

Sample Pages from



Created *by* Teachers *for* Teachers and Students

Thanks for checking us out. Please call us at **800-858-7339** with questions or feedback or to order this product. You can also order this product online at **[www.tcmpub.com](http://www.tcmpub.com)**.

For correlations to state standards, please visit  
**[www.tcmpub.com/administrators/correlations](http://www.tcmpub.com/administrators/correlations)**

**TIME**  
**Nonfiction Readers—**  
**Grade 6**

**This sample includes the following:**

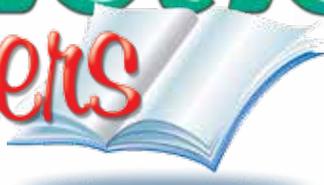
**Teacher's Guide Cover** (1 page)  
**Table of Contents** (1 page)  
**How to Use This Product** (8 pages)  
**Lesson Plan** (12 pages)  
**Reader** (25 pages)

To Create a World <sup>in</sup> which  
**Children** Love to Learn!

800-858-7339 • [www.tcmpub.com](http://www.tcmpub.com)



TIME  
**Nonfiction**  
Readers



**Grade 6**  
**Teacher's Guide**

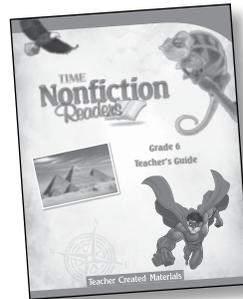


**Teacher Created Materials**

<b>Program Welcome</b> .....	4
<b>Research</b> .....	7
The Importance of Nonfiction Reading .....	7
Developing Essential Nonfiction Reading Skills.....	8
Key Reading Skills .....	9
Classroom Practices.....	11
Differentiating by Specific Needs.....	13
Extending the Reading.....	15
<b>Best Practices</b> .....	17
Comprehension Strategies for Nonfiction.....	17
<b>Program Scope and Sequence</b> .....	22
<b>How to Use This Product</b> .....	24
Kit Components .....	24
Getting Started .....	25
Teaching a Lesson .....	26
Using the Trio Resources .....	27
Using Assessment Options.....	27
Using Technology Options .....	27
About the Books.....	28
Word Counts and Level Correlations.....	29
Using This Program in a Balanced Literacy Model.....	30
Pacing Plans.....	32
Using Interactiv-eBooks.....	39
<b>Standards Correlations</b> .....	42
Introduction to Correlations.....	42
Standards Correlations Chart.....	43
<b>Lessons</b>	
<b>Trio 1</b>	
Lesson 1: <i>History of Video Games</i> .....	44
Lesson 2: <i>History of Monster Movies</i> .....	55
Lesson 3: <i>History of Comic Books</i> .....	66
Trio 1 Culminating Lesson .....	77
<b>Trio 2</b>	
Lesson 4: <i>Struggle for Survival: Water</i> ....	80
Lesson 5: <i>Struggle for Survival: Fire</i> .....	91
Lesson 6: <i>Struggle for Survival: Shelter</i> ..	102
Trio 2 Culminating Lesson .....	113
<b>Trio 3</b>	
Lesson 7: <i>The Science of Monsters</i> .....	116
Lesson 8: <i>The Science of Magic</i> .....	127
Lesson 9: <i>The Science of Superpowers</i> ...	138
Trio 3 Culminating Lesson .....	149
<b>Trio 4</b>	
Lesson 10: <i>You Are There!</i> <i>Ancient Egypt 1336 BC</i>	
Lesson 11: <i>You Are There!</i> <i>Ancient Greece 432 BC</i> .....	163
Lesson 12: <i>You Are There!</i> <i>Ancient China 305 BC</i> .....	174
Trio 4 Culminating Lesson .....	185
<b>Trio 5</b>	
Lesson 13: <i>Young Adult Literature:</i> <i>Dystopian Worlds</i> .....	188
Lesson 14: <i>Young Adult Literature:</i> <i>The Worlds Inside Us</i> .....	199
Lesson 15: <i>Young Adult Literature:</i> <i>Magical Worlds</i> .....	210
Trio 5 Culminating Lesson .....	221
<b>References Cited</b> .....	224
<b>Answer Key</b> .....	227
<b>Indexes</b> .....	231
TIME Nonfiction Readers Grade 6 Comprehension Skills .....	231
TIME Nonfiction Readers Grade 6 Content Standards and Cross-Curricular Connections .....	232
Digital Resources .....	236

## Kit Components

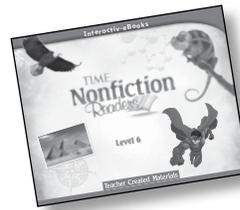
### Trio 1



### Teacher's Guide

Easy-to-use standards-based lesson plans

### Trio 2



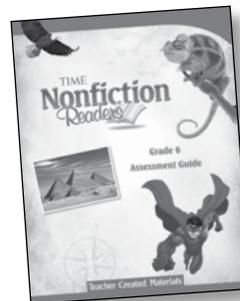
### Digital Resources

- PDFs of books for whiteboard use
- teacher resources
- student activity sheets and assessments
- professional audio recordings of books
- Interactiv-eBooks with comprehension activities, close-reading activities, embedded audio and videos, and digital assessments

### Trio 3



### Trio 4



### Assessment Guide

- Comprehension Pre-assessment
- individual reader assessments with multiple-choice, constructed-response, and close-reading questions

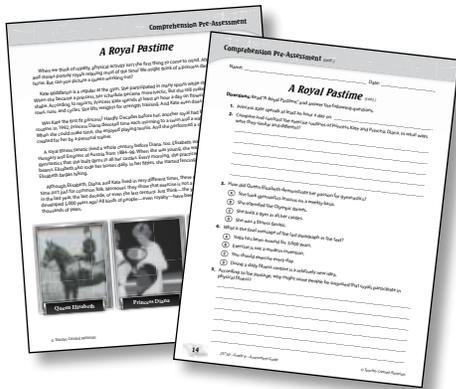
### Trio 5



## Getting Started

### 1. Use the Comprehension Assessment.

Diagnose which comprehension skills your students will need to focus on. For a complete overview of the comprehension assessment and directions for test administration, see page 6 of the *Assessment Guide*.

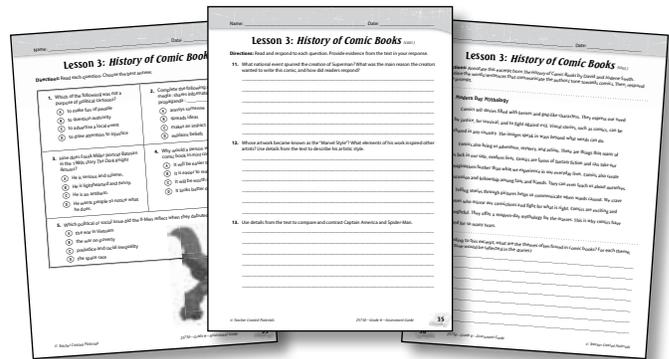


**2. Create reading groups.** If desired, place students in reading groups based on their reading levels or other instructional needs. For students reading below grade level, the grades K–5 *Nonfiction Readers Series Placement Test* is included as a digital resource only. This is an individual oral reading test that can be used to determine general reading levels or to measure growth and aid in selecting books for students. See pages 30–31 for tips on using *TIME Nonfiction Readers* in a balanced literacy classroom.

**3. Prepare student resources.** As an option, organize student resources such as dictionaries and writing folders.

### 4. Prepare assessment resources.

Depending on how you plan to conduct your assessment, you may wish to create an assessment folder for each student. These folders can hold the student's Comprehension Assessment, individual-reader assessments, activity pages, and anecdotal records taken during the reading lessons.



## Teaching a Lesson

Each 11-page lesson is organized in a consistent format for ease of use. Teachers may choose to complete some or all of the lesson activities to best meet the needs of their students.



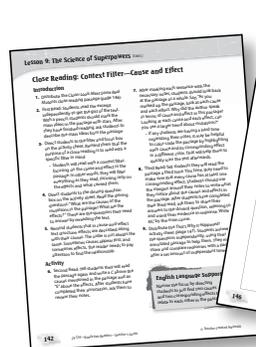
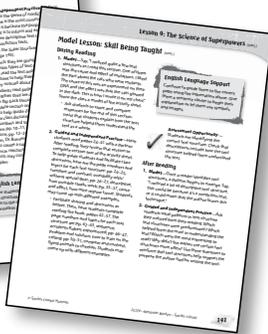
**Lesson Overview** provides lesson objectives and key information for planning purposes.



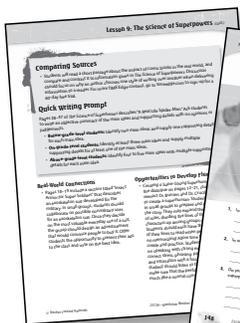
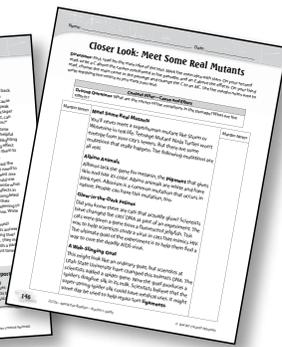
**Word Analysis** section includes activities and suggestions for teaching word patterns, parts of speech, Greek and Latin Roots, etymology of words.



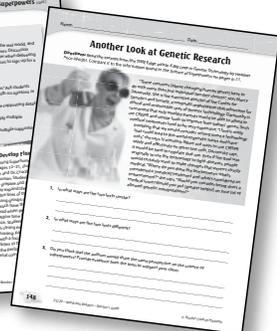
**Comprehension Model Lesson and Practice Opportunities** provide teachers with simple and engaging activities that reinforce the comprehension skill addressed in the lesson. Each lesson includes a graphic organizer to help students organize the material being taught.



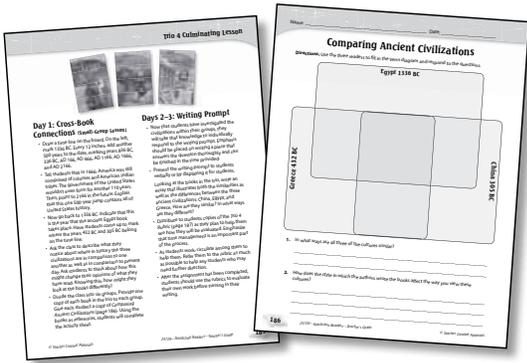
**Close-Reading Lesson and Activity Sheet** provide students with an opportunity to practice close reading a short passage of text from the reader for a very specific purpose. Each trio of books has a close-reading “filter” in common, but each individual lesson uses the filter in a different way. See page 21 for more information on the close-reading filters. Each lesson includes a step-by-step close-reading lesson, a student passage for annotating, and an activity sheet to extend the lesson.



**Comparing Sources, Quick Writing Prompts, Real-World Connections, and Opportunities to Develop Fluency** sections offer additional activities for building comprehension and making connections.



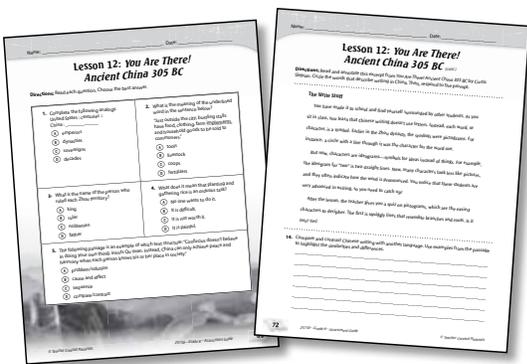
## Using the Trio Resources



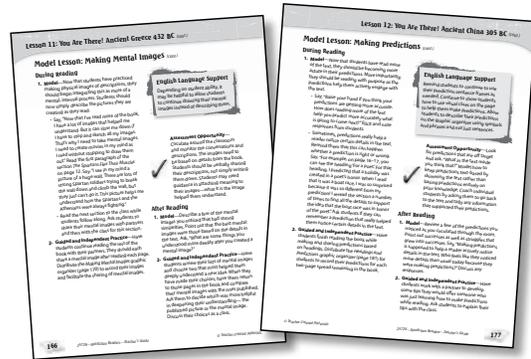
Each trio has a culminating lesson that combines small-group work with an individual assignment designed to allow students to look across the books in the trio to find similarities and differences among the books. Each trio lesson is designed to be given over multiple days and includes an activity sheet as well as a rubric to help evaluate student work.

## Using Assessment Options

1. **Use individual reader assessments at the end of each lesson.** Each lesson is accompanied by an assessment designed to be given out at the end of the lesson. It contains multiple-choice, constructed-response, and close-reading components. The assessments mirror the skills being taught in the lessons and reinforce classroom learning.



2. **Use informal assessments during each lesson.** Refer to the assessment tips embedded throughout the lessons to gather information about students' reading skills. Record anecdotal records as they meet the needs of your classroom.



## Using Technology Options

1. **Use the audio recordings of the readers as models of fluent reading.** The digital resources include professional audio recordings of the books. Play the audio files of the books to support students as a prereading activity, during fluency practice, or in a center.
2. **Use the Interactiv-eBooks to enhance the reading experience.** This kit includes interactiv-eBooks that guide students toward independent reading and engage them in fully interactive experiences. Students can hear the texts read aloud, view video clips and book trailers, record their own readings, and complete interactive activities to build academic skills—from close reading to comprehension and writing. The interactiv-eBooks can be used in a variety of instructional settings and help support numerous literacy and learning goals. For a detailed overview of how to use the interactiv-eBooks in the classroom, see pages 39–41.

## About the Books

TIME *Nonfiction Readers* is designed to enhance any reading program. Each book motivates students to want to read because of its high-interest content and engaging visuals. The authentic reading experiences help students develop vocabulary, comprehension, and fluency skills.

## Leveling Components

Each book offers a variety of specialized features, including the following:

- detailed and descriptive text with sentences of varying lengths
- frequent use of sophisticated fonts in sidebars and chapter headings
- a bibliography, which includes fiction titles, to keep students reading
- a Try It! section to extend and support the content
- a glossary, an index, and a table of contents as key nonfiction text features
- increased use of illustrations, graphics, primary sources, and photographs
- interactive spreads to prompt critical thinking
- between 100 and 250 words per page spread for robust reading experiences

## Special Features in the Books

Each reader includes the following special features to enhance the reading experience:

### Think Link



- Introduces main concepts
- Poses critical-thinking questions or key points to encourage reading with a purpose

### Dig Deeper!



- Provides background knowledge to access a deeper understanding
- Offers a variety of text types, including instructions, maps, diagrams, and interviews
- Provides high-interest graphics and interaction

### Stop! Think...



- Poses additional critical-thinking questions
- Guides students in expanding their visual literacy and comprehension using information from charts, graphs, and more

## Word Counts and Level Correlations

Grade 6 Title	Pages	Word Count	TCM Level	Guided Reading Level	DRA Level	Lexile® Measure
<i>History of Video Games</i>	48	3,691	6.8	U	60	840L
<i>History of Monster Movies</i>	48	3,480	6.9	V	60	850L
<i>History of Comic Books</i>	48	4,194	6.7	V	60	830L
<i>Struggle for Survival: Water</i>	48	3,488	6.3	W	60	830L
<i>Struggle for Survival: Fire</i>	48	3,212	6.3	V	60	990L
<i>Struggle for Survival: Shelter</i>	48	3,538	6.3	W	60	880L
<i>The Science of Monsters</i>	64	4,359	6.9	X	60	880L
<i>The Science of Magic</i>	64	4,194	6.7	X	60	870L
<i>The Science of Superpowers</i>	64	3,549	6.4	W	60	840L
<i>You Are There! Ancient Egypt 1336 BC</i>	32	2,328	6.0	V	60	920L
<i>You Are There! Ancient Greece 432 BC</i>	32	2,349	6.4	X	60	910L
<i>You Are There! Ancient China 305 BC</i>	32	2,435	6.3	V	60	860L
<i>Young Adult Literature: Dystopian Worlds</i>	48	3,488	6.8	Y	60	810L
<i>Young Adult Literature: The Worlds Inside Us</i>	48	3,395	6.6	Z	60	850L
<i>Young Adult Literature: Magical Worlds</i>	48	3,036	6.8	X	60	850L

### Using This Program in a Balanced Literacy Model

*TIME Nonfiction Readers* is a supplemental leveled reading program that can be flexibly implemented in a balanced literacy model. The high-interest books provide an engaging reading experience while supporting the development of important reading skills that include comprehension, fluency, vocabulary, and word study. The comprehensive Teacher's Guide with step-by-step, scaffolded model lessons and student activities can be easily incorporated into any block of a balanced literacy model, including large group, guided reading groups, literature circles, and independent work time. Multiple assessment opportunities will diagnose students' needs and help direct teachers as they plan for differentiation and inform their instruction as they move students toward mastery of key reading and writing skills.

#### Guided Reading

Two key features of *TIME Nonfiction Readers* allow it to be effectively used within a guided reading framework. First, it can serve to target specific word-analysis skills. Second, the high-interest leveled books make them ideal selections for use with groups that need practice at certain reading levels and with general reading skills.

The readers are ideal to use with small teacher-led guided reading groups. The high-interest leveled books in this kit make them ideal selections to use with readers who read at levels 6.0–6.9. The chart on page 29 indicates the reading levels of the books included within this kit.

The easy-to-follow lesson plans offer a carefully scaffolded format that provides explicit teacher modeling through think-alouds as well as guided practice to use with peers and independently. Teachers may use the readers in a variety of small-group settings, including guided reading groups and as an intervention with struggling readers.

**Lesson Plan Structure:** The core of the guided reading lesson is organized around before-, during-, and after-reading activities and suggestions. Each book targets two main strategies or skills: one comprehension and one close reading. (Refer to page 231 for a complete list of the skills addressed in this kit.) Each comprehension strategy lesson is carefully scaffolded using teacher modeling, guided practice, and independent practice. The lessons are designed to provide a rich menu for teachers to pick and choose from as they differentiate instruction for students. If needed, the lessons can also be used as quick reviews or mini-lessons.

#### Leveled Practice and Other Reading Skills:

Each reader included in the program has been leveled for use in small groups of students with similar reading levels. In addition to teaching the specific comprehension skills that students need to read nonfiction, the lesson plans for the readers also include carefully crafted instruction in the following areas of literacy:

- **Word Analysis:** Word analysis is broken into two sections: Etymology and Breaking Down Words. The Etymology sections look at the history of certain words and how they have developed over time. Breaking Down Words looks at how words are put together and how words are built. Each word-analysis activity is accompanied by a student activity sheet to extend the learning beyond the lesson.
- **Academic Vocabulary:** Students study key academic vocabulary through the use of dictionaries, graphic organizers, drama, sketching, and glossary use. Many of the activities are appropriate for whole-class work in a vocabulary session focusing on activities suggested in the lesson plans for vocabulary development or for word-knowledge practice.

### Using This Program in a Balanced Literacy Model *(cont.)*

#### Guided Reading *(cont.)*

- **Fluency:** Fluency activities focus on reading text aloud while also focusing on stress, phrasing, pausing, pace, and intonation. These activities are designed to be highly engaging for students.
- **Progress Monitoring:** Assessment options are found directly in each lesson so that teachers can keep ongoing formative assessment records and adjust instruction accordingly. During the lessons, frequent assessment checks and suggestions for observing students while reading offer concrete ways to inform instruction and chart student progress in the program. The activity sheets that accompany each lesson also provide assessment checks for the teacher. The informal and formal assessments are included in easy-to-use formats.

#### Other Blocks of Balanced Literacy

**Writing:** The lesson plan for each book includes an engaging writing activity. Additionally, further writing tasks are integrated into the student activity sheets. The writing activities vary in style but are all designed to be completed in single writing sessions to allow teachers to fit this important practice into class time.

#### **Learning Centers and Independent Practice:**

One of the challenges of a balanced literacy classroom is making sure the students who are not in the small instructional group with which the teacher is currently working are constructively engaged. *TIME Nonfiction Readers* lesson plans provide ample suggestions and materials for independent student use and for the development of centers. For example, three high-interest activity sheets are included for each book. Students may complete these practice pages independently after reading the book.

**Independent Reading:** Students who spend more time reading independently outperform their peers on standardized tests and other measures. Time spent reading independently is the best predictor of reading achievement (Anderson, Wilson, & Fielding 1988). The books from the *TIME Nonfiction Readers* series provide easy-to-read, high-interest content. They can be added to classroom libraries for independent reading selections.

## Focus Objectives

Students will be able to:

- determine an authentic purpose for reading.
- assess the persuasiveness of an argument.

## Language Objective

- Students will replace everyday vocabulary with precise word choices.



## Word Analysis

- Etymology: Students will explore the origin of the word *catastrophe*.
- Breaking Down Words: Students will examine and use the prefix *ex-* to determine and clarify the meaning of words.
- *Over and Out* student activity sheet (page 97)

## Comprehension

- Model Lesson: Establishing Purpose: Students will set a purpose for reading in order to increase engagement and comprehension.
- *Finding the Purpose* graphic organizer (page 98)

## Close Reading

- Close-Reading Lesson: Analytical Filter: Students will assess the persuasiveness of an argument.
- *Closer Look: The Importance of Fire for Survival* close-reading passage (page 99)
- *Fire Is Important* close-reading student activity sheet (page 100)

## Comparing Sources

- Students will find similarities and differences when looking at two sources about similar topics.
- *Struggle for Survival: Fire* (pages 6–17) and *Another Look at Fire* student activity sheet (page 101)

## Quick Writing Prompt

- Students will write paragraphs using accurate and credible sources to support claims about how best to survive the cold.

## Real-World Connections

- Students will create classroom emergency kits.

## Opportunities to Develop Fluency

- Students will create and perform informational public service announcements (PSA).

### Reader's Guide Reminder

The Reader's Guide questions in each book encourage students to think critically and can serve as class discussion starters. Suggested answers are provided in the Digital Resources.

## Word Analysis

**1. Etymology**—Remind students that language is something that is alive and always changing. New words are created and added to languages when they are needed.

- Write the word *catastrophe* where all students can see. Ask if any of them have heard this word before, and allow all students to share their descriptions. Have students sketch their ideas of a catastrophe and share them with partners.
- Write the following: *kata* = down; *strophe* = turn. Ask, "Can you define the meaning of *catastrophe* using its Greek roots?" Guide students in defining *catastrophe* as "a downward turn, a bad end, an unlucky turn of events". Clarify that a catastrophe is a large, often sudden, disaster or ending. Ask students to give examples of the kinds of things that could be considered catastrophes (*earthquakes, tornadoes, hurricanes, tsunamis, volcanoes, etc.*).
- Say, "When I look at the word's Greek roots, it makes me think that something really disastrous must have happened that people needed to describe. But it wasn't until 1748 that this word started to mean 'sudden disaster.'" Tell students that in 1748, an engineer found the ruins of the town of Pompeii. It had been buried under several feet of ash and rock for hundreds of years since the volcano Mt. Vesuvius erupted. Allow all students to describe their ideas and connections. End by telling the class that though we don't know for sure if that's why

*catastrophe* means what it does, studying what happened in history can help us put words into context.

**2. Breaking Down Words**—Divide the class into teams and ask each team to get out a sheet of paper. Tell them that each team will have two minutes to brainstorm a list of words that begin with the prefix *ex-*. When two minutes are up, have students share their lists.

- Say, "It's one thing to think of a lot of words that use a prefix and another to know what the prefix means." Write the meaning on the board: *ex-* = "out." Ask students to pick examples from their lists and give definitions of the words that use the word *out*.
- Write *intensifying force* on the board. Tell students that *ex-* sometimes has what is called an intensifying force. This adds "strength" or "intensity" to the meaning of a word. Point out how *ex-* means "out" in the word *exhale* but means "very" in the word *excited*. Say, "We often have to try out both meanings to see which one makes the most sense in the context. It's not always easy to tell which meaning fits best, so you need to use your best judgment. Sometimes, both meanings will fit."
- For further practice, have students complete the *Over and Out* student activity sheet (page 97).

## Model Lesson: Establishing Purpose

### Before Reading

1. **Model**—Tell students, “We read informational texts for a purpose or a reason. Sometimes, we have questions we want answered. Maybe we need to learn more about a topic so we can present it in a report. Sometimes, we want to learn about a topic to learn how to do something. There can be more than one purpose for reading a book, and different people will often have different purposes. Deciding on my purposes for reading helps me stay engaged in the text and remember what I read.”
  - Read aloud the section “In a Cold, Dark World” on pages 4–5. After reading, say, “This introduction makes me think of some different purposes I might have as a reader for reading this text. I think it will tell me what kinds of skills I need to stay alive. Plus, the heading makes me think that the book will talk about light, while the title tells me I will learn about fire. But we can also think about the purpose that the author had for writing the text. What was the message that she was trying to get across to the readers?” Ask students what kinds of purposes the author had for the reader. What are some purposes the reader might have or reasons why someone would want to read this book?
  - Read the sidebar “Practice Carefully” aloud. Say, “This part is really specific. It tells me that I will learn how to start a fire safely. That’s a good purpose for someone who wants to be prepared in an emergency situation.”
2. **Guided and Independent Practice**—Distribute the *Finding the Purpose* activity sheet (page 98) to students. Review the six purposes listed on the activity sheet. Read the section “The Importance of Fire for Survival” aloud to the class. After reading, ask them to turn to partners and describe which of the purposes are served by this section. Have students share their ideas and explain how they made their decisions. Say, “After reading the heading and the rest of the section, I decided that a reader could read this section to answer the question, *Why is fire important?*”
  - Explain to students that they are going to work with partners to identify the different purposes for reading *Struggle for Survival: Fire*. Have students read pages 8–19 in pairs. When they finish reading the section, they should collaboratively decide on two purposes for reading this section. Students complete two boxes on the *Finding the Purpose* activity sheet (page 98) for the two purposes chosen.

### English Language Support

Tell students to focus on just one purpose for the section. If necessary, guide them to a specific page or pages that have an obvious purpose and/or a helpful heading. Offer sentence frames to help them articulate the purpose for reading.

### Model Lesson: Establishing Purpose *(cont.)*

#### During Reading

- 1. Model**—Say, “I read the section ‘A Toothpaste Fire’ so when I’m done, I can write a report. What’s my purpose?” Response should be “to do something with the information.” Ask a few students to share examples from their activity sheets. Emphasize that there is often more than one purpose that can be identified for a text. It is up to the reader to make the final judgment!
- 2. Guided and Independent Practice**—Have students read pages 20–31 with partners. When they are done reading the section, they should collaboratively decide on two purposes for reading this section. Please note that this section has the best opportunity to “read to study a point of view” in the sidebar about Richard Duarte (page 20). Students complete two more boxes on the *Finding the Purpose* activity sheet (page 98) for the two purposes they have chosen.
  - When students have identified and explained the two purposes on their activity sheets, ask for volunteers to share. Make sure at least one student pair identifies “point of view” as a purpose for this section. Clarify that readers know there is a specific point of view when a person’s name is mentioned.
  - Have students read the rest of the book (pages 32–43) with partners. They now need to decide how the text serves the remaining two possible purposes on their activity sheets.

#### Assessment Opportunity—

Circulate as students work and listen for students giving reasons to back up purpose choices. Jump in as needed and ask why partners made a given choice. Keep asking questions to get their purposes as specific as possible.



#### English Language Support

Have students first express their thoughts in their own words. If needed, help them to replace some of their word choices with more sophisticated vocabulary from the graphic organizer.

#### After Reading

- 1. Model**—Discuss with students why it is important to know what purpose a reader could have for reading an informational text. Was there one purpose they could have used more than once? Is there one purpose they feel they use too much? Not enough?
- 2. Guided and Independent Practice**—Ask students to turn to their partners and describe the relationship between a reader’s purpose and how closely a reader reads the text. After they’ve had time to discuss, ask them to share their ideas. Finally, ask students what they would do to make reading the informational texts they are required to read in school more interesting to other students their age, basing their ideas on what they have learned.

## Close-Reading: Analytical Filter—Persuasiveness

### Introduction

1. Distribute the *Closer Look: The Importance of Fire for Survival* close-reading passage (page 99).
2. First Read: Have students read the excerpt independently to get the gist. Students should star interesting or tricky words that they find as they read. After they are done reading independently, ask students to describe the main ideas from the passage.
3. Direct students to the filter and focus box on the activity sheet. Remind them that the purpose of a close reading is to read with a specific filter in mind.
  - Tell them they are going to read with an analytical filter, focusing on the persuasive parts in the passage. In other words, they will filter everything as they read, focusing only on how the text persuades them.
4. Direct students to the driving question on the activity sheet and read it aloud: *How persuasive is the author's claim that fire is important for survival?* This is the question they need to keep in mind while rereading the text.
5. Remind students that the persuasiveness of a claim rests on having supporting reasons and convincing word choices. The emotions of the reader (*pathos*) can also be used to make an argument seem more convincing (*ethos*) or urgent (*kairos*).
7. After marking each sentence with the necessary notes, students should look back at the passage. Say, "I notice that the author is using a lot of persuasive language in this passage. Why would she try to persuade readers of the importance of fire?"
  - If any students are having a hard time organizing their notes, it may be helpful to color-code the passage by highlighting where the author is using convincing word choices in one color and where the author supports her reasoning in another.
8. Third Read: Tell students they will read the passage a third time. This time, they will look for how the author may be using the emotions of the reader to create a persuasive argument. They should write a "#" any time they think this is happening. Suggest that they add or erase anything as needed. After students have completed their third reads, ask them to share their answers to the driving question, referring to and using their evidence in response.
9. Distribute the *Fire Is Important* activity sheet (page 100). Have students answer the questions independently, using their annotated passage to help. They may share and compare responses with partners after a set amount of independent time.

### Activity

6. Second Read: Have students read the passage again and circle the phrases that make a claim. They should underline the evidence that supports each claim. After students have completed their annotation, ask them to review their notes.

### English Language Support

Allow students to only answer questions 2 and 3. Help students identify key words from the questions. Guide them in using those key words to scan the passage and find evidence.

## Lesson 5: Struggle for Survival: Fire (cont.)

### Comparing Sources

Have students read a passage from TIME Edge, *Another Look at Fire* (page 101), and compare and contrast it with information given in *Struggle for Survival: Fire*. Discussion should focus on why an author chooses one style of writing over another when delivering information to a reader. For more TIME Edge content, go to [timeedge.com](http://timeedge.com) to sign up for a 60-day free trial.

### Quick Writing Prompt

Instruct students to use the section “Can You Overdo It in the Cold?” (pages 34–35) to write responses to the following prompt: *Describe how a person should stay warm in extreme cold and what to avoid. If you use someone else’s ideas, make sure you credit them by using their title and their name (if you know it).*

- **Below-grade-level students:** Write pieces that offer two to three pieces of evidence to support the claim.
- **On-grade-level students:** Write pieces that offer three to five pieces of evidence to support the claim.
- **Above-grade-level students:** Write pieces that offer three to five pieces of well-organized evidence to support the claim. At least two different sources from the book are referenced in the writing.

### Real-World Connections

- Working in teams, students use the information found on pages 22–23 about fire-making kits and 26–27 about bug-out packs to design the ideal emergency pack for the classroom. Students should consider things like where the school is located, what kinds of environments they would most likely be facing, and the number of people to prepare for. Groups should present their designs to the class. The class can synthesize all the designs into the final real emergency pack that will be stored in the classroom.

### Opportunities to Develop Fluency

- **Public Service Announcements (PSAs)**—Students work in small groups to create and perform short PSAs that teach about survival skills. Students may choose one of the following topics and page numbers to create their PSAs. How to: build a fire (14–15), make a bow drill (16–17), make a toothpaste fire (18–19), make a pine knot torch (30–31), or use the sky for help (32–33). Allow time for groups to create their scripts by copying lines straight from the text, adding their own touches to help it flow. Students should have their own copies of their lines to read when performing—no memorizing! The goal is for students to speak with strong expression focusing on correct stress and pacing.

# Closer Look: The Importance of Fire for Survival

**Directions:** First Read—read for the gist of the text. Star key words and phrases as you read. Second Read—Circle each phrase that makes a claim, and underline the evidence that supports each claim. Third Read—Write a # any time you think emotions are being used. Review and revise to find the best evidence to support the driving question.

## Analytical Filter—Focus on Persuasiveness

**Driving Question:** How persuasive is the author's claim that fire is important for survival?

Margin Notes	<b>The Importance of Fire for Survival</b>	Margin Notes
	<p>Imagine the planet in total darkness. It might feel like being transported back in time. What was it like when people had to survive off the land with only the most primitive resources? What did people use as sources of heat and light?</p> <p>Fire, one of the most important forces of nature, is a truly valued resource. But be careful—it can have both positive and negative impacts since it can both help and harm you. Fire provides heat and light, which is necessary to <b>sustain</b> and regenerate life. But it can also be very destructive and can damage anything in its path in the blink of an eye.</p> <p>Fire has been a key part of survival for millions of years. If you are building a fire to survive, you probably want the fire to provide many different things. You'll need fire to stay warm and dry, especially in cold areas, which is essential for survival. Fire can also <b>illuminate</b> the darkness, and having fire means you can cook food or melt snow or ice into drinking water. Smoke from a fire could also help others locate you.</p>	

# Fire Is Important

**Directions:** Use your notes from *The Importance of Fire for Survival* passage to answer the following questions. Be sure to include evidence from the text in your responses.

1. Which claims in the text are supported by reasons? Which are not?

---

---

---

---

2. Look at the evidence presented to support the argument that fire can harm you. Is the evidence good enough to support the claim? How could it be better?

---

---

---

---

3. What evidence is presented to support the claim that fire can provide many different things? How can you tell that this is strong evidence?

---

---

---

---

4. What emotions are brought out in the reader? Does this help the argument to be more or less persuasive? Explain with examples from the text.

---

---

---

---

---

## Lesson 5: *Struggle for Survival: Fire*

**Directions:** Read each question. Choose the best answer.

1. What is the name of the chemical reaction that takes place between oxygen and fuel?

- (A) ignition
- (B) friction
- (C) carbon
- (D) combustion

2. Where is the best location to start a fire?

- (A) an area that is flat and grassy
- (B) in between several dry bushes
- (C) an area that is dry and flat
- (D) on the slope of a hill

3. The author gives the following advice about starting a fire: "Be patient and don't give up." What can be inferred from this statement?

- (A) Starting a fire is easy.
- (B) Starting a fire is not easy.
- (C) Starting a fire can be done quickly.
- (D) Don't ever try to start a fire.

4. How should you block wind when starting a fire?

- (A) with your body
- (B) with a tree branch
- (C) with grass
- (D) with your jacket

5. What role does toothpaste play in starting a "toothpaste fire"?

- (A) fuel
- (B) ignition
- (C) polish
- (D) tinder



## Lesson 5: *Struggle for Survival: Fire* (cont.)

**Directions:** Read each question. Choose the best answer.

<p>6. If you live in a city when a catastrophe happens, experts advise that you _____ as soon as possible.</p> <p>(A) stay</p> <p>(B) leave</p> <p>(C) hide</p> <p>(D) forage</p>	<p>7. If a person needs to use a bug-out pack, what conclusion can be drawn?</p> <p>(A) The person's house needs pest control.</p> <p>(B) An emergency situation has happened, and the person needs to leave home for a period of time.</p> <p>(C) The person has a cut and needs to use disinfectant.</p> <p>(D) The person is going on a weekend camping trip.</p>
<p>8. What happens when wood is used to start a fire? Choose the answer that best describes the stages from start to finish.</p> <p>(A) igniting, smothering, smoking, blazing</p> <p>(B) smoking, igniting, blazing, smothering</p> <p>(C) igniting, smoking, blazing, smothering</p> <p>(D) smoking, smothering, igniting, blazing</p>	<p>9. Which of the following sentences is a command?</p> <p>(A) "When it's time to put out the fire, remove the fuel (wood), the heat, or the oxygen."</p> <p>(B) "Fire is a chemical reaction between oxygen and some type of fuel such as wood."</p> <p>(C) "The gas is in the smoke that starts to rise."</p> <p>(D) "The wood continues to burn and turns to char."</p>
<p>10. What does movement have to do with staying warm?</p> <p>(A) It helps a person to avoid panic.</p> <p>(B) It makes a person hungry.</p> <p>(C) It leads to a good night's sleep.</p> <p>(D) It increases circulation.</p>	



## Lesson 5: *Struggle for Survival: Fire* (cont.)

**Directions:** Read and respond to each question. Provide evidence from the text in your response.

11. According to the text, how can you make a fire starter using dryer lint?

---

---

---

---

---

---

---

---

12. Compare and contrast hot and cold deserts.

---

---

---

---

---

---

---

---

13. Based on the text, what are some different uses for the yucca plant?

---

---

---

---

---

---

---

---

## Lesson 5: *Struggle for Survival: Fire* (cont.)

**Directions:** Read and annotate the excerpt from *Struggle for Survival: Fire* by Christine Dugan. Underline any words/sentences in which the author makes claims or uses the readers' emotions to make her point about the importance of heat and light in emergency situations. Then, answer the question.

.....

### Afraid of the Dark?

It's difficult to imagine a large populated city going completely dark. But it has happened, and it will probably happen again. It pays to be prepared and know how to create light from different resources. While knowing how to build a fire for light is a great skill, you only want to do that if you absolutely have to. Prepare ahead of time by gathering things that already make light (such as flashlights, lanterns, and candles) in an emergency kit.

Knowing what common items can be used as sources of light is an important survival skill. Did you know that crayons make excellent candles? These colored tubes of wax will burn for about 30 minutes each. If something happens to your candles or flashlights, crayons can be great last-minute replacements.

A large fire, or bonfire, can help you stay warm and create ample light. But you should be very careful where you build any fires. Make sure all fires are located in safe places and that they won't spread out of control. Ideally, you would have some tools on hand for cutting firewood. A chainsaw would be great, but it requires fuel, so you might need to locate smaller tools, such as an axe or a log splitter.

.....

14. Which claims about being prepared to find heat and light in an emergency situation are supported by reasons in the text?

---

---

---

---

**STRUGGLE  
FOR SURVIVAL**

**TIME**

# Fire



**Christine Dugan**

## Consultants

### **Timothy Rasinski, Ph.D.**

Kent State University

### **Lori Oczkus, M.A.**

Literacy Consultant

### **Christopher Nyerges**

Author and Educator;

Cofounder of School of Self-Reliance

## Publishing Credits

Rachelle Cracchiolo, M.S.Ed., *Publisher*

Conni Medina, M.A.Ed., *Managing Editor*

Dona Herweck Rice, *Series Developer*

Emily R. Smith, M.A.Ed., *Content Director*

Stephanie Bernard and Seth Rogers, *Editors*

Robin Erickson, *Multimedia Designer*

The TIME logo is a registered trademark of TIME Inc. Used under license.

**Image Credits:** p.6 Verdateo/Dreamstime.com; pp.6-7 Rvc5pogod/Dreamstime.com; pp.12-13 Daitoiumihai/Dreamstime.com; pp.14-15, 19 Illustrations by Kevin Pham; pp.34-35 Jerry Schad/Science Source; p.39 David Vaughan/Science Source; pp.40-41 Stephen J. Krasemann/Science Source; pp.42-43 William Attard Mccarthy/Dreamstime.com; pp.44-45 Zoya Fedorova/Dreamstime.com; all other images from iStock and/or Shutterstock.

Notes: Care and caution should always be practiced when using tools and methods for survival. The answers to the mathematics problems posed throughout the book are provided on page 48.

## Teacher Created Materials

5301 Oceanus Drive  
Huntington Beach, CA 92649-1030  
<http://www.tcmpub.com>

**ISBN 978-1-4938-3605-5**

© 2017 Teacher Created Materials, Inc.

# Table of Contents

In a Cold, Dark World . . . . .	4
The Importance of Fire for Survival . . . .	6
Starting a Fire. . . . .	14
The Lights Are Out in the City . . . . .	22
In the Woods . . . . .	30
Deserted in the Desert . . . . .	36
Survival of the Fittest . . . . .	42
Glossary . . . . .	44
Index . . . . .	45
Check It Out! . . . . .	46
Try It! . . . . .	47
About the Author . . . . .	48



# In a Cold, Dark World

What do you think it would be like to suddenly have the world go dark? All the modern inventions you expect to easily use—lights, cell phones, computers—suddenly stop working. It is hard to imagine such an extreme situation as being somewhere with no phone, no electricity, and no Internet.

Consider what you might need to survive such a scenario. It is always good to be prepared for anything that could happen. If the world suddenly goes dark for a long period of time, you may start looking for the basic necessities to survive. Heat and light are important for survival, but where would you find heat and light in an emergency?

The skills needed to survive a serious emergency do not require heroic acts or great physical strength. The skills you need to stay alive will work if you keep calm and make good choices. You need to know about the environment you are in when disaster strikes. How can that environment help you? What challenges do you need to overcome? Facing a tough situation with determination will help you stay alive!

## Trying It Out

You can take a survival class and practice different ways to stay alive. The Boulder Outdoor Survival School claims to be the oldest survival school in the world. You can learn how to make rope, start a fire, build a shelter, and identify **edible** plants.

## Practice Carefully!

To be prepared for a disaster, you may want to practice some of the fire-starting suggestions in this book. Always make sure an adult is present to help, and only practice under safe conditions! Fire is not a toy and must be respected.

# The Importance of Fire for Survival

Imagine the planet in total darkness. It might feel like being transported back in time. What was it like when people had to survive off the land with only the most primitive resources? What did people use as sources of heat and light?

Fire, one of the most important forces of nature, is a truly valued resource. But be careful—it can have both positive and negative impacts since fire can both help and harm you. Fire provides heat and light, which is necessary to **sustain** and regenerate life. But it can also be very destructive and can damage anything in its path in the blink of an eye.

Fire has been a key part of survival for millions of years. If you are building a fire to survive, you probably want the fire to provide many different things. You'll need fire to stay warm and dry, especially in cold areas, which is essential for survival. Fire can also **illuminate** the darkness, and having fire means you can cook food or melt snow or ice into drinking water. Smoke from a fire could also help others locate you.



- © Describe what fire provides for you in a survival situation.
- © Why are heat and light so important when fighting to survive?
- © Which do you think is more important: heat or light?

1400°C  
1200°C  
1000°C  
800°C

## How Hot Is That Flame?

You know fire is hot, but how hot is it? That depends on the type of fire and the environment in which it is burning. Even a candle has different temperatures within it. Look at the diagram and determine the difference between the hottest and coldest part of the candle flame.





## What Is Fire?

Fire is a chemical reaction between oxygen and some type of fuel, such as wood. This is also called **combustion**. Here is what happens when wood is heated and catches fire.

### Watch It Ignite!

Something has to ignite the wood, which means something heats the wood to a temperature at which a fire begins. The heat can come from a source such as a match, lightning, friction, or focused light.



2

### Up in Smoke

The wood reaches about 302 degrees Fahrenheit (°F), which is the same as 150 degrees Celsius (°C). The wood starts breaking down because of the heat, so part of the wood is changing from a solid into a gas. The gas is in the smoke that starts to rise.



3

### Flaming Fire

The wood continues to burn and turns into *char*, which is made up of **carbon** and ash. This creates the flames that rise from the fire. These flames can be different colors depending on the fuel that is burning and how hot the fire is.

### Putting It Out

When it's time to put out the fire, the fuel (wood), the heat, or the oxygen must be removed. Taking wood out of a fire can be very tricky when the wood is hot. The most common (and safest) methods are to remove the heat from fire by **dousing** it with water or to remove the oxygen by **smothering** the fire with dirt or sand.



4



8



9

## Staying Warm

You can't survive in cold environments for long without proper clothing and shelter. Without heat or protection, you risk letting your body temperature drop too low. Heat sources help keep your body warm and dry. With proper heat, you can survive cold temperatures and wet surroundings.



## Body Temperatures

**Hypothermia** occurs when your body temperature is dangerously low (below 95°F or 35°C) from cold temperature or **exposure**. A healthy core body temperature is between 98°F and 99°F (36.7°C and 37.2°C).

Here are the conversions for changing Fahrenheit to Celsius and Celsius to Fahrenheit.

- ◎ To convert F to C: subtract 32, multiply by 5, and divide by 9.
- ◎ To convert C to F: multiply by 9, divide by 5, and add 32.

If your body temperature is 92°F, what is it in °C?

If your body temperature is 37°C, what is it in °F?

## The Perfect Temperature

You are always trying to find the right temperature that feels good for your body. Usually when you feel cold, you can turn up the heat in your house or car. Your family might build a fire in a fireplace using matches, newspaper, and wood. Or maybe they simply ignite the gas. You can cuddle under blankets or layer on extra clothes. But if you need to stay warm and dry to survive in an emergency situation, you must know how to light a fire or generate heat in different ways.



## Can You Overdo It in the Cold?

The main purpose of building a fire in an emergency is to keep you warm. Creating a warm fire, covering your body with proper clothing, and building a shelter will all help you stay warm.

Moving and keeping your body active will also help you stay warm. Movement keeps your body's blood circulating, which moves heat throughout your body to places such as your fingers and toes.

But is there a way you can overdo it? Can you cause other problems by moving too much? Most certainly! Movement and activity cause your body to burn calories. Your body needs those calories to stay warm. As your body burns its necessary calories, it is easier for hypothermia to set in.

### Wear Your Layers

Experts say that the best way to dress for the cold is to dress in layers. You need a base layer to keep moisture off your body, a middle layer that traps heat, and a top layer to protect you from the cold and wind.

### Sweating in the Snow

If you work too hard and start sweating in the cold, you might develop a problem. The sweat can freeze next to your skin, drawing away heat from your body. The sweat can also make your clothing wet, reducing its ability to keep you warm.



# Starting a Fire

In a perfect world, you would be able to create a fire in a flat area without any wind. There would also be a large supply of wood nearby, and you could start a fire simply by building the perfect structure and igniting it with the flick of a single match. But how could you do that in the pouring rain or in the middle of a city or a desert? What if you had no matches or lighters, and you didn't have any pieces of dry wood? You may have to get creative about how and where you start a fire, but luckily, there are many ways to get flames going!

## Location, Location, Location

Some places are more ideal for building fires and keeping them going than others. Try to find dry ground and a flat surface. You want your fire to be close to a source of wood and close to your sources of shelter and water. Once you've found a good spot, you're ready to light the fire.

Begin by gathering wood and stacking it in a tepee-like shape in your selected fire area. The wood should be dry and positioned so that it can easily catch and maintain fire. The tepee shape will help the fire burn steadily without being smothered. Once your wood stack is ready, you can begin to light the fire.

### The Dakota Fire Hole

Building a fire hole helps you burn fuel more efficiently and use less wood. American Indians developed this special method to create fire in windy areas such as the Dakotas in the Great Plains.

A decreased airflow means that the fire will burn fuel slower than if it were started above ground.

Heat and smoke escape through the hole above the fire, which stops air from coming down into the hole.

Some air is diverted into the tunnel, which gives the fire a source of oxygen.

airflow



## It Only Takes a Spark

**Tinder, kindling, and logs** are different types of fuel necessary to start fires. **Tinder** is the light material that catches fire easily with one spark. This might be grass, leaves, moss, or straw that is completely dry. Usually, a pile of tinder that is about the size of two fists is enough to get a fire started.

## From Tinder to Flame

Lighting tinder is the first step in getting a fire going, and it only takes a single spark! Matches allow you to do this quickly, but if disaster strikes and you don't have any matches available, you will need to rely on other materials. Rubbing two pieces of wood together can create enough heat to start a spark. **Flint** is a kind of metal that will produce sparks when steel is rubbed against it. A magnifying glass or a camera lens lined up with the sun can create a hot spot that will ignite tinder.

At first, it might seem impossible to start even the smallest spark. Be patient, and don't give up. Remember that people have been starting fires for a million years. With the right materials and a persistent attitude, you can get a fire going, too.

### Clear the Area

Don't build a fire where it is unsafe or where other objects may catch fire. Find a spot away from dry trees and brush. Consider how strong the wind is blowing when building a fire. Remember that a forest fire would be a much bigger problem for you to solve!

### Fire Tools

Starting a fire is much easier with the proper tools. An axe or a knife is essential for fire making because you can cut wood into smaller pieces. These tools can also be used to split wood to get the dry parts from inside a log. If you don't have an axe or a knife, you can make one using a sharp stone and a wooden handle.

## A Bow Drill

What happens when you don't have matches handy? Don't worry; there are ways to meet this extreme challenge! One method of fire starting has been used for thousands of years and is called the *bow drill*, which consists of a fire board, a bow, a drill or a spindle, and a socket or a "handhold."

The fire board consists of a soft, dry wooden board. The preliminary step includes digging out part of the center of the board to make a small pit. Cut a notch in the fire board from the pit to the edge. Once you've completed these steps, place the board on the ground so the notch is directly above a small pile of tinder.

Next, construct a bow by curving a branch and tying a string or a rope to each end. Twist the drill around the bow's string, and situate the drill in the small pit. The socket, which should be made of hard wood, goes above the drill and is where you will apply pressure to hold the drill in place.

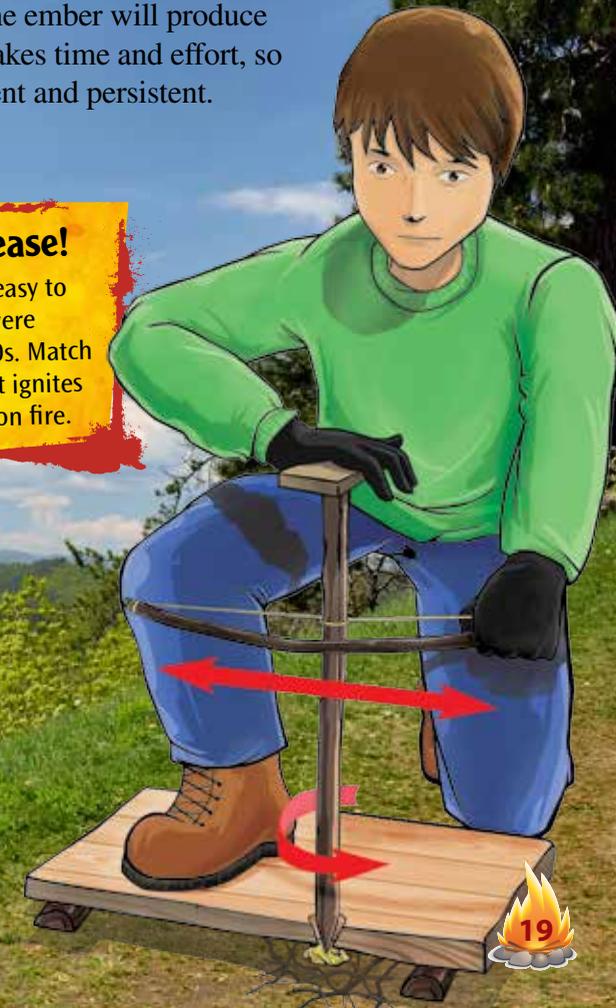
Once you have the bow, drill, and socket prepared, you're ready to start your fire. If there is any discernable wind, try to position yourself so that your body creates a blockade from the wind to prevent it from blowing out your fire. Firmly press down on the socket with one hand and quickly pull the bow back and forth with the other, thus spinning the drill. The friction against the fire board will create smoke, which will slowly become a small **ember**. Gently blowing on the ember will produce a fire! This method takes time and effort, so remember to be patient and persistent.

### A Matchbook, Please!

Today, matches make it easy to start fires. Matchbooks were invented in the late 1800s. Match heads contain sulfur that ignites and sets the matchstick on fire.

### Responsibility with Fire

Whether you're lighting a match or building a fire for survival, it is always important to use extreme caution. Even a small fire can get out of control quickly.



## A Toothpaste Fire?

If only you could start a fire with familiar items you might have in your home . . . Well, you can! You can start a fire with an **aluminum** soda can and toothpaste. Getting innovative about how to make flames may help you survive **dire** situations. This trick requires sunlight and tinder.

The bottoms of soda cans often have dull finishes. If you look closely at a can, you'll see there are subtle lines that indicate the grain of the aluminum. These lines make it difficult for the sun's rays to reflect off the can because the lines scatter the rays. A polished can bottom that looks like a mirror works better for reflecting and concentrating sunlight.

To get started on a toothpaste fire, rub toothpaste on the bottom of the can in tiny circles. You're actually using the toothpaste to polish the can. Wipe off the excess toothpaste. If you do it well, the bottom of the can should clearly reflect your face as you look at it.

Then, place some tinder at the center of the can bottom. Point the bottom of the can toward the sun, and eventually the tinder should start to **smolder** as the sun's rays reflect off the bottom of the can. Once the tinder is smoldering, add it to a bigger bundle and blow until a flame appears.

### Fire Starters

Fire starters are good to add to an emergency kit. They can be useful when you have no tinder to burn or when you want to create fires quickly. You can buy fire starters or make your own. With an adult's help, place dryer lint in an egg carton. Then melt wax and pour that onto the cups, covering the lint. Once the wax dries, cut apart the cups. These small fire starters make small but useful flames that will burn for about 10 minutes. That's enough time for the bigger pieces of wood in your fire to catch.



### Soda Can Angle

When polishing the bottom of the can, you make an average of 150 circles on the can per minute. It takes you 14 minutes 30 seconds to get the can fully polished. How many circles would you have made?



# The Lights Are Out in the City

If you are ever trapped in a cold, dark place with no easy way to make light and heat, stay calm. Remember, there are several different things you can do to stay alive and safe. What you need to do to survive depends on where you are and what materials you have available. If you are in a city, what could you use for heat and light to stay alive?

## Safety First

Many experts advise leaving the city as soon as possible in the event of a **catastrophe**. There might be more resources available to you in a city at first, but there would also be more people looking for those same materials. Soon, people may fight over food and water. That kind of conflict can become dangerous.

### A Lightbulb Moment

Modern inventions help us create light with the flip of a switch. What an unsettling idea to think of a disaster in which lamps and lightbulbs would not work. Here is a list of important light inventions:

- © 1780—oil lamp
- © 1792—gas lamp
- © 1867—fluorescent lamp
- © 1875—electric lightbulb
- © 1962—light-emitting diode (LED) lights

How many years ago were LED lights invented?

### Help From FEMA

FEMA stands for the Federal Emergency Management Agency. This is the government office that helps cities and states in the United States deal with natural disasters.



22



23

## Bug-Out Pack

In the event of a serious emergency, some city **dwellers** may want to get out of the cities as quickly as possible. This means planning ahead and being prepared and packed are key. Getting together a “bug-out pack” is part of this plan.

This special pack includes a large backpack filled with essential items. These items would allow you to survive for a long time away from cities. It is not the same as an emergency kit. This is something you would likely wear on your back and travel with for long distances. You’ll want to pack carefully and strategically, so you have everything you need.

### Points on a Compass

There are four cardinal points on a compass—North, South, East, and West. There are intercardinal points (NE, SE, SW, NW) and secondary intercardinal points (NNW, NNE, ENE, ESE, SSE, SSW, WSW, WNW) as well.



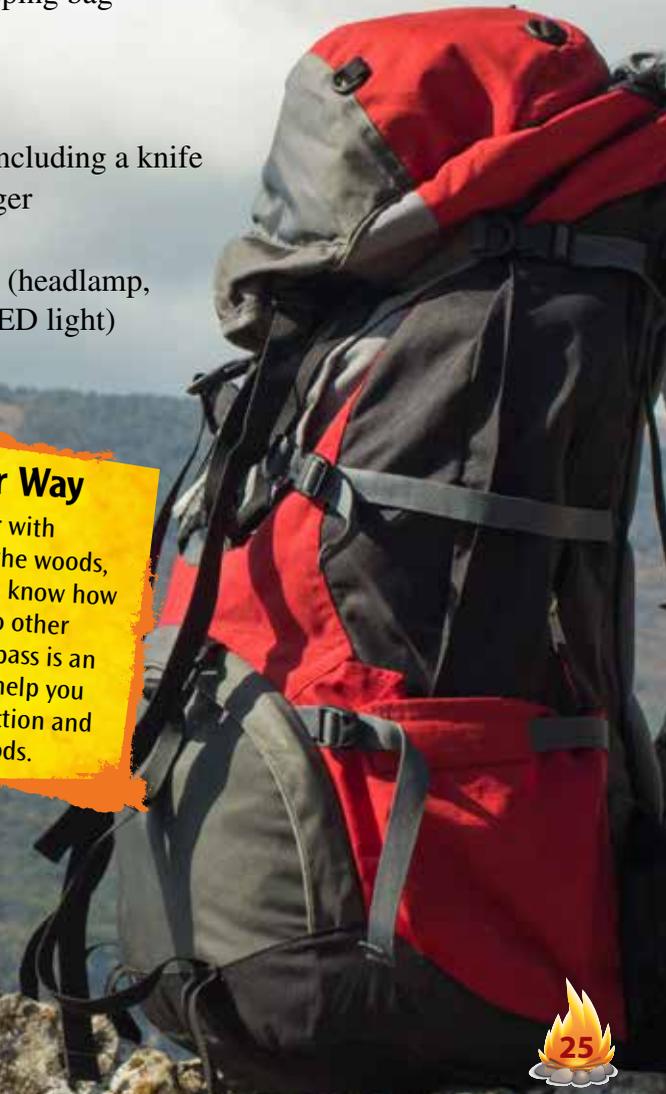
## Inside the Pack

These are some essential items you may find in a bug-out pack:

- water and filters
- nonperishable food for at least three days
- two sets of clothes so you have one that is dry at all times
- tent and sleeping bag
- first aid kit
- fire starters
- rope or cord
- multi-tool, including a knife
- solar recharger
- compass
- lighting tool (headlamp, candle, or LED light)

### Finding Your Way

If you are familiar with where you are in the woods, you might want to know how to find your way to other landmarks. A compass is an important tool to help you navigate your direction and location in the woods.





## Be Prepared: Creating an Emergency Fire-Making Kit

One of the best ways to help survive a situation without lights or heat is to have an emergency fire-making kit. You can gather supplies and store them safely. This means you'll know where to find essential items if you ever need them. Having an emergency kit requires thinking and planning. You may never need it, but it's a good thing to have just in case.

People often think about storing food and medical supplies first, but other common items are also important to have, especially for fire making. If you have access to a kit like this, you will be more likely to create the fire needed to survive.

© **Save a Light**—To stay warm and dry, the first thing you'll need in your kit is a variety of lighting tools. Waterproof and windproof matches are best. So is a lighter. Flint tools are great things to add to your kit, too.

© **Where's the Rope?**—Superfine steel wool and a short rope are good to have in your kit. Both things can be used as tinder. And the rope may also be helpful in building a shelter.

© **Magnify the Problem**—A magnifying glass is also useful. This can be used with the sun to create hot spots to light tinder.

© **Lip Balm Fire?**—Add a tube of petroleum-jelly lip balm to your kit. So you won't have chapped lips? No! You can use it on your tinder to make it burn hotter and longer.

© **Warm Blanket**—Don't forget a thermal blanket. These blankets are lightweight and should not take up much space, but they keep you warm and help prevent hypothermia. Even if you build a fire for warmth, a thermal blanket is essential.

## Afraid of the Dark?

It's difficult to imagine a large populated city going completely dark. But it has happened, and it will probably happen again. It pays to be prepared and know how to create light from different resources. While knowing how to build a fire for light is a great skill, you only want to do that if you absolutely have to. Prepare ahead of time by gathering things that already make light (such as flashlights, lanterns, and candles) in an emergency kit.

Knowing what common items can be used as sources of light is an important survival skill. Did you know that crayons make excellent candles? These colored tubes of wax will burn for about 30 minutes each. If something happens to your candles or flashlights, crayons can be great last-minute replacements.

A large fire, or bonfire, can help you stay warm and create ample light. But you should be very careful where you build any fires. Make sure all fires are located in safe places and that they won't spread out of control. Ideally, you would have some tools on hand for cutting firewood. A chainsaw would be great, but it requires fuel, so you might need to locate smaller tools, such as an axe or a log splitter.

### Bonfire 101

There is a science to building a bonfire. The tepee, or pyramid shape, usually suggested helps create a chimney effect. This shape also increases the intensity of the fire.

### Volume of a Pyramid Fire

If a fire is built as a pyramid with a rectangular base, you can determine the volume of the pyramid.

$$V = \frac{lwh}{3}$$

If the fire pyramid is 1.2 feet long, 2.2 feet wide, and 3.4 feet high, what is the volume of the pyramid?

# In the Woods

You may think that trying to survive in a city is a challenge. However, staying alive in the woods can be extremely difficult. It's worse if you don't have proper supplies or modern conveniences, such as matches, flashlights, and fuel, to help make survival easier. Two important factors to be mindful of in the woods are the time of year and the weather conditions. For example, a wooded environment in winter may have dangerously low temperatures.

One main goal for survival in a wooded area is to stay warm and dry. A fire will help with that goal. But you also need proper clothing to protect your body and keep it heated. Wearing a hat is key because more than 40 percent of your body heat is lost through the top of your head.

## Chilly Wind

Surviving the cold means being aware of things such as **windchill**. This means how cold the air feels on your skin.

Windchill Chart					
Wind Speed	Equivalent Temperature (°F)				
0 MPH	40°	20°	0°	-20°	-40°
10 MPH	28°	4°	-21°	-46°	-70°
20 MPH	18°	-10°	-39°	-67°	-96°
30 MPH	13°	-18°	-48°	-79°	-109°
40 MPH	10°	-21°	-53°	-85°	-116°



## STOP! THINK...

- © If the temperature is  $-20^{\circ}\text{F}$  outside and the wind is approximately 10 MPH, how cold will the air feel?
- © If the temperature is  $20^{\circ}\text{F}$  outside, what speed wind will lower the temperature you feel to  $-18^{\circ}\text{F}$ ?
- © If the temperature is  $40^{\circ}\text{F}$  outside but the wind is approximately 30 MPH, how much colder will the air feel?



## Lighting Up the Forest

For thousands of years, pine knot torches have illuminated the darkest places on Earth. A pine knot is the dead bark inside a pine tree, and it makes a remarkable light for people to carry and use in the woods. Knowing how to make a torch from this part of a tree is a useful skill for all survivalists.

There are necessary tools, such as hatchets or saws, that are required to complete this project. Securing a hatchet or saw will simplify your task, but a small knife will be sufficient to get the job done. Figure out which tool can be used to light the torch and keep it burning successfully.

### Keep It Lit

Imagine you are surviving in the woods and you make a torch to last each night for five nights in a row. Using the information below, what is the average amount of time the torch provided light?

Night 1: 4 hours 32 minutes

Night 2: 4 hours 54 minutes

Night 3: 3 hours 5 minutes

Night 4: 5 hours 17 minutes

Night 5: 4 hours 44 minutes

Here are the steps for making a pine knot torch:

- Find a dead pine tree limb and rip off the bark.
- Gather the bark from the tree, and tie it together with string or rope. You can also split the knot end of the limb into four sections and then stuff twigs and wood shavings into those sections.
- Light the end of the torch, and watch it burn for several hours!

### Light the Way

Torches are the most basic kinds of flashlights and have been used for thousands of years. Holding a light in a dark place not only helps you see your surroundings better but also helps you see where to step to prevent tripping and injuring yourself.



32



33

## Look Up for Light

Even if the woods are incredibly dark, there might be one thing in nature to light the way—the night sky. The night sky not only provides some natural light, but it also provides information about the general direction in which you are moving.

The moon moves from east to west as it crosses the sky. In the Northern Hemisphere, the sunlit part of the moon appears to move from right to left. In the Southern Hemisphere, the sunlit part the moon appears to move from left to right.

The glow of the daytime sun can provide not only heat and light but also a reference for direction. The sun follows a constant path as it rises in the east and sets in the west. So, pay close attention to the direction in which the sun is moving.

Stars and constellations can be helpful, too. The constellation Orion rises in the east and sets in the west, matching the path of the sun. Finding the North Star will allow you to position yourself facing north. All you have to do is imagine a line down to the horizon from the North Star.

## Phases of the Moon

If you look up at the night sky, the moon will look different depending on which phase it is in. The moon has eight phases:



waxing gibbous



first quarter



waxing crescent



full moon



new moon



waning gibbous



third quarter



waning crescent

## Fractions of the Moon

As the moon cycles through its phases, different fractions become visible.

Approximately what fraction of the moon shows during the waning gibbous phase?

Which two moon phases represent  $\frac{1}{2}$ ?

Which moon phases are closest to  $\frac{1}{8}$ ?

# Deserted in the Desert

When disaster strikes, it often happens quickly and without warning. You don't always have time to prepare or to get to the most comfortable environment. What would survival techniques look like if you were stuck in the desert without an easy way to create heat or light?

It may seem as if a desert would be an ideal place for heat and light. It's so hot and sunny there, so why would you need to worry about staying warm? Well, deserts have extreme temperatures. The climate can be

very hot, but it can also be extremely cold. A desert's climate determines whether it is a cold desert or a hot desert. A hot desert is a dry environment with little rain or snow. It is often hot during the day but can get quite cold at night. A cold desert gets more rain and snow but is also a dry environment that has extremely cold temperatures.

## Too Hot and Too Cold

Desert temperatures can be above 120°F (48.9 °C) during summer days, but they can also go far below freezing in wintertime, even to -0.4°F (-18°C)!

## Dry Land

A desert is a dry area that receives very little precipitation, usually less than 10 inches (25.4 centimeters) per year. Precipitation in a hot desert typically refers to rain, while cold deserts receive snow.

## Surviving the Cold

Most people don't live in cold deserts, so it is unlikely that you would need to prepare to survive in a cold desert. But it could happen. What is more likely, though, is a situation in which you would be in a hot desert at night or in the winter months. You would need very specific and advanced survival skills to handle the cold temperatures and darkness in such a **desolate** place.

Your main goal in cold climates is to stay warm, but it's easy to panic and feel overwhelmed when you are in harsh environments. Remember that an important aspect of survival is the ability to stay calm. Think about what you need to survive each situation you face. Look at the resources available to you. Consider how you might build a fire to stay warm in an area with few trees or plants.

### Animal Adaptations

Animals that live in cold deserts have to adapt to very low temperatures. For instance, lemmings have a lot of fur to keep them warm. They also **burrow** into the snow to stay safe and warm.

### Antarctica Population

Many scientists live and work in Antarctica, which has the world's largest cold desert. There are about 4,000 people there in the summer months, but fewer people stay for the harsh winters.



## Desert Dilemma

Building a fire in cities or in the woods may be easier than in a desert because there are more things available to burn. A desert environment has very few trees or bushes. With that in mind, how can you create a fire in the desert so you'll have heat and light to stay warm and safe?

### Fire Protection

Building a fire in a survival situation can do more than give heat and light. It also adds a layer of protection from dangerous animals, including snakes and scorpions.



yucca plant

## Know Your Plants

You have to make smart decisions in the desert about what you burn. It's good to know which of the desert plants are the most effective for burning warm fires. Yucca and juniper plants are two of the best fire-starting plants. Yucca plants have dry flower stalks that make good material for fires. Juniper plants are helpful because they provide wood and fiber that burn easily.

### Clean Up While You Warm Up

Yucca plants have leaves that make great soap. Native tribes in the American Southwest discovered this long ago. Who knew you could stay clean using plants?!



- © Describe the progression of a fire from the moment it starts until it is extinguished.
- © How can you start a fire without a match?
- © What can happen if you are exposed to extreme cold?

# Survival of the Fittest

Staying calm in tough situations is always an important first step. If you find yourself in an emergency and you have to think about ways to find heat and light, consider what you already know. Where are you, and what can your environment provide to keep you warm? What objects can help you make light so you can see where you are and where you want to go? What would be the easiest and safest way to build a fire?

Survival skills have improved over the last thousand years. Today, you may not have to use those skills often, but if you ever do, you are certainly capable of successfully completing the necessary tasks to find heat and light. Trust yourself, and look to your surroundings to help you find your way to safety.

## Believe in Yourself

Winston Churchill, the one-time prime minister of England, once said, "Never, never, never give up." To know that you are going to survive a challenging situation, you have to believe in yourself and not give up.

## Surviving on TV

Survival skills are so important that they have made television shows about them! The television show *Survivor* is shown in many countries. It involves watching people being stranded in remote places and having to survive.

# Glossary

**aluminum**—a metal found in the earth's crust

**burrow**—to hide by digging an underground hole

**carbon**—a chemical element that forms coal

**catastrophe**—a sudden disaster

**combustion**—the act of burning

**desolate**—lonely or abandoned

**dire**—extreme

**dousing**—putting out a fire with water

**dwellers**—people who live in certain places

**edible**—safe to eat

**ember**—a glowing piece of wood from a fire

**exposure**—to be without shelter or protection

**flint**—a hard mineral that produces a spark when struck by steel

**hypothermia**—the reduction of body temperature to a low level

**illuminate**—to light up

**kindling**—a material that burns easily and is used to start a fire

**smolder**—to burn slowly without flames

**smothering**—covering a fire to put it out

**sustain**—to keep going

**tinder**—a light material that burns easily

**windchill**—the temperature your body feels when air is combined with wind

# Index

Antarctica, 39

bonfire, 28

Boulder Outdoor Survival School, 5

bow drill, 18

bug-out pack, 24–25

Churchill, Winston, 43

compass, 24–25

constellations, 34

Dakota Fire Hole, 14

desert, cold and hot, 14, 36–41

emergency kit, 20, 24, 26, 28

FEMA, 22

fire starters, 20, 25

fire temperature, 7–8

fire tools, 17

flint, 16, 26

hypothermia, 11, 13, 27

North Star, 34

Orion, 34

phases of the moon, 35

pine knot torch, 32–33

*Survivor*, 43

windchill, 30–31

# Check It Out!

## Books

George, Jean Craighead. 2004. *My Side of the Mountain*. Puffin Books.

\_\_\_\_\_. 2009. *Pocket Guide to the Outdoors*. Dutton Children's Books.

Levy, Joel. 2012. *How to Be a World Explorer: Your All-Terrain Training Manual*. Weldon Owen Publishing.

McNab, Chris. 2008. *The Boy's Book of Outdoor Survival: 101 Courageous Skills for Exploring the Dangerous Wild*. Ulysses Press.

Nyerges, Christopher. 2014. *How to Survive Anywhere: A Guide for Urban, Suburban, Rural, and Wilderness Environments*. Stackpole Books.

O'Dell, Scott. 2010. *Island of the Blue Dolphins*. HMH Books for Young Readers.

Paulsen, Gary. 2006. *Hatchet*. Simon & Schuster Books for Young Readers.

## Websites

Nyerges, Christopher. *School of Self-Reliance*.  
<http://www.christophernyerges.com/>.

Practical Survivor. *Starting a Fire in Adverse Weather*.  
<http://www.practicalsurvivor.com/fireintherain>

Wild Backpacker. *How to Build a Fire*.  
<http://www.wildbackpacker.com/wilderness-survival/articles/how-to-build-a-fire/>

# Try It!

You have been hired by a camping equipment company to create a bug-out bag that customers can buy in stores. This bag will be packed with all the essentials for a survival scenario. While it must have as many handy items as possible, it needs to be light enough for a person to easily carry on his or her back for long periods of time. Your final product design must include the following:

- ☉ Create a list of all items that should go in the bag.
- ☉ Design the bag itself. Will it be a backpack? A duffel bag? What color should it be?
- ☉ Draw a diagram of the bag and all of its contents with a brief description of each item and why it's included.
- ☉ Determine a catchy name for your product that makes it stand out to customers.



# About the Author



Christine Dugan has written many books for both students and teachers. She has worked as an author, an editor, and a classroom teacher. Currently, Christine teaches in the Pacific Northwest, where she lives with her husband and their two daughters. Though she is curious about which method she might use to start a fire in the desert or woods, she prefers to light a fire in her fireplace with a match and sit in front of its warmth at home with a good book.

## Answers

page 7—approximately 600°C

page 11—33.3°C; 98.6°F

page 21—2,175 circles

page 23—today's year – 1962 =  
(for example, 2017 – 1962 = 55 years)

page 29—2.992 feet<sup>3</sup>

page 31—-46°F; 30 MPH; 27°F

page 32—4 hours 30 minutes

page 35—three-quarters; first quarter  
and third quarter; crescent in waning  
and waxing

# Reader's Guide

1. What key information about survival should be taught in a two-hour survival skills class?
2. Look at the list of items for a bug-out pack on page 25. Which one item could be left off this list, and why?
3. Conduct a survey about what people think is most important in a survival situation: heat, light, shelter, clothing, food, or water. Compile your data in a chart. How does your data compare to what you learned about surviving dangerous situations in this book?
4. In what ways, other than heat, can a fire be useful in a survival situation?

