If you are having trouble with lat/long searches, check your **Google Earth Preferences**. Under the **3D View tab** in the **Show Lat/Long** section, select **Degrees, Minutes, Seconds**.
- The **Line tab** in the **Ruler window** only measures a straight line between two points. If students want to measure the animals more accurately, click on the **Path tab** in the **Ruler window** and then click multiple times along the animal’s body, including a curving trunk or tail, to measure.

### Screenshots



Africa Megaflyover photo

© 2011 CNES/SPOT IMAGE, © GOOGLE





## Screenshots *(cont.)*



© 2011 CNES/SPOT IMAGE, © GOOGLE

**Hippos in Zambia**



IMAGE © 2011 GEOEYE, © GOOGLE

**Elephants in Chad**





Name \_\_\_\_\_ Date \_\_\_\_\_

## Nose to Tail

**1** Pretend you are standing on the ground by the cows. Draw some of the cows. Draw the airplane that took the picture.

**2** Color the airplane red.





## Nose to Tail *(cont.)*

- 3 As you view each photo, write the type of animal and the length of the animal.

Animal	Length	Will it fit in your classroom?	
		Yes	No

- 4 How long is the largest empty space in your classroom?

---

- 5 Will each African animal fit in your classroom? Circle Yes or No in the chart above.



## Graphing Trains

### Standards

Students collect and represent information about objects or events in simple graphs.  
Students know modes of transportation used to move people, products and ideas from place to place, their importance and their advantages and disadvantages.

### Google Earth Tools

- Status bar: elev, Eye alt
- Toolbar: Path:  
Measurements tab\*

### Overview

Students will use Google Earth to count and graph train cars and to create addition and subtraction problems.

### Vocabulary

- freight

### Materials

- *All Aboard!* activity sheets (pages 196–198)
- crayons
- reference scale cards (*Creating Reference Scales* lesson, pages 73–75)
- *Freight Train* (Crews 1996) (optional)

### Procedure

1

Read *Freight Train* (Crews 1996) or another book about trains. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Ask students what color a train is. Ask students if they think all train cars look the same or if the tops of boxcars are the same color as the sides of boxcars.

2

Distribute copies of the *All Aboard!* activity sheets (pages 196–198) to students and open Google Earth. **Fly to** Tehachapi Loop, California. **Zoom** to an **Eye alt** of 1.5 km (5,000 ft.). Have students look for the train, its engines, and the boxcars. Ask students to count how many engines are pulling the train and how many different colors of boxcars there are. As a class, count how many cars are in this train.

3

Ask students why they think this train is making a circle. Slowly move the cursor over the track and have students observe the **elev** change in the **Status bar**. The mountains here are so steep that the loop is needed to help the train go up the mountain gradually. Ask students to identify which direction the train would be travelling if it were going uphill. Look for tunnels and lead a discussion about why train tunnels are so important.

\* Tool introduced in this lesson



## Graphing Trains (cont.)

### Procedure (cont.)

- 4 **Fy to** Terminal Island, Los Angeles, CA. Use the **navigation tools** to look for trains. The Port of Los Angeles is one of the busiest ports in the country, so there are always plenty of trains around. Choose a train that is an appropriate length for your students to count.
- 5 Make a list of the colors of cars students see in the train. Have students label the bar graph on their activity sheets with the colors of the train cars (question 1).
- 6 Count aloud all the cars of each color in the train and have students color in the bar graph on their activity sheets (question 2).
- 7 Have students use the graph data to fill in the totals on the chart on their activity sheets (question 3).
- 8 Instruct students to create two questions about their graph (question 4). Have students trade papers and answer each other's questions.
- 9 Open the **path tool**. Create a **path** along the length of the train. Click on the **Measurements tab** in the **Path window** to determine how long the train is. Have students use the reference card (from the *Creating Reference Scales* lesson, pages 73–75) to find out how many cars would fit in your school.

### Extension Activity

**Zoom** to an **Eye alt** of about 1.5 km (5,000 ft.) to look around the port of Los Angeles. Explore the harbor and look for things to count: train cars, shipping containers, round storage tanks, buildings, ships, cranes, or cars. Have students make up and solve addition and subtraction problems using what they see in Google Earth.

### Did You Know?

Other Google Earth locations for counting include Charles De Gaulle Airport, Paris, France, to count airplanes, and The World, Dubai, to count islands.



## Graphing Trains *(cont.)*

### Screenshot



**Terminal Island, California**



Name \_\_\_\_\_ Date \_\_\_\_\_

## All Aboard!

- 1 In the bottom row of the graph, write the colors of the train cars.
- 2 Color in the boxes to show how many cars of each color are in the train.

### Train Car Colors

11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					





## All Aboard! *(cont.)*

- 3 Use the graph you created to fill in the chart below. Add up the number of cars of each color to find the total number of cars in the train.

Car Color	Number of Cars
Total number of cars=	



## All Aboard! *(cont.)*

- 4 Create two questions about your graph and write them below.

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# Exploring the Moon

## Standards

Students understand the composition and structure of the universe and Earth's place in it.

Students know basic patterns of the Sun and Moon.

## Google Earth Tools

- Layers panel: Moon Gallery: Apollo Missions\*
- Toolbar: Planets: Moon\*

## Overview

Students will call upon all their Google Earth skills to travel to the Moon and explore the Apollo landing sites, as well as the craters and lava seas that make the Moon different shades of gray.

## Vocabulary

- crater
- mare

## Materials

- *Maps on the Moon* activity sheets (pages 202–204)
- crayons
- *The Moon Book* (Gibbons 1997) (optional)

## Procedure

1

Read *The Moon Book* (Gibbons 1997) or another book about the Moon or the Apollo missions. (See the Recommended Literature List in Appendix F, page 242, for more titles.)

2

Ask students if they have ever seen the Moon. Talk about how far away the Moon is and how hard it would be to go there. The Moon is an average of 380,000 km (236,000 mi.) away from Earth. That is about the width of thirty Earths.

3

Distribute copies of the *Maps on the Moon* activity sheets (pages 202–204) to students and open Google Earth. Turn off the **My Places folder** as well as any open layers in the **Layers Panel**. Click the **planets tool** in the **Toolbar** and select **Moon** from the pull-down menu.

4

**Zoom** out as far as you can and rotate the Moon. Ask students to describe what they see. **Zoom** in on the side of the Moon that has the most dark material. Explain to students that the dark areas are called seas, or mare (MAHR-ay), because they were once thought to be seas. We now know they are areas that were once flooded with dark volcanic lava.

\* Tool introduced in this lesson



## Exploring the Moon *(cont.)*

### Procedure *(cont.)*

- 5 Rotate the Moon until you see a view similar to the one on the students' activity sheets. Your center **lat/long** should be 0 N 20 E and an **Eye alt** of about 3,200 km (2,000 mi.) with north at the top of the **3D viewer**. Ask students to color the major mare on the diagram on their activity sheets (question 1).
- 6 Rotate the Moon to the brighter side and **zoom** in for a close look at some craters. Ask students why they think the Moon has more craters than Earth. Explain that Earth once had a lot of craters, but over many millions of years, wind and water have worn most of them away. Craters are still visible on the Moon because there is no wind or water on the Moon to erode the craters.
- 7 It is possible to find a few craters still visible on Earth. Navigate back to Earth using the **planets tool** and **Fly to** these craters: Clearwater Lakes, British Columbia, Canada, **Eye alt** 120 km (75 mi.); Manicouagan Crater, Canada, **Eye alt** 120 km (75 mi.). Ask students to draw and color one Earth and one Moon crater on their activity sheets (question 2).
- 8 Navigate back to the Moon using the **planets tool**. Direct students' attention to the **Layers panel**. Does it look different for the Moon than it does for Earth? Open the **Moon Gallery** and then turn on the **Apollo Missions layer** to see a view of the Moon that shows all six Apollo landing sites.
- 9 Look for the Apollo 12 landing site and double-click on it to **zoom** in. The black line shows the path where the Apollo 12 astronauts explored. It is labeled EVA for Extra Vehicular Activity. **Zoom** in until you see a three-dimensional model of the Lunar Lander. Double-click on the **video icon** to see a movie of Pete Conrad descending to the lunar surface. Click on any of the **camera icons** to view panoramic photographs of the astronauts' views from the surface of the moon. Ask students to draw what they see on their activity sheet and label as many items as they can (question 3).
- 10 With students, read the story problem about moon boots on their activity sheets. Help students calculate how many people landed on the Moon and how many pairs of boots are still on the Moon (question 4).



## Exploring the Moon (cont.)

### Extension Activity

In addition to seeing the Moon in Google Earth, you can also explore Mars. Use the **planets tool** to travel to Mars and open the **Mars Gallery layer** and turn on the **Rovers and Landers layer** to find out where the rovers named Spirit and Opportunity are today.

### Screenshot

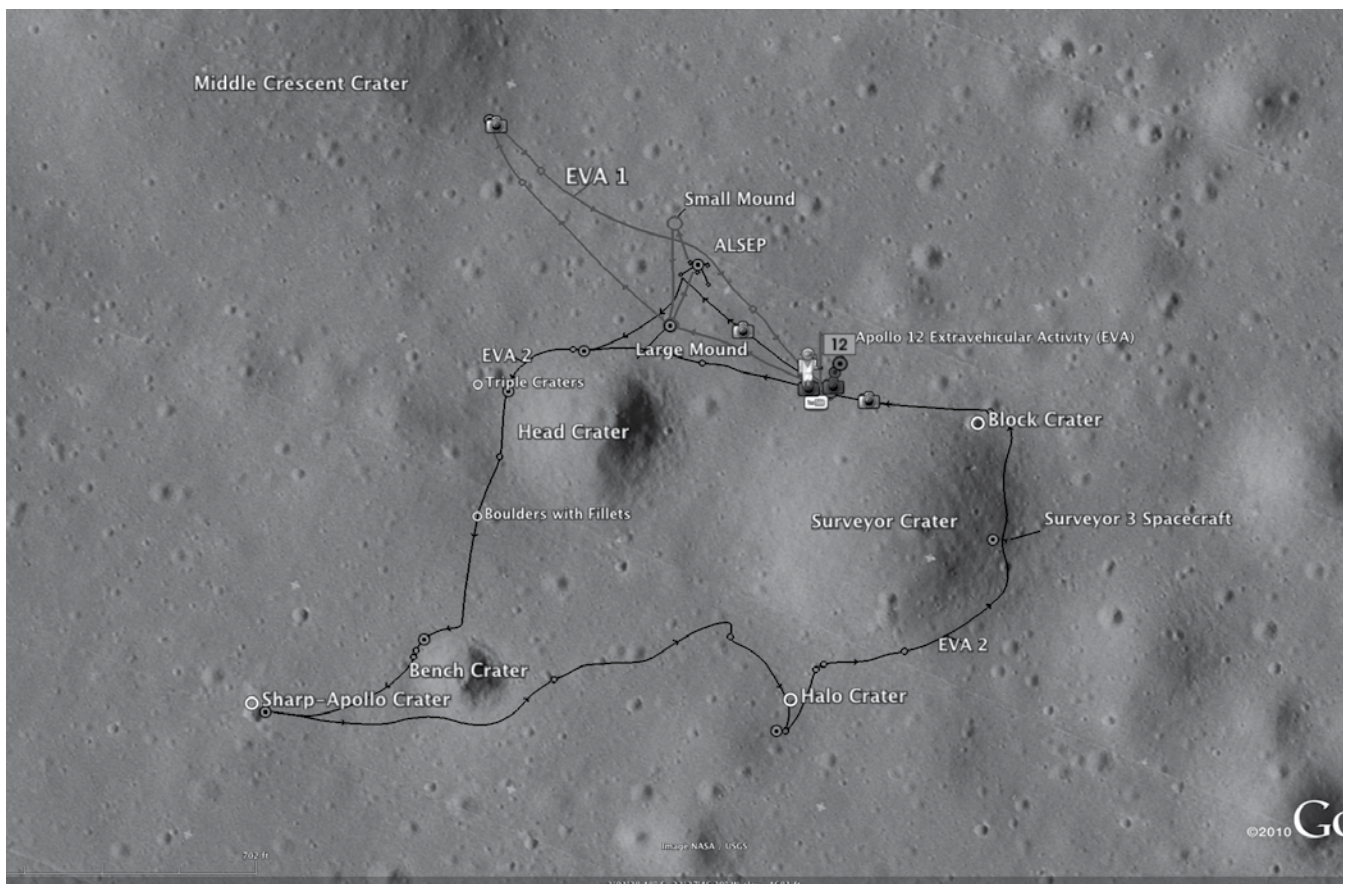


IMAGE NASA/USGS, © GOOGLE

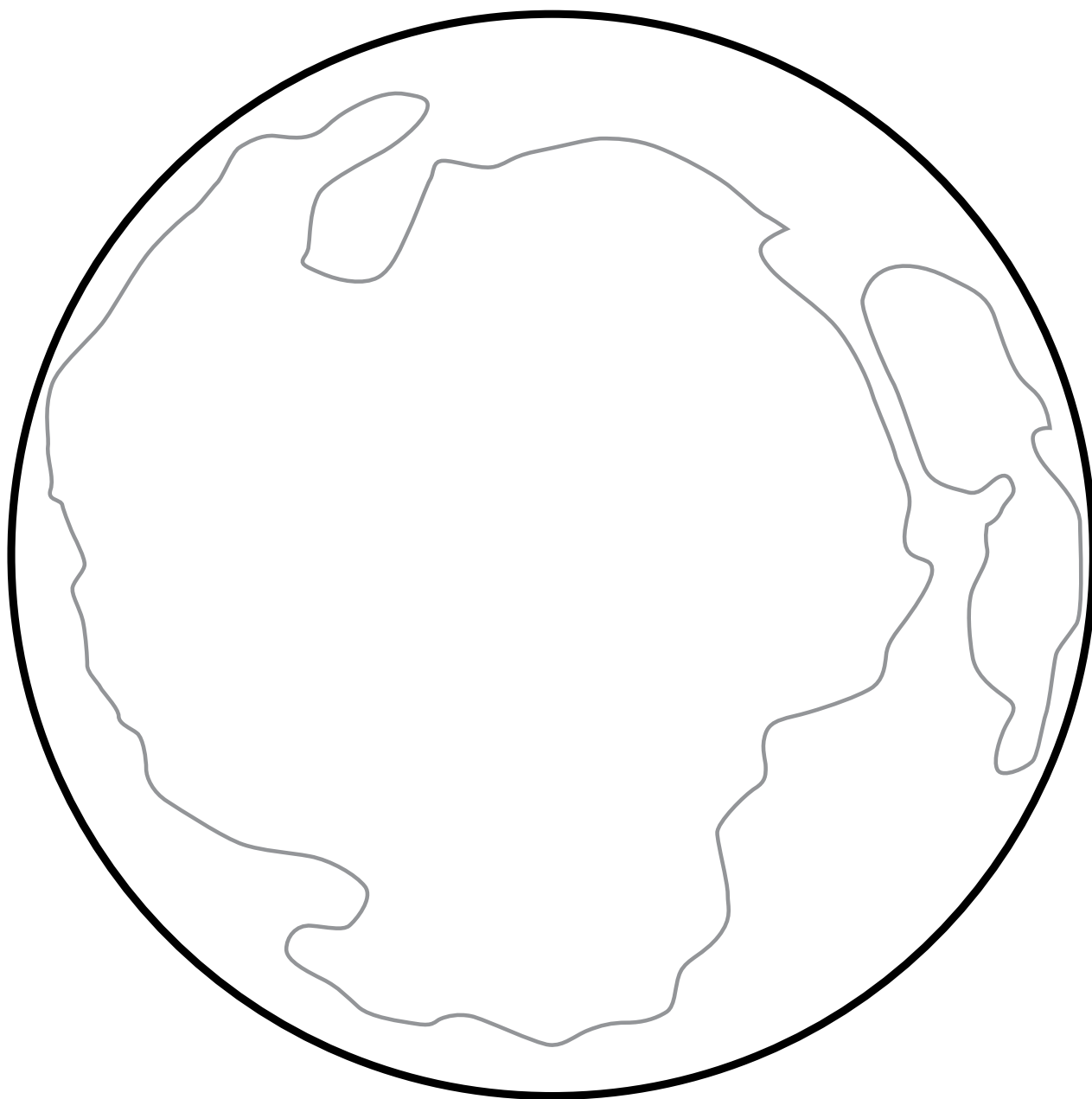
Apollo 12 landing site



Name \_\_\_\_\_ Date \_\_\_\_\_

## Maps on the Moon

- 1 Color the mare you see on the Moon.







## Maps on the Moon *(cont.)*

2

Draw and color one Earth crater and one Moon crater.

**Earth Crater**

**Moon Crater**



## Maps on the Moon *(cont.)*

- 3 Draw what you see at the Apollo 12 landing site. Label as many items as you can.

### Apollo 12 Landing Site

- 4 Read the story problem and answer the questions.

Six Apollo missions landed on the Moon. Each trip had three astronauts. Two of them walked on the Moon, and one stayed in the Command Module orbiting the Moon. When the astronauts were done with their moon boots, they left them on the surface to make room in their spaceship for Moon rocks.

How many people landed on the Moon? \_\_\_\_\_

How many moon boots are on the Moon? \_\_\_\_\_



## Diving Below the Ocean Surface

### Standards

Students know that Earth materials consist of solid rocks, soils, liquid water, and the gases of the atmosphere. Students know areas that can be classified as regions according to physical criteria.

### Google Earth Tools

- Layers panel: Borders and Labels
- Status bar: Eye alt
- View: Water Surface\*

### Overview

Students will use Google Earth to explore seamounts, and islands below the surface of the ocean.

### Vocabulary

- island
- mountain
- seamount

### Materials

- *Undersea Mountains* activity sheets (pages 208–210)
- chart paper and markers
- crayons
- *An Island Grows* (Schaefer 2006) (optional)

### Procedure

1

Read *An Island Grows* (Schaefer 2006) or another book about islands. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Distribute copies of the *Undersea Mountains* activity sheets (page 208–210) to students.

2

Ask students to describe a mountain and record their responses on chart paper. Open Google Earth and **Fly to Mt. Everest, Nepal**. **Zoom** in and use the **Look joystick** to look around the mountain. **Zoom** all the way down to one of the surrounding valley floors and use the **Look joystick** to look up at the mountain. Have students draw a mountain on their activity sheets (question 1).

3

**Fly to Hawaii** and **zoom** in to about 200 km (125 mi.) above the main island of Hawaii. Turn on the **Borders and Labels layer** in the **Layers panel** to see several seamounts south of Hawaii. Look for Apuupuu Seamount and Loihi Seamount and center the **3D viewer** on a point between the two (**lat/long** 18 43 10 N 155 18 0 W).

\* Tool introduced in this lesson



## Diving Below the Ocean Surface *(cont.)*

### Procedure *(cont.)*

**4** In the **Menu Bar** under **View**, turn on **Water Surface**. As you slowly **zoom** in, tell half of your students to watch the **Eye alt** and tell you when it becomes negative. Tell the other half of the class to watch the **3D viewer** and let you know when you dive below the surface of the ocean.

**5** **Zoom** in to about -450 m (-1,500 ft.) and then use the **Look joystick** top arrow to tilt your view up until you see the surface of the ocean above you. Use the **Look joystick** to look around. Tell students that a seamount is a mountain that is completely below the water. Ask students if the seamounts are sticking out above the water or if they are completely below the water.

**6** Have students draw a seamount on their activity sheets (question 2). Have them color the whole box blue to show that the seamount is under water.

**7** On their activity sheets, have students write a short explanation of how a seamount is different from a mountain (question 3).

**8** **Zoom** in on a spot just off the southern coast of Hawaii (west of the Papau Seamount works well) until you are just under the surface of the water. Click

and hold the up arrow on the **Look joystick** until you can see the underwater part of the island. **Zoom** out slowly until you are just above the surface of the water and you can see the part of the island that is above water. Go back and forth between the underwater and above water views to show students that the island is a mountain that starts on the ocean floor and then rises up through the surface of the water.

**9** On their activity sheets, have students color the island above and below the water (question 4).

**10** Have students use what they have learned to fill in the blanks on their activity sheets (question 5).

### Extension Activities

- **Fly to Monterey Canyon**, just off the coast of Monterey, California, and explore. Have students dive under the surface and look around this canyon. Help them investigate the depth and compare it to the Grand Canyon.
- Have students make mountains, seamounts, and islands out of clay and place them in basins or trays of water to illustrate each type of landform.



## Diving Below the Ocean Surface *(cont.)*

### Did You Know?

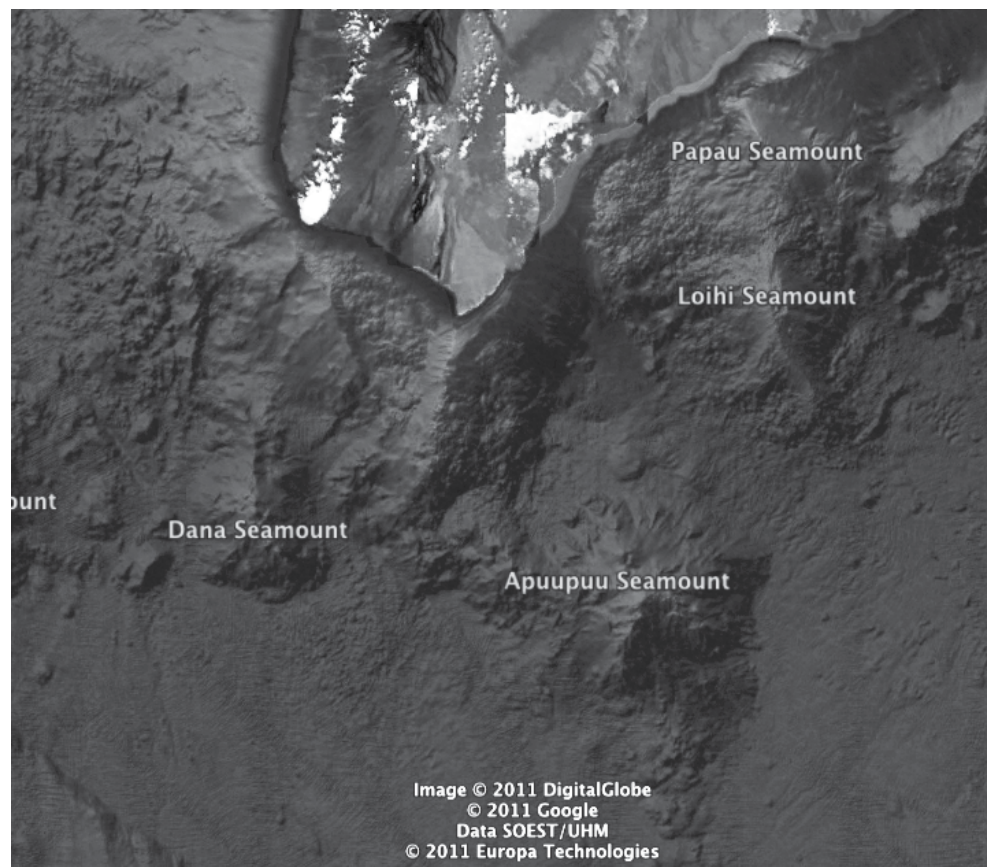


The Hawaiian Islands were formed when the Pacific plate moved north over a hot spot below the ocean's surface. The first island to form over the hot spot was Kauai. As the plate moved northwest, Oahu, Molokai, and then Maui formed. Now Oahu is over the hot spot and has active volcanoes, especially Kilauea.

### User Tip

In most places in Google Earth, the ocean bottom topography is very low resolution, but around Hawaii and Monterey, the resolution is high enough to provide an exciting view below the sea surface.

### Screenshot



**Seamounts south of Hawaii**



Name \_\_\_\_\_ Date \_\_\_\_\_

## Undersea Mountains

1 Draw and color a mountain.

**mountain**

2 Draw and color a seamount.

**seamount**





## Undersea Mountains *(cont.)*

3

Describe how a seamount is different from a mountain.

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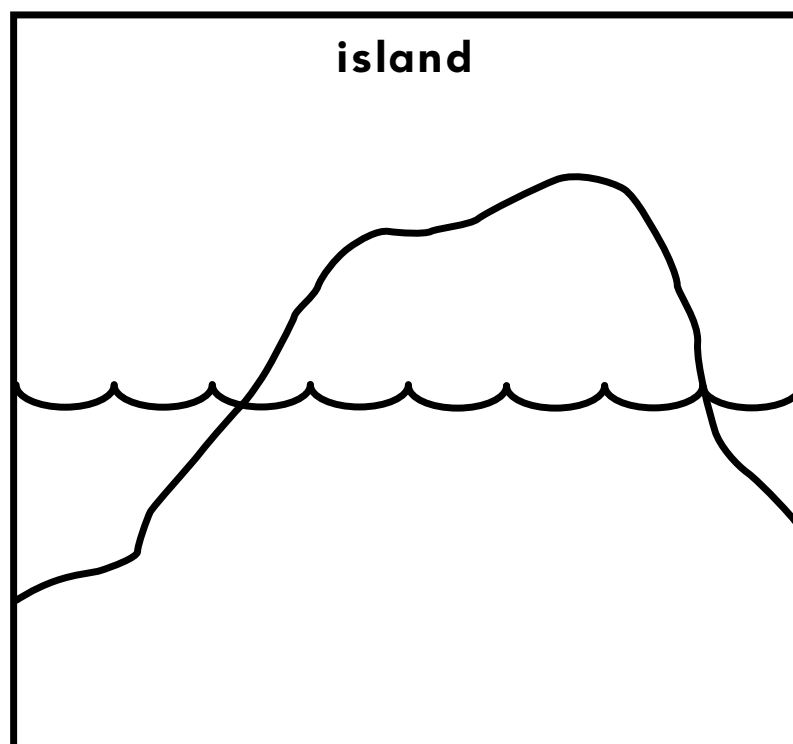
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4

Color the island. The bottom half of the box is under the water. Make the colors match what you saw on Google Earth.





## Undersea Mountains *(cont.)*

5 Fill in the blanks below using the words in the word box.

Word Box		
island	mountain	seamount

A \_\_\_\_\_ is completely above the water.

A \_\_\_\_\_ is completely underwater.

An \_\_\_\_\_ sticks up out of the water.



## Describing Colors on Earth

### Standards

Students know the differences among visual characteristics (e.g., color, texture) and purposes of art (e.g., to convey ideas).

Students know areas that can be classified as regions according to physical criteria.

### Google Earth Tools

- Status bar: Eye alt
- Layers panel: Global Awareness: The Earth from Above with GoodPlanet\*

### Overview

Students will call upon all their Google Earth skills to create their own art inspired by colorful images on Google Earth.

### Vocabulary

- photograph
- season

### Materials

- *Earth Colors* activity sheets (pages 214–216)
- chart paper
- crayons, markers or colored pencils

### Procedure

1

Distribute copies of the *Earth Colors* activity sheets (pages 214–216) to students and open Google Earth. **Zoom** to a view of Earth that is centered on Australia at about **Eye alt** 48,000 km (30,000 mi.) Open a discussion about what colors and textures students see. Start a collaborative list of describing words, such as “rusty orange” and “bumpy,” on the board or chart paper.

2

Tell students that a photographer named Yann Arthus-Bertrand, flew around the world and photographed Earth from his airplane. He focused on some of the most beautiful and colorful parts of our planet. In the **Layers panel**, open the **Global Awareness layer** and turn on **The Earth from Above with GoodPlanet layer**. Click on the icons in the **3D viewer** to see Mr. Arthus-Bertrand’s photographs.

3

The chart at the bottom of the next page shows some particularly interesting areas in which to compare Yann Arthus-Bertrand’s photographs with the view from Google Earth. Navigate to the Google Earth view of each location and ask students to describe the colors and textures they see. Add their descriptive words to the list you created earlier.

\* Tool introduced in this lesson



## Describing Colors on Earth *(cont.)*

### Procedure *(cont.)*

4

Ask students what they think Earth's surface is in each area. Then look for and click on the icon to open the Arthus-Bertrand photograph to see a closer view. Have students fill in the chart on their activity sheets for each location (question 1).

5

**Fly to** Stillwater, Minnesota (**Eye alt** 16 km or 10 mi.). Images taken at four different times allow you to see the colors of the seasons all in one view. Ask students to identify the seasons by the colors (white snow in winter, dark green leaves in summer, etc.)

6

Ask students to use crayons or colored pencils to create an abstract drawing for each season on their activity sheet (question 2). They do not need to draw any outlines or make any particular shapes, just color each box randomly with different shades they might see in a Google Earth image from each season. Have students write two describing words for each season. (question 3).

Location	Eye alt	Photograph
Bali, Indonesia	2 km (6,500 ft.)	<i>Harvesting Algae</i>
San Rafael lagoon, Chile	6 km (20,000 ft.)	<i>Glacier flowing into the San Rafael lagoon</i>
Leona River, Santa Cruz, Argentina	3 km (9,000 ft.)	<i>Leona River</i>



## Describing Colors on Earth *(cont.)*

### Extension Activity

Have students explore Australia and Arizona in Google Earth. Tell them to look for regions that have warm colors such as oranges, reds, and yellows. When students have discovered an area they like, have them create a painting using the image as inspiration. They can add textures to their paintings by pasting or gluing items that they find outdoors, like small leaves and rocks.

### Did You Know?

Earth art is an art form that is created in nature using natural materials, such as rock, wood, soil, and water, along with man-made materials such as concrete and metal. The works are usually in the open and are left to erode over time. One example is in Emmen, The Netherlands at a **lat/long** of 52 48 33 N 6 55 44 E, **Eye alt** of 200 m (700 ft.) Another example is Spiral Jetty in The Great Salt Lake at **lat/long** 41 26 16 N 112 40 08 W, **Eye alt** 2 km (6,500 ft.).

### Screenshots



Harvesting algae, Bali, Indonesia

IMAGE © 2011 DIGITALGLOBE, © YANN ARTHUS-BERTRAND/EARTH FROM ABOVE, © GOOGLE



Glacier flowing into the San Rafael Lagoon, Chile

© 2011 CNES/SPOT IMAGE, © YANN ARTHUS-BERTRAND/EARTH FROM ABOVE, © GOOGLE



Name \_\_\_\_\_ Date \_\_\_\_\_

## Earth Colors

- 1 Look at each place in Google Earth and write some describing words about it.

Location	Describing Words
Bali, The Philippines	
San Rafael Lagoon, Chile	
Leona River, Argentina	





- 3 Write two describing words under each picture.

---



## Earth Colors *(cont.)*

**Fall**

**Winter**



## Observing Earth at Night

### Standards

Students know that electricity in circuits can produce light, heat, sound, and magnetic fields.

Students understand why people choose to settle in different places.

### Google Earth Tools

- Layers panel: Gallery: NASA: Earth City Lights\*
- Layers panel: Roads\*

### Overview

Students will explore Earth at night in Google Earth and what it can tell them about where people live.

### Vocabulary

- coastline
- floodplain

### Materials

- *Night Lights* activity sheets (pages 220–222)
- crayons
- *Owl Moon* (Yolen 1987) (optional)

### Procedure

1

Read *Owl Moon* (Yolen 1987) or another book about nighttime aloud to students. (See the Recommended Literature List in Appendix F, page 242, for more titles.) Ask students to describe what they can see at night. Ask if they can see colors or bright lights. Ask what Earth might look like at night from space. Ask students what they might be able to see and what would be hard to find.

2

Distribute copies of the *Night Lights* activity sheets (pages 220–222) to students and open Google Earth. In the **Layers panel**, open the **Gallery layer**, then open the **NASA layer**, and turn on the **Earth City Lights layer**. Turn the layer on and off a few times and ask students to color the daytime and nighttime globes on their activity sheet (question 1).

3

Ask students what they think the bright spots on the Earth are. Ask them why they think there are more or bigger lights in some places. Tell students that there are a lot of people where they see the biggest lights. Show each continent in turn, and ask students which continents have a lot of people, based on the lights they see.

\* Tool introduced in this lesson



## Observing Earth at Night *(cont.)*

### Procedure *(cont.)*

**4** Navigate to your town. Ask students if the lights in your town show that a lot of people live there. **Zoom** out to show your state or country. Ask students if they see some patterns indicating where people settle. Ask students if they see many cities along coastlines. Ask students why they think some of the lights look like they are in a straight line.

**5** Navigate to Egypt until it fills the **3D viewer**. Ask students to describe what they see. Turn the **Earth City Lights layer** on and off to help students discover that most of the people in Egypt live along the Nile River or on the Nile floodplain because that is where the water is. In the daytime view, **zoom** in and look along the floodplain and delta for crops and towns. Explore the desert to the west of the Nile Valley, and then turn on the **Earth City Lights layer**. Ask students if many people live in the desert and why they think that is. Ask students to draw pictures of themselves enjoying the water from the Nile (question 2) and wishing for water in the middle of the Sahara Desert (question 3).

**6** **Zoom** out to a global view and use the cursor to rotate Earth. Make sure all layers except for **Earth City Lights** are turned off for the best view. **Earth City Lights** images were taken by satellites. Ask students if these images could have been taken all at one time. Discuss with students how **Earth City Lights** images were taken over time since only half of Earth is dark at one time. Turn off the **Earth City Lights layer** and use the **Sun slider tool** to review with students that it is only nighttime on half of the Earth at one time.

**7** Turn the **Earth City Lights layer** back on, navigate to the United States, and turn on the **Roads layer**. Ask students if the roads are connected to the big cities. Ask students to describe the relationship between the roads and cities they see. Initiate a debate about whether the roads or the cities came first.



## Observing Earth at Night *(cont.)*

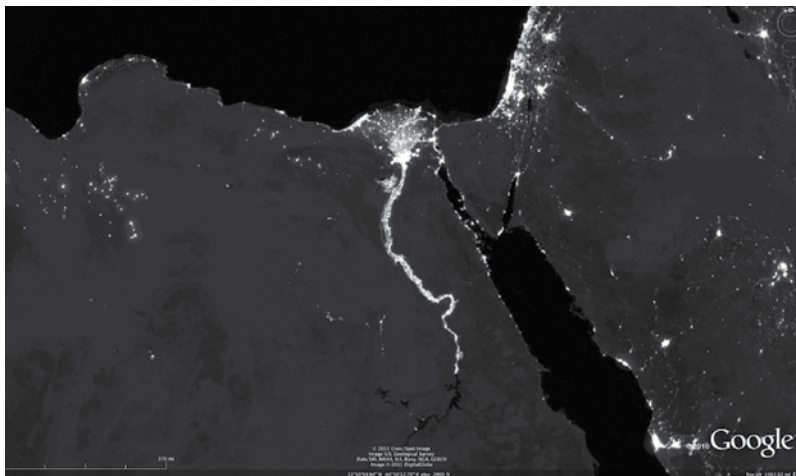
### Extension Activity

Have students compare the brightness of the United States to other countries around the world. Ask students if they think the people in the United States use a lot of electricity. Ask students how they could do something about this.

### Did You Know?

The International Space Station orbits Earth every hour and a half. That means that the astronauts are in daylight for 45 minutes and then in darkness for 45 minutes. It also means they see a sunrise or a sunset every 45 minutes.

### Screenshots



Egypt at night

© 2011 CNES/SPOT IMAGE, IMAGE U.S. GEOLOGICAL SURVEY, DATA SIO, NOAA, U.S. NAVY, NSA, GEBCO, IMAGE © 2011 DIGITALGLOBE, © GOOGLE



U.S. at night

© 2011 CNES/SPOT IMAGE, IMAGE USDA FARM SERVICE AGENCY, DATA SIO, NOAA, U.S. NAVY, NSA, GEBCO, IMAGE © 2011 TERRAMETRICS, © GOOGLE



Name \_\_\_\_\_ Date \_\_\_\_\_

## Night Lights

- 1 Color one of the globes below to show daytime, and the other to show nighttime.



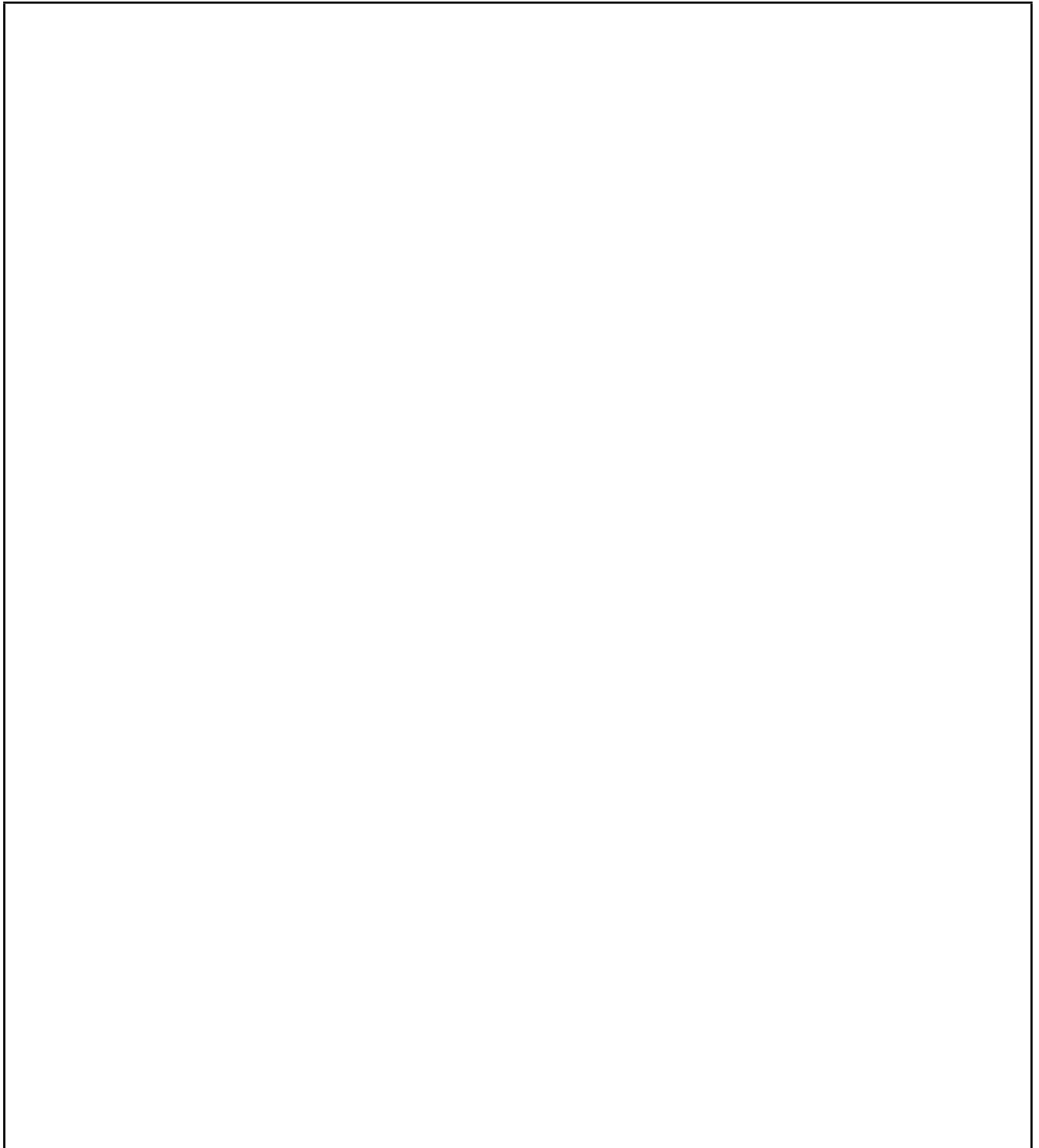




## Night Lights *(cont.)*

**2**

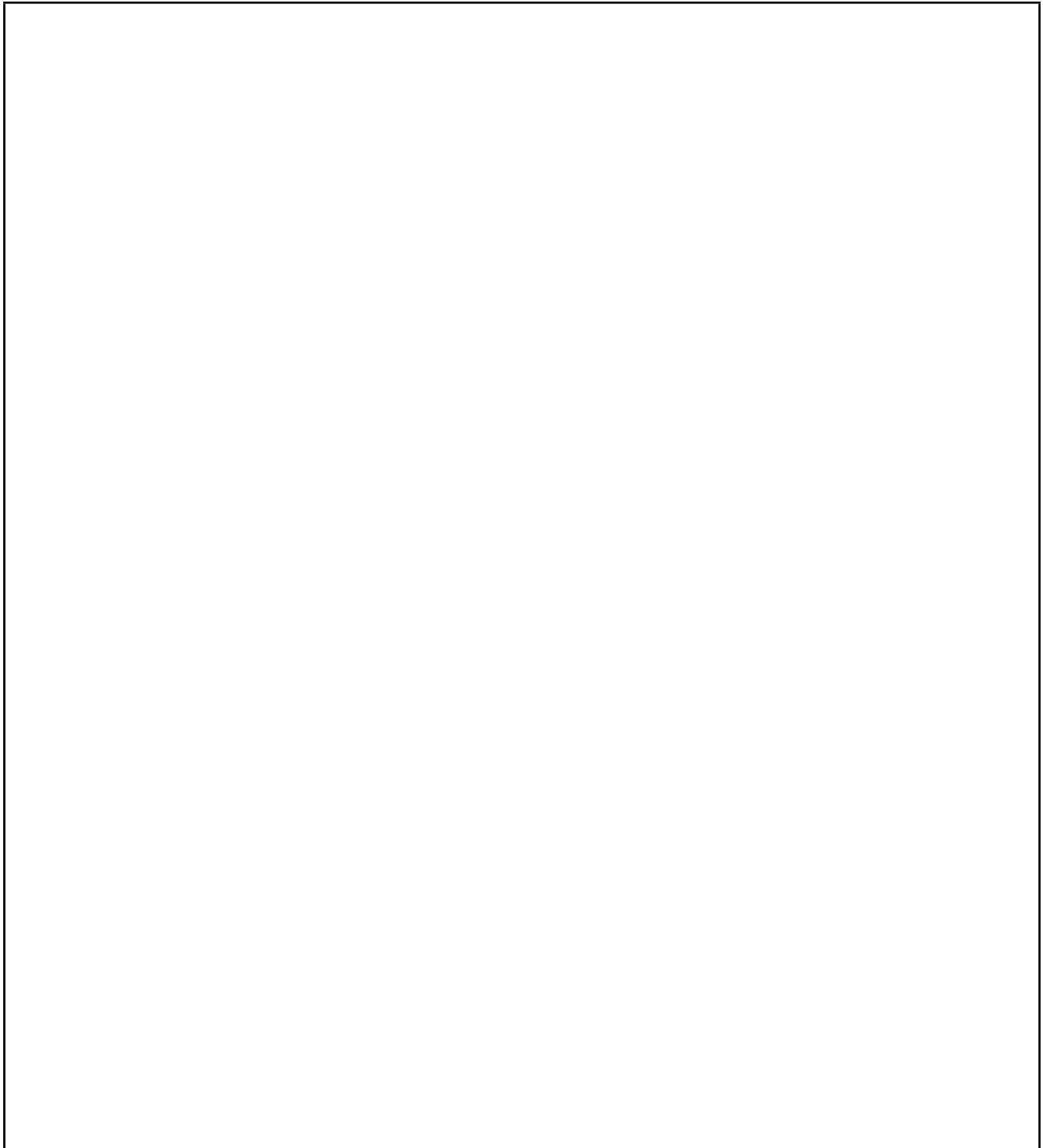
Draw yourself enjoying the waters of the Nile.





## Night Lights *(cont.)*

3 Draw yourself in the Sahara Desert, without water.





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## Answer Key

### Learning to Fly

#### Exploring the Globe (pages 34–36)

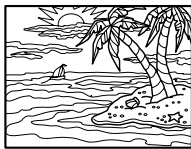
1.



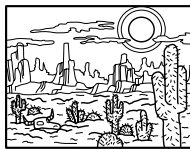
ocean



jungle



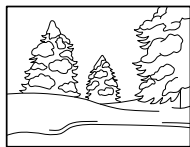
island



desert

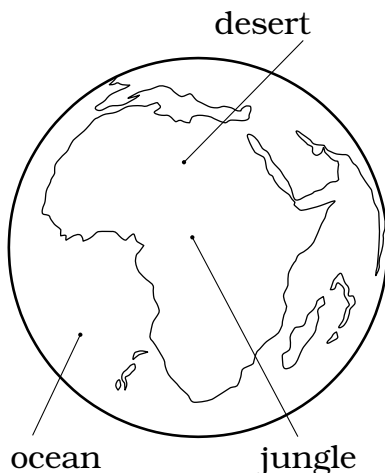


forest



ice and  
snow

2.



#### Moving Around Earth (pages 41–42)

1. North-up button

Look joystick

Move joystick

Zoom slider

2. Students should draw a curved horizon.

3. Students should draw a straight horizon.

#### Different Views (pages 46–48)

1. Responses will vary.

2. Students should draw the shapes seen in the Statue of Liberty from overhead.

3. Responses will vary.

4. Responses will vary.

#### Big Picture (pages 52–54)

1. Students should draw an outline of their country.

2. Students should put an X on their state in the drawing of their country.

3. Responses will vary.

4. Responses will vary.

5. Responses will vary.

6. Students should write the name and draw the shape of their state.

7. Students should put an X on their school in the drawing of their state.

8. Responses will vary.

9. Responses will vary.

10. Responses will vary.

### Seeing Earth

#### Highs and Lows (pages 58–60)

1. Students should draw a volcano.

2. Students should draw Mt. Taranaki.

3. Responses will vary.

4. Approximately 2,400 m (7,900 ft.)

5. Students should draw four natural features and write the highest elevation of each.



## Answer Key *(cont.)*

### Adding to Earth (pages 65–66)

1.

Natural	Man-made
grass	houses
trees	roads
animals	cars
birds	playgrounds
oceans	schools

2. Students should color the bay and ocean blue and the land green or brown.

3. and 4.

The land route should be drawn in red and the bridges in black.



### Reading Between Earth's Lines (pages 70–72)

- Students should draw the equator on the globe.
- Students should draw some longitude/latitude lines on the globe.
- Students should draw a squiggly line representing the border between Texas and Mexico.
- Students should draw two intersecting straight lines to represent the four corners border.
- Students should draw the shape of their state and list any natural features that make the borders.

### Comparing Sizes (pages 76–78)

- Students should draw the Golden Gate Bridge and their school. The drawings do not need to be to scale.

- Students should draw the Golden Gate Bridge and their school roughly in scale.
- Responses will vary.

## Building My World

### Pin the Placemark on My School (pages 82–84)

- Students should draw two parts of their school as they may appear from overhead in Google Earth.
- Students should use simple shapes to draw their school as it appears in Google Earth.
- Students should draw placemarks on the picture they drew for question 2.
- Students should draw a simple map of their classroom and add icons.

### Neighborhood Knowledge (pages 88–90)

- Students should write the name of the class folder that you created in Google Earth.
- Students should write the names of the locations the class visited in Google Earth and draw icons for them.
- Students should draw a community helper and write a sentence about how they help.
- Students' names should be written on the first line of the folder.
- On the folder, students should write three places they would like to visit and draw an icon for each.

### Places in Books (pages 94–96)

- Students should draw a place from the story as it appeared from overhead in Google Earth.
- Students should draw a ground-level view of the place they drew in question 1.
- Students should write one thing that is the same about the pictures they drew in questions 1 and 2.
- Students should write one thing that is different between the pictures they drew in questions 1 and 2.
- Students should list book settings that are real and might be found in Google Earth.



## Answer Key *(cont.)*

### Learn About Egypt (pages 100–102)

1. Students should draw an overhead view of the pyramids.
2. Students should write two questions about the pyramids or the Sphinx.
3. Students should draw either a pyramid or the Sphinx as they see it in Google Earth 3D View.
4. Students should write two facts about Egypt.
5. Students should draw lines connecting each place to one or more folders. Responses may vary.

### Language Arts

#### Into the Book (pages 106–108)

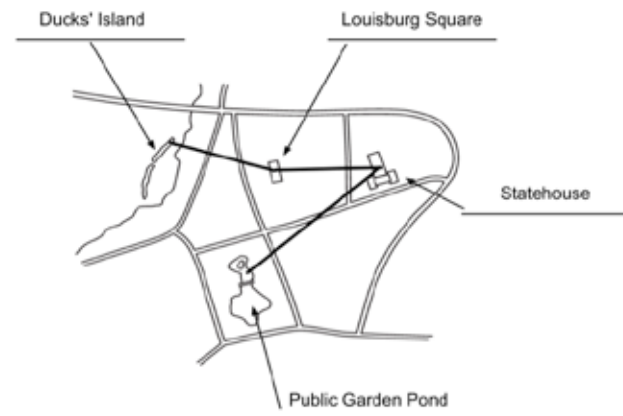
1. Students should trace the shoreline of Maine.
2. Responses will vary. Sample responses include: jagged, broken, wet.
- 3.



4. Students should color the ocean blue, the shore white or tan, and the interior of the island green.
5. Ocean: seal or loon, Shore: clam or seagull, Forest: fish hawk, Sky: fish hawk or sea gull
6. Students should write the names of three books that have real-life settings.

### Mapping a Book (pages 112–114)

1. All items should be checked off.
- 2., 3., and 4.



5. Responses will vary.

### Book Tour (pages 118–120)

1. England: dairy; France: egg; Italy: wheat; Vermont: apples; Jamaica: sugar cane; Sri Lanka: cinnamon.
2. Responses will vary.
3. Responses will vary.

### Put the Story in Order (pages 124–126)

1. Students should draw the bridge, the lighthouse, and their school in roughly the right scale.
2. Students should draw four images from the story in the order in which they occur.

### Social Studies

#### Old and New (pages 130–132)

1. Responses will vary.
2. Students should draw the shape of old Yankee Stadium.
3. Students should draw the shape of new Yankee Stadium.
4. Younger.
5. Younger.
6. Responses will vary.





## Answer Key *(cont.)*

### From Coast to Coast (pages 136–138)

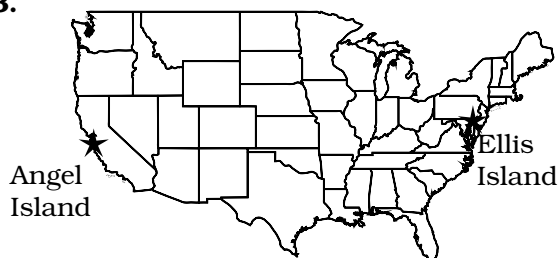
1. Palos, Spain; Canary Islands; San Salvador, The Bahamas; Cuba; Haiti.
2. and 3.



4. West
5. East
6. Students should color the ship.
7. Responses will vary.

### Immigration Stations (pages 142–144)

1. Students should draw a line from Europe to the general area of New York City.
2. Students should draw Ellis Island and the immigration building.
- 3.



4. Responses will vary. Sample responses include: They were near the ocean; They are sheltered; They are islands.

### Celebrate America (pages 148–150)

1. Responses will vary.
2. MLK Jr. Day—January; Washington's birthday—February; Memorial Day—May; Flag Day—June; Independence Day—July; Columbus Day—October; Thanksgiving—November
3. Responses will vary.

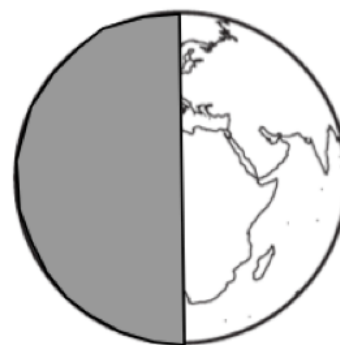
### Science

#### Ocean Life (pages 154–156)

1. Students should color the globe to match Google Earth.
2. Four or more
3. Responses will vary.
4. Responses will vary.
5. Responses will vary.
6. Responses will vary.
7. Responses will vary.
8. Responses will vary. Sample responses include: to find food; to have offspring; to find a mate; to escape cold weather.

#### Shadows on Earth (pages 160–162)

1. day; night
- 2.



3. Students should draw one activity they do at night and one they do in the day.
4. Students should color the lengths of the winter day and summer day they observed.
5. shorter; longer

#### Where is the Weather? (pages 166–168)

1. Students should color the globe to match Google Earth and add cotton "clouds" across the middle of Africa.
2. Students should color the thermometer to reflect the temperature in their town.
3. Responses will vary.
4. Responses will vary.



## Answer Key *(cont.)*

### Ice Is Nice (pages 172–174)

1.



2. Students should draw the Arctic sea ice as it appears in Google Earth.
3. Students should draw each form of water in the correct box.

### Mathematics

#### Shaping Up Washington, DC (pages 179–180)

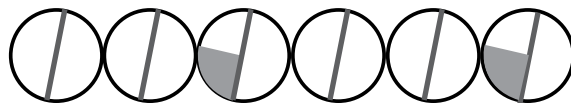
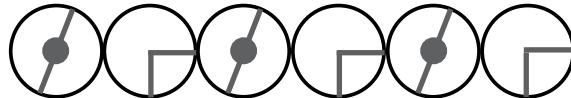
1. Students should draw a triangle connecting three houses.
2. Students should draw a rectangle connecting four houses.
3. Students should color in an oval or a circle.
- 4.

3 corners, 3 sides	4 corners, 4 sides	Infinite points, no straight sides
triangle	square rectangle	circle oval

#### Shape Up the Farm (pages 184–186)

1. Students should draw lines to divide each square into smaller squares and rectangles. Each square should be divided differently.
2. Students should draw lines to divide each circle into smaller parts. Each circle should be divided differently.

3.



### Nose to Tail (pages 191–192)

1. Students should draw a ground-level view of a cow or cows, the airplane overhead, and shadows.
2. Students should color the airplane they drew red.
3. Responses will vary.
4. Responses will vary.
5. Responses will vary.

### All Aboard! (pages 196–198)

1. Students should write the colors of the train cars across the bottom of the graph.
2. Students should color in each column to show the correct number of train cars.
3. Students should record the number of cars of each color and add to get the total number of cars.
4. Responses will vary. Sample responses include: How many cars are (color)? Which color had the most/least cars? How many more (color) cars are there than (color) cars?



## Answer Key *(cont.)*

### Beyond Earth

#### Maps on the Moon (pages 202–204)

1.



2. Students should draw one Earth and one Moon crater.
3. Students should draw the Apollo 2 landing site. Possible labels include: ALSEP, Small mound, EVA 1, Large mound, Head Crater, EVA 2, Triple Craters, Boulders with Fillets, High Bench, Low Bench, Halo Crater, Surveyor Crater, Block Crater.
4. 12 people; 24 moon boots

#### Undersea Mountains (pages 208–210)

1. Students should draw and color a mountain.
2. Students should draw and color a seamount.
3. Seamounts are located under water and mountains are not.
4. Students should color the water blue and the land brown or green.
5. mountain; seamount; island

#### Earth Colors (pages 214–216)

1. Responses will vary.
2. Responses will vary.
3. Responses will vary.

#### Night Lights (pages 220–222)

1. Students should color one globe to show daytime and one to show nighttime.
2. Responses will vary.
3. Responses will vary.



## Assessment Rubric

Use this chart to assess students' technology skills. An example of how to fill it out has been shown here.

### Google Earth Skill Assessment Sample

Name: \_\_\_\_\_

Skill	Cannot Perform	Can Perform with Assistance	Can Perform Independently	Can Use and Apply in Other Situations	Comments
Placemarking			✓		
Create a Path		✓			
Use Ruler Tool				✓	



## Assessment Rubric *(cont.)*

Use this chart to assess students' technology skills. Use the blank lines to customize the chart as you want.

### Google Earth Skill Assessment Template

Name: \_\_\_\_\_

Skill	Cannot Perform	Can Perform with Assistance	Can Perform Independently	Can Use and Apply in Other Situations	Comments

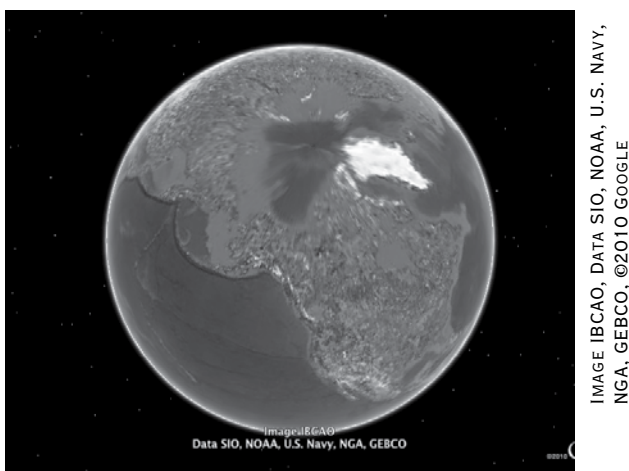


## How-to Guide

### 1. Installing and Opening Google Earth

To install Google Earth, go to <http://www.earth.google.com> and download the latest version. Look for the .dmg file on your desktop and click on it. Follow the installation instructions.

To open Google Earth, click on the application. If a pop-up window appears, close it. A view of Earth appears and you are ready to begin.



### 2. Google Earth Window

The **Google Earth Window** includes the **Menu Bar**, the **3D viewer**, the **Toolbar**, and the **Search, Places, and Layers Panels**. Within the **3D viewer** are the **Status bar** (at the bottom) and the **navigation tools** (in the upper right). (See page 13 for a full view of the **Google Earth Window** and all the tools, or see Reference.pdf on the Teacher Resource CD.)

### 3. Google Earth Status Bar

The **Status bar** provides information about the location of the cursor or the center of the **3D viewer**.

**Latitude and Longitude:** The latitude and longitude (**lat/long**) display in the **Status bar** identifies the coordinates of the cursor, or, if the cursor is off the **3D viewer**, the coordinates at the center of the **3D viewer**.

**Elev:** The **elev** display represents the elevation, or height of the land relative to sea level at the location of the cursor, or, if the cursor is off the **3D viewer**, the elevation at the center of the **3D viewer**. If the cursor is over the ocean, the elevation is the depth of the ocean.

**Eye Alt:** **Eye alt** is the height of your eye relative to sea level at the center of the image.

### 4. Google Earth Navigation Tools

The **navigation tools** allow you to maneuver around the **3D viewer** and to change the **Eye alt** of your view as well as your perspective.

**Look Joystick:** The **Look joystick** has an eye on it and it allows you to change your view as if you were moving your eyes. In a close-up view, the arrows allow you to view a mountain or building as if you were standing next to it, looking up and down, left and right. The bottom arrow returns you to an overhead view.



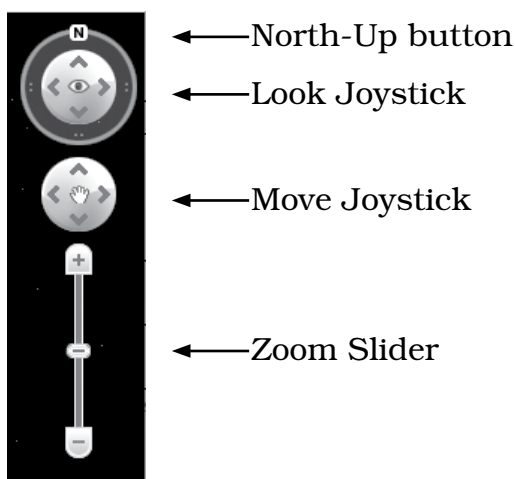


## How-to Guide *(cont.)*

The **North-up button** on the **Look joystick** rotates your view clockwise or counterclockwise. When the Earth is not in a North-up view, click the N on the **North-up button** once to return the Earth to a North-up orientation.

**Move Joystick:** From a close-up view, the **Move joystick** allows you to move to the north, south, east or west of your current view, depending on which arrow you press. Hold down a section of the circle in the **Move joystick** to fly along above Earth. From a global view, the **Move joystick** rotates the Earth around an axis.

**Zoom Slider:** The **zoom slider** allows you to change your **Eye alt**, which makes it look like you are zooming in and out of a scene in the **3D viewer**. Click and hold on the **+zoom** to move closer to the surface, or the **-zoom** to move farther away.



**Street View:** **Street view** allows you to view a region from the level of the street in some locations. **Zoom** in to an **Eye alt** of between 100 and 500 miles until the **Street View pegman icon** appears above the **zoom slider**. Drag the pegman across the **3D viewer** and look for blue lines. Drop the pegman over any of the blue lines and the view will change to a photograph of the view from the street. Use your cursor to drag the image to the left or right to look around, or use the **Move joystick** to move down the road. (**Note:** This imagery is taken from a camera on top of a car; Google™ is building this data set every day.)

### 5. Google Earth Search, Places and Layers Panels

**Search Panel:** Use the **Search panel** to find a specific location. Type the location in the **Fly to box** and click the magnifying glass or the return key on your keyboard. Google Earth recognizes the following types of search terms:

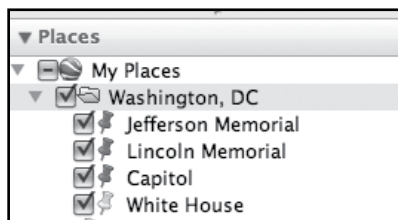
- City, state
- City, country
- Number, street, city, state or country
- Zip code or postal code
- Latitude and longitude (**Note:** These should be entered without symbols, but with spaces between degrees, minutes, seconds and cardinal direction, e.g., 72 33 44 N 134 23 45 E)



## How-to Guide *(cont.)*

Sometimes a number of options appear under the **Fly to box**. Double-click the one that you are looking for to fly to it directly.

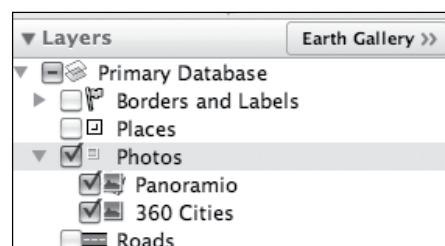
**Places Panel:** Places that you have searched for can be dragged from the **Search panel** to the **Places panel** using your cursor. Once in the **Places panel**, these places will appear every time you open Google Earth. **Placemarks, paths** and **tours**, as well as folders, are stored in the **Places panel** for future reference.



**Layers Panel:** The **Layers panel** contains a variety of information about Earth in the form of overlays and **placemarks** collected by Google. To see these layers, click the small arrow (Mac) or plus sign (PC) next to **Primary Database** to open the database. Ten layers will appear. Click on the box to the left of each layer turn on the layer and see the overlay or **placemarks** that are contained in that layer. For example, turn on the **Roads layer** to see road lines and names overlaid in Google Earth. When a layer is on, you will see a check mark in the box directly to the left of the layer name. Click the box again to turn the layer off.

If layers have an arrow (Mac) or plus sign (PC) to the left of their names, it means there are additional sublayers available. Click the arrow the plus sign to open the layer menu and see the layers within.

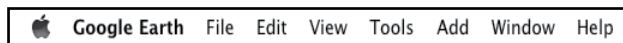
**Note:** Only keep one or two layers on at a time to prevent Google Earth from slowing down



Google Earth is constantly updating the layers data. If any of the layers used in these lessons do not appear in the **Layers panel**, search in the **Google Earth Gallery** for the missing layers.

## 6. Google Earth Menu Bar

The **Menu Bar**, located at the very top of your computer screen, offers a number of options, some of which are duplicated in the **Toolbar**.



**File > Save > Save My Place As:** To save a **placemark** or folder, highlight it the **Places panel**. Click **File**, then select **Save** and then **Save My Place As...** to save. A pop-up window will allow you to name the file and



## How-to Guide *(cont.)*

choose where to save it. The file is a **.kmz** (keyhole markup language) or **.kml file** named after the computer language used in Google Earth.

**Edit > Find:** To search for a **placemark** you have previously saved, using a keyword, click **Edit** and select **Find**. In the **Find box** type in a word from the name of a folder or **placemark** that you have saved previously.

**View > Grid:** To overlay latitude and longitude lines on the Earth, click **View** and select **Grid**. The equator, the Date Line, the Tropics of Cancer and Capricorn, and the Arctic and Antarctic Circles are highlighted.

**View > Scale Legend:** To add a scale to the lower left corner of the **3D viewer**, click **View** and select **Scale Legend**.

**View > Water Surface:** To add an artificial water surface over the ocean, click **View** and select **Water Surface**. You can dive below this surface by **zooming** into the ocean and looking up at the surface from below using the **Look joystick**.

### 7. Google Earth Toolbar

The **Toolbar**, located at the top of the **3D viewer**, allows easy access to a number of tools that can add information to your **3D view**.



**Placemark:** Save a favorite view as a **placemark** by clicking on the **placemark tool**. In the **Placemark window**, name your **placemark** and add a description. Move the yellow thumbtack cursor in the **3D viewer** to a desired location while the **Placemark window** is open. Click **OK** to save the **placemark**. It will appear either in the **Search panel** or **Places panel**. Drag it to the **Places panel** to save it until the next time you open Google Earth.

To modify or move a **placemark**, right-click (or control-click) on it in the **Places panel**. Select **Get Info** (Mac) or **Properties** (PC) and the **Placemark window** will reappear. You can add a new name or modify the description. Click on the **Style, Color tab** to modify the color and size of the **placemark icon** and label. Choose **View** and use the **navigation tools** to select a new view related to that **placemark**. Click on **Snapshot current view** to keep the new view.

You can change the look of the **placemark icon**. Click on the yellow thumbtack in the upper right corner of the **Placemark window**. A **Placemark icon window** will appear where you can select any number of **placemarks**, or choose **No Icon** if you want to label a **placemark** with a name but not an icon.



## How-to Guide *(cont.)*

**Placemarks** may be collected and organized in folders. At the top of the **Places panel**, right-click (or control-click) on the **My Places** folder and choose **Add**, then **Folder**. A **New Folder window** will appear that is similar to the placemark window. Type in a name and click OK. This new folder will appear at the bottom of your list of placemarks in the **Places panel**. Move it to the top of the panel just under **My Places** by dragging it with the cursor. Use the cursor to drag placemarks into this folder. Second and third level folders may be added by right clicking on the first level folder, and then proceeding as above.



**Polygon:** To create a **polygon** around a feature, click on the **polygon tool** and a **polygon window** will appear. Name the **polygon** and move the cursor (which will be a square) to the first corner of the feature you want to label and click once. Click on the next corner and proceed around the area until all corners are clicked. Click on the **Style, Color Tab** in the **polygon window** and choose a color and an opacity for the lines and the area (100% if you want the lines or area to show up; 0% if you want them to disappear). Click OK.



**Path:** To create a **path**, click on the **Path tool** in the **Toolbar**. You will see a **path window** and

a square **path cursor** in the **3D viewer**. Name the **path**. Place the **path cursor** over beginning of your desired path and click once. You should see a colored dot. Now move the cursor along your **path** and click again. The first colored dot will turn a different color, and a new colored dot will appear with a line between the two dots. Click several more times to make a four- or five-point path, then click **OK** to close the path window. A **path placemark** will appear in the **Places panel** (or possibly in the **Search panel**) with a path symbol just to its left.

Note that when the **path window** is open, you will need to navigate using the **navigation tools**. Using the cursor will alter your **path**. If you do this accidentally, you can erase the last point on a path by right clicking (or control-clicking) on it.



**Tour:** To create a tour of several **placemarks**, organize your **placemarks** according how you want to tour them, and click on the **tour tool** in the **Toolbar**. A **record tour panel** will appear in the lower-left corner of the **3D viewer**. The red button on the left is the start/stop button. The numbers indicate the duration of the tour in minutes and seconds (mm:ss).



## How-to Guide *(cont.)*

To start a **tour**, click on your first **placemark**, and then click the start/stop button on the **record tour panel**. The entire button will turn red. Wait a second and then double-click on the second **placemark** in your tour. The **3D viewer** will navigate to this placemark. Double-click the third **placemark** and the **3D viewer** will go to this place. Continue to the last **placemark**, then click the start/stop button to stop the **tour**.

A **play tour panel** will appear and the **tour** will automatically start playing. The **play tour panel** includes (from the left) *play*, *pause*, *go back*, and *fast-forward* buttons, a tour slider, an indicator of the current time of the **tour**, a repeat button and a save button. Click the save button to save the **tour**.



**Clock:** The **clock tool** allows you to look at historical imagery that can go back as far as the 1940s in some locations. Click on the **clock tool** in the **Toolbar** and a **timeline slider** will appear in the upper-left corner of the **3D viewer**. Each vertical bar represents an image that was taken in the past. Use the cursor to move the marker along the **timeline slider** to see these historical images.



**Sun:** Usually the Earth in the **3D viewer** is entirely lit by the **Sun**. To add a shadow representing the night half of the **Earth**, click on the **sun tool** in the **Toolbar**. A **sun slider** will appear in the upper left corner of the **3D viewer**. Move the slider backwards and forwards to follow the shadows on Earth. Click once on the *sun slider* icon that looks like a magnifying glass with a (-) on it. Notice the time span that is being measured changes (one day, one week, one month, one year). Click on the **sun slider play button** (it looks like a clock with an arrow on it) to watch Earth rotate through the time span on the **sun slider**.

Note that in Google Earth, it appears as though the Sun revolves around Earth, when in reality, Earth revolves around the Sun in a year and rotates around its own axis in a day.



**Planets:** Uncheck all boxes in your **My Places** folder, as well as any open layers in the **Layers panel**. Click on the **planet** icon in the **Toolbar**. Choose *Moon* or *Mars* and proceed to explore these planets as you did Earth. Note that the layers available in the **Layers** panel have changed and allow you to explore the Apollo landing sites for the Moon, and the rover paths for Mars, as well as many other layers.





## How-to Guide *(cont.)*



**Ruler:** To measure a feature in the **3D viewer**, click on the **ruler tool** in the **Toolbar**. In the **Ruler window**, choose your units of length from the drop down menu. Click from one end of a feature you want to measure to the other. A dot will appear at the first click, and as you move the cursor, a yellow line will appear until your next click. The value for length in the **Ruler window** changes as you move the length of the line.

The **ruler tool** also measures heading (an angular direction relative to north). Click on the **Path tab** in the **Ruler window** to measure the length of a **path**.



**Print:** To print an image from Google Earth, go to the **print tool** in the **Toolbar**. Choose **Graphic of 3D View** and then **Screen, Low**, or **Medium** to choose the resolution of your print. Then click **Print**. **Note:** The dimensions next to the print options depend on the dimensions of the **Google Earth Window** open on your screen. Note that printing can be very expensive due to the cost of ink.



**Email:** A view, folder, or **placemark** can be emailed by clicking on the **email tool** in the **Toolbar**. Choose **Graphic of 3D View** to send a *.jpg* image of the current view. Choose **Snapshot of 3D View** to send a **.kmz file**. Choose **Selected Placemark/Folder** to send a **.kmz file** of a selected **placemark** or folder. Click **OK** and you will be directed to your email application. **Note:** In advance of using the **email tool**, you will need to go to **Preferences** under Google Earth in the **Menu Bar**, and select your email program under the **General tab**.





## Google Earth Skills Matrix

Lesson Title	Google Earth Skill Used
Finding Earth (page 31)	<ul style="list-style-type: none"> <li>• <b>3D viewer</b></li> <li>• <b>cursor</b></li> </ul>
Navigating Our Planet (page 37)	<ul style="list-style-type: none"> <li>• 3D viewer</li> <li>• <b>Look joystick</b></li> <li>• <b>Move joystick</b></li> <li>• <b>North-up button</b></li> <li>• <b>Zoom slider</b></li> </ul>
Searching to Find Me (page 43)	<ul style="list-style-type: none"> <li>• <b>Search panel: Fly to box</b></li> </ul>
Exploring Layers (page 49)	<ul style="list-style-type: none"> <li>• <b>Layers panel: Borders and Labels</b></li> </ul>
Investigating Natural Features (page 55)	<ul style="list-style-type: none"> <li>• <b>Status bar: elev</b></li> </ul>
Identifying Man-made Features (page 61)	<ul style="list-style-type: none"> <li>• <b>Status bar: Eye alt</b></li> </ul>
Overlaying Abstract Features (page 67)	<ul style="list-style-type: none"> <li>• Layers panel: Borders and Labels</li> <li>• Status bar: Eye alt</li> <li>• <b>View: Grid</b></li> </ul>
Creating Reference Scales (page 73)	<ul style="list-style-type: none"> <li>• <b>Toolbar: Ruler</b></li> <li>• <b>View: Scale Legend</b></li> </ul>
Placemarking Our Discoveries (page 79)	<ul style="list-style-type: none"> <li>• <b>Toolbar: Placemark</b></li> </ul>
Saving Our Places (page 85)	<ul style="list-style-type: none"> <li>• <b>Layers panel: Places</b></li> <li>• <b>Places panel: Folders</b></li> <li>• Toolbar: Placemark</li> </ul>
Making Literature Connections (page 91)	<ul style="list-style-type: none"> <li>• <b>Layers panel: 3D Buildings</b></li> <li>• Places panel: Folders</li> <li>• Toolbar: Placemark</li> </ul>
Building History Connections (page 97)	<ul style="list-style-type: none"> <li>• Layers panel: 3D Buildings</li> <li>• <b>Layers panel: More: Wikipedia</b></li> <li>• Places panel: Folders</li> <li>• Toolbar: Placemark</li> </ul>
Exploring the Setting of a Book (page 103)	<ul style="list-style-type: none"> <li>• Layers panel: Borders and Labels</li> <li>• <b>Layers panel: Photos</b></li> <li>• Places panel: Folders</li> <li>• Toolbar: Placemark</li> </ul>

**Note:** Bold indicates the lesson in which a tool is introduced and in which directions for its use are included.



## Google Earth Skills Matrix *(cont.)*

Lesson Title	Google Earth Skill Used
Mapping the Setting of a Book (page 109)	<ul style="list-style-type: none"> <li>• Layers panel: Photos</li> <li>• <b>Toolbar: Path</b></li> <li>• Toolbar: Placemark</li> </ul>
Touring a Book (page 115)	<ul style="list-style-type: none"> <li>• Status bar: Eye alt</li> <li>• Toolbar: Placemark</li> <li>• <b>Toolbar: Tour</b></li> </ul>
Narrating a Book (page 121)	<ul style="list-style-type: none"> <li>• Layers panel: 3D Buildings, Borders and Labels</li> <li>• <b>Toolbar: Placemark: Snapshot View</b></li> <li>• <b>Toolbar: Tour: Audio</b></li> </ul>
Going Back in Time (page 127)	<ul style="list-style-type: none"> <li>• Layers panel: 3D Buildings</li> <li>• <b>Toolbar: Clock</b></li> </ul>
Mapping Columbus (page 133)	<ul style="list-style-type: none"> <li>• Status bar: Eye alt</li> <li>• Toolbar: Path, Tour</li> <li>• <b>Toolbar: Placemark: Placemark icon</b></li> </ul>
Coming to America (page 139)	<ul style="list-style-type: none"> <li>• Layers panel: 3D Buildings</li> <li>• Toolbar: Path, Placemark</li> <li>• <b>Zoom: Global, Regional, and Local view</b></li> </ul>
Celebrating American Holidays (page 145)	<ul style="list-style-type: none"> <li>• <b>Toolbar: Placemark: Description</b></li> <li>• Toolbar: Tour</li> </ul>
Tracking Ocean Animals (page 151)	<ul style="list-style-type: none"> <li>• <b>Layers panel: Ocean: Animal Tracking</b></li> <li>• Status bar: elev, Eye alt</li> <li>• Toolbar: Tour</li> <li>• Toolbar: Ruler</li> </ul>
Following the Sun (page 157)	<ul style="list-style-type: none"> <li>• <b>Toolbar: Sun</b></li> </ul>
Observing Weather (page 163)	<ul style="list-style-type: none"> <li>• Layers panel: Borders and Labels</li> <li>• <b>Layers panel: Weather: Clouds, Radar, Conditions and Forecast</b></li> <li>• Toolbar: Placemark</li> </ul>
Analyzing Ice (page 169)	<ul style="list-style-type: none"> <li>• <b>Fly to box: lat/long</b></li> <li>• <b>Layers panel: Ocean: State of the Ocean: Arctic Sea Ice</b></li> <li>• Status bar: Eye alt</li> <li>• Toolbar: Clock</li> </ul>
Shaping the Capital (page 175)	<ul style="list-style-type: none"> <li>• Layers panel: Photos, Places</li> <li>• Status bar: Eye alt</li> <li>• Toolbar: Placemark</li> <li>• <b>Toolbar: Polygon</b></li> </ul>
Drawing Field Patterns (page 181)	<ul style="list-style-type: none"> <li>• Fly to box: lat/long</li> <li>• Status bar: Eye alt</li> </ul>



## Google Earth Skills Matrix *(cont.)*

Lesson Title	Google Earth Skill Used
Measuring Animals (page 187)	<ul style="list-style-type: none"> <li>• Fly to box: lat/long</li> <li>• <b>Layers panel: Gallery: National Geographic Magazine: Africa Megaflyover</b></li> <li>• Status bar: Eye alt</li> <li>• Toolbar: Placemark, Ruler</li> </ul>
Graphing Trains (page 193)	<ul style="list-style-type: none"> <li>• Status bar: elev, Eye alt</li> <li>• <b>Toolbar: Path: Measurements tab</b></li> </ul>
Exploring the Moon (page 199)	<ul style="list-style-type: none"> <li>• <b>Layers panel: Moon Gallery: Apollo Missions</b></li> <li>• <b>Toolbar: Planets: Moon</b></li> </ul>
Diving Below the Ocean Surface (page 205)	<ul style="list-style-type: none"> <li>• Layers panel: Borders and Labels</li> <li>• Status bar: Eye alt</li> <li>• <b>View: Water Surface</b></li> </ul>
Describing Colors on Earth (page 211)	<ul style="list-style-type: none"> <li>• Status bar: Eye alt</li> <li>• <b>Layers panel: Global Awareness: The Earth from Above with GoodPlanet</b></li> </ul>
Observing Earth at Night (page 217)	<ul style="list-style-type: none"> <li>• <b>Layers Panel: Gallery: NASA: Earth City Lights</b></li> <li>• <b>Layers panel: Roads</b></li> </ul>



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## Glossary of Terms

**3D view**—a view in which height, width, and thickness are all visible

**artificial**—made or produced by humans rather than existing naturally

**border**—a line separating two areas

**coastline**—the shape or boundary of a coast

**construction**—the process of building something

**continent**—a large mass of land surrounded by water

**corner**—a place or angle where two or more sides or edges meet

**crater**—a depression caused by the impact of a large rock or volcanic eruption

**crop**—a plant that is grown as food

**day**—the time between sunrise and sunset

**elevation**—height above sea level

**equator**—the imaginary line around the middle of Earth

**explorer**—a person who travels into unknown regions

**field**—an area of open land that is sometimes used to grow crops

**floodplain**—an area of low-lying ground adjacent to a river, subject to flooding

**freight**—products carried by a vessel or vehicle

**geometric**—characterized by or decorated with regular lines and shapes

**glacier**—a huge mass of ice slowly flowing over a land mass

**globe**—a sphere that represents Earth

**ground-level view**—a view as if the viewer was standing on Earth

**harbor**—a place on the coast where vessels may find shelter

**herd**—a group of animals that live or move about together

**history**—past events

**holiday**—a day of festivity to commemorate an event in history

**horizon**—the line at which Earth's surface and the sky appear to meet

**iceberg**—a large floating mass of ice detached from a glacier or ice sheet and carried out to sea

**icon**—a picture, image, or other representation

**image**—a picture of Earth made using a camera or an instrument on a satellite

**immigration**—the action of coming to live permanently in a foreign country

**irregular**—not even in shape or arrangement

**irrigation**—a system of ditches or pipes set up to supply dry land with water

**island**—a piece of land surrounded by water

**journey**—a trip from one place to another, often over a great distance

**landing**—a place where persons or goods are landed, as from a boat or spaceship

**landmark**—an important building or landmark

**latitude**—distance north or south from the equator measured in degrees



## Glossary of Terms *(cont.)*

**lighthouse**—a tower or other structure containing a beacon light to warn or guide ships at sea

**location**—a particular place or position

**longitude**—distance measured by degrees east or west from the prime meridian

**man-made**—made or caused by human beings

**mare**—a large, dark area of the moon covered in lava rock

**memorial**—something intended to commemorate someone or something

**microphone**—an instrument for recording sound

**migration**—the movement of people or animals from one country or locality to another

**monument**—a statue, building, or other structure erected to commemorate a famous or notable person or event

**mountain**—a large natural elevation of Earth's surface rising abruptly from the surrounding level

**natural**—present in or produced by nature

**night**—the time between evening and morning

**north**—one of Earth's four main directions, specifically the direction of Earth's magnetic pole or 90° latitude

**ocean**—a very large expanse of sea

**overhead view**—the view of Earth from above looking down

**park**—a large public green area in a town

**photograph**—a picture made using a camera

**placemark**—a record, including an icon, used to mark and save a point of interest in Google Earth

**plantation**—a large farm where crops are grown

**polygon**—a geometric figure that is closed, that lies in a plane, and whose edges are all straight lines

**pyramid**—a monumental structure with a square or triangular base and sloping sides that meet in a point at the top

**radar**—a method of detecting objects and determining their position, velocity, or other characteristics

**railroad**—a track or set of tracks made of steel rails along which passenger and freight trains run

**reference**—a feature with which you are familiar, used to compare objects you are not familiar with

**satellite**—a device designed to be launched into orbit around Earth, another planet, the Sun, etc.

**scale**—a ratio of size in a map, model, drawing, or plan

**sea ice**—ice formed on the surface of the ocean from frozen sea water

**seamount**—an underwater mountain

**season**—each of the four divisions of the year (spring, summer, autumn, and winter)





## Glossary of Terms *(cont.)*

**shadow**—a dark area or shape produced by something coming between rays of light and an object

**shape** —the outline of an area or figure

**shoreline**—the line along which a large body of water meets the land

**sphinx**—a winged monster with a man's head and a lion's body

**square**—a place in a town where people gather; a rectangle with four equal sides

**statehouse**—the building where the state's legislature meets

**storyboard**—a series of sketches of shots or scenes are arranged in sequence for outlining the action of a film

**street view**—a view in which buildings and landmarks are visible from the perspective of walking on the street

**structure**—something that is built by people, like a building or a bridge; a pattern of organization

**temperature**—the degree or intensity of heat present in a substance or object

**timeline**—a graphic representation of the passage of time as a line

**tracking**—to follow

**volcano**—a vent in a planet's crust from which melted rock and steam come out; a hill or mountain composed entirely or in part of the material thrown out

**voyage**—a long journey





## Contents of Teacher Resource CD

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How-to Guide	How_to.pdf
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Student Activity Sheets	
Learning to Fly	
Exploring the Globe	page34.pdf
Moving Around Earth	page41.pdf
Different Views	page46.pdf
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## Notes:



## Notes:



## Notes:



## Notes:





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