

Lesson
5

Find Word Meanings Using Roots and Affixes

- 8.2(C)** Determine the meaning and usage of grade-level academic English words derived from Greek and Latin roots such as ast, qui, path, mand/mend, and duc.
- 8.5(F)** Make inferences and use evidence to support understanding.
- 8.5(G)** Evaluate details read to determine key ideas.
- 8.6(F)** Respond using newly acquired vocabulary as appropriate.

 Introduction

Real-World Connection

Michael is doing some research on future careers. As he starts reading through different articles, he notices a lot of words that end in *-ology*. Michael is not sure what these words means, but he thinks it is important that they all end with the same few letters. How can he use this ending to figure out the meaning of the words he found? We will practice the skills in Guided Instruction and Independent Practice. Then, at the end of the lesson, we will revisit Michael and his career research.

Words to Know

root
prefix
suffix
affix



What I Am Going to Learn

- Determine the meaning and use of English words derived from Greek and Latin roots.
- Make inferences using evidence to support.
- Evaluate details in reading to determine key idea.
- Respond using newly acquired vocabulary.

What I May Already Know 7.2(C), 7.5(F), 7.5(G), 7.6(F)

- I know how to determine the meanings of some words with Latin and Greek roots.
- I know how to make inferences from evidence in the text.
- I know how to evaluate and determine key details in what I read.
- I know how to respond to a text by using new vocabulary I learned.

Understand the TEKS

These vocabulary words will help you understand the TEKS.

What are root words and word parts? Knowing the difference can help you determine the meaning of unfamiliar words or newly acquired vocabulary.

The **root** of a word is its base form from which other words are built. The root carries the word's core meaning. Sometimes the root is a whole word. For example, the root in *review* is *view*. *View* means the ability to see something; *review* means to look at it again.

Sometimes a word has a root that comes from a Latin, Greek, or Anglo-Saxon word. In this case, the root cannot stand alone. For example, the word *manuscript* is made up of two roots, *manu* + *script*. Before the invention of printing, a manuscript was written (script) by hand (manu). Today, we use the word to refer to any text from an author before it is printed.

Here are some word roots you will encounter as you read the articles and do the activities in the lesson.

Word Root	Meaning	Example
archa, archaeo, archeo	ancient, beginning	archaic
aster, astro	star, planet	astronaut
cav	hollow, hole	cavity
fid, feder	faith	fidelity
geo	Earth, earth	geography
graph	write, written	auto graph
lith	stone	monol ith
man, manu	hand	manuscript
phon, phone, phono	sound	tele phone
sci	know, knowledge	scientific
scrib, script	writing	pre scription
terr, terra	earth, land	territory
techno, tech	art, craft, referring to machines and equipment	technical
tect	cover	pro tection

A **prefix** is a group of letters added to the beginning of a word or root to change its meaning.

Here are some prefixes you will encounter as you read the articles and do the activities in this lesson.

Prefix	Meaning	Example
col-, com-, con-, cor-	with, together	collection
de-	from, reverse of, down	decrease
dis-	not, opposite of, away from	dishearten
ex-	out, beyond, without	expel
il-, im-, in-, ir-	not	irregular
im-, in-	in, into	injection
micro-	little, small	microscope
pre-	before, earlier	preparation
pro-	for, forward, in favor of	promote
proto-	first	protocol
trans-	across, beyond	translation
un-	reverse, opposite of	unlikely

A **suffix** is a letter or group of letters added to the end of a root. It changes the meaning of a word and its part of speech.

Here are some suffixes you will encounter as you read the articles and do the activities in this lesson.

Suffix	Meaning	Part of Speech	Example
-al	relating to	adjective	personal
-ant, -ent	having the qualities of	adjective	resistant
-ar, -er, -or	a person who; something that	noun	creator
-ate	make	verb	demonstrate
-ation, -sion, -tion	state of	noun	expiration
-ic	like, having the nature of	adjective	numeric
-ics	study of, art of, skill in	noun	athletics
-ist	a person who, that which	noun	artist
-ity	state of, quality of	noun	creativity
-less	without	adjective	fearless
-ly	in the manner of	adverb	gently
-ness	state of, quality of	noun	kindness
-ology, -logy	study of, science of	noun	mythology
-ous	full of, having qualities of	adjective	furious

The word **affix** means “to attach to something else.” Prefixes and suffixes are both affixes because they attach to the beginning or end of root words. They are sometimes called combining forms because you can combine them to form new words. You can add a prefix to a root, a suffix to a root, and both a prefix and suffix to a root. You can even add more than one prefix and/or suffix to a root.

Knowing the meaning of prefixes and suffixes can help you determine the meaning of many unfamiliar words, but remember to always go back to the context to make sure the meaning you come up with is valid.

Think About It

When you try to determine the meaning of a longer word, identify the word parts. Think of other words you know that have one or more of these parts. Connect their meaning to the new word. Making these associations will increase your understanding.

archa + ic = archaic

The senator claimed the law was archaic. It should be changed because it was no long pertinent to our times.

- What do you think *archaic* means? Check that the meaning you come up with fits the context.

mono + lith + ic

At the center of the circle of stones was a monolithic structure that loomed over all the others.

- What do you think *monolithic* means? Check that the meaning you come up with fits the context.



Guided Instruction

Read the passage below. Then answer the questions in the margin and complete the activities.

Choosing a Site

by Angela Murock Hussein

- 1 **A** Archaeology has many exciting tales of discovery. The stories about finding ancient sites and the amazing finds made on them are part of the romance of archaeology. The city of Troy was believed to be a myth. Then its location was found by following the geographical clues in the poems of the ancient Greek poet Homer. The tomb of the Chinese emperor Shi Huangdi in Xi'am and his terracotta army was found by a pair of farmers who were digging a well. **B** A Maya settlement that was known only from looted inscriptions on the black market was located in the jungle of Guatemala in 1996. These events, however, are exceptional. How, then, are most sites chosen for archaeological exploration? And once chosen, how does a field project begin?

Here, or There?

- 2 **C** While there are many ways to select a site, archaeologists generally choose areas where they expect to find as much ancient material as possible. This is because archaeology is a very expensive and time-consuming process.
- 3 The easiest method is to dig at a site that is already known. **D** For example, the location of the pyramids and surrounding cemeteries at Giza, Egypt, has never been forgotten because of the monumental size of the tombs and the fact that they have always remained above ground. Many pueblo settlements in the American Southwest were obvious choices because they contain large, well-preserved structures. Archaeologists have chosen to excavate in and around these places because they know they were the center of much human activity.
- 4 There is another way to find archaeological sites that might not be as easily detected. It is by field survey. It can be done by field walking. This means that archaeologists will map out an area and mark out sections of it on a grid. They then walk squares in the grid. They look on the ground for pieces of pottery and other objects. Where concentrations of artifacts occur, there is likely an archaeological site. In a similar method, small squares in a grid are selected for shovel test pits. They are dug as samples to see where archaeological material occurs. The results of the samples are analyzed to see if there is a pattern that points to

Guided Questions

Find the word *archaeology* in sentence **A** in paragraph 1. Underline the root. Circle the suffix. What does this word mean?

In sentence **B** in paragraph 1, underline the word that has a root that means "writing." What does this word mean?

In sentence **C** in paragraph 2, find the word that shares the same root as *archaeology*. Underline it. What does it mean?

the location of an archaeological site. Various techniques help scientists detect archaeological monuments that cannot be seen well from the ground. These include aerial photography, ground-penetrating radar, and remote sensing. All provide clues about what is under the earth.

Permit Required!

- 5 Once a site has been chosen, permission to dig must be obtained. Archaeological sites and all the ancient objects contained within are the property of the country in which they are located. Therefore, excavation permits must be obtained from the culture ministry or interior department of the national government. To apply for a field permit, archaeologists usually must write a research proposal stating the questions they want to answer and how work at the site will help them do so.
- 6 **E** Once permission has been granted, the excavation team can be formed. The team includes the director in charge of coordinating the entire project and assistant directors and area supervisors to oversee work onsite. Different specialists may also be included on a team. It depends on the needs of the project. For example, archaeological digs regularly include experts in areas such as pottery, bones, and artifact conservation. Artists or architectural drafters are invited to record the appearance of artifacts and building ruins. Most often, representatives from the government, inspectors or superintendents, will oversee the project and make sure that the cultural property is handled safely. The actual digging will be done either by volunteers who are there to learn about archaeology, or by professional diggers who usually are hired with the help of the local government.



Guided Questions

In sentence **D** in paragraph 3, underline the word that contains a prefix that means “one” or “single.” What does this word mean? How is it related to the idea of “one” or “single”?

Underline the word *excavation* in sentence **E** in paragraph 6. What is an excavation team? Find the verb in paragraph 6 that is related in meaning to excavation and underline it.

Critical Thinking



1. Read the sentence below and pay close attention to the underlined word.

Various techniques help scientists detect archaeological monuments that cannot be seen well from the ground.

What does the word detect mean? Write a sentence using it.



2. Use your knowledge of word parts to complete the chart below. (Hint: If the root ends in e, drop the e when you add -er.)

Combine	Form Word
in- + scribe =	
in- + scribe + -er =	
in- + script + -ion =	
de- + scribe =	
de- + scribe + -er =	
de- + script + -ion =	
pre- + scribe =	
pre- + scribe + -er =	
pre- + script + -ion =	
trans- + scribe =	
trans + scribe + er =	
trans- + script + ion =	



3. What special habits of mind, traits, education, and experience do you think are necessary to be an archaeologist? Do some research to find out more about what an archaeologist does. Then discuss your findings with a partner. Work together to create a job description for an archaeologist.

How Am I Doing?

- ★ What questions do you have?

- ★ How can you use root words, affixes, and suffixes to help you understand the meaning of an unknown word?

- ★ Fill in the circle that shows how you are doing with the skill.

I am stuck.

I almost have it.

I understand the skill.



Independent Practice

★ Practice

Read the selection and choose the best answer to each question.

Robots to the Rescue

by Susan Barnes and Steven R. Wills

- 1 On August 6, 2006, 16 coal miners working 1,500 feet underground in the Crandall Canyon mine in Emery County, Utah, felt the earth shift and buckle beneath them. Coal shafts below and around them heaved and walls bulged. A low rumble quickly exploded into a roar that seemed to surround them, signaling a cave-in so powerful it registered 3.9 on the Richter Scale—a measurement typically reserved for earthquakes.
- 2 There was no time for the men to even begin the quarter-mile journey to the surface. They were trapped. For the next 10 days the nation waited, watched, and hoped for some word of a miraculous rescue. That word never came. The 16 miners, along with three rescue workers who died in the effort to save them, were among 47 coal mining fatalities in 2006.
- 3 It was a heartbreaking tragedy, not only for the families and friends of the 19 men, but for the scores of others who worked tirelessly to try and save them. Among those working was Dr. Robin Murphy, a University of South Florida engineering professor who offers help in such disasters in the form of rescue robots.
- 4 Since Murphy's robots are designed for specific types of catastrophes, they don't all look the same. Some are small and move on treads; others have cameras that look like eyes. But they all do serve one general purpose: to extend the senses of human rescue teams. To do this, some rescue robots use cameras (to extend sight), microphones and speakers (to extend listening and speaking), chemical sensors (to "smell" the air for toxins), and maneuverable wheels, treads, and arms (to extend reach).

Here They Come

- 5 Although scientists have talked about using robots in rescue situations for many years, rescue robots' history is actually short. After the Oklahoma City bombing in 1995, which claimed 168 lives and injured 800, researchers began to see how robots could have been used to search the collapsed Federal Building. That same year, robot prototypes were used to search for victims in the Conchita, California, mudslides.
- 6 In order to boost interest in this technology, the American Association for Artificial Intelligence held the first Rescue Robot Competition in 2000. These competitions have increased in frequency and in difficulty over the last eight years, providing a showcase for better designs and new ideas.
- 7 By 2001, after the destruction of the World Trade Center, some rescue robots were ready for action. They were flown to Manhattan to help in four ways: to search for victims; to find pathways through the rubble; to check for structural weaknesses; and to detect hazardous

materials. Although their use was limited, the robots were able to explore spaces too small and too dangerous for people, and were able to find remains within the wreckage. By 2005, in the wake of Hurricane Katrina, it was no longer a surprise to human rescue teams to see robots on the job. Robots also assisted rescue forces at the collapse of a parking garage in Florida in 2007, as well as at the Crandall Canyon mine disaster described earlier.

Success Within Reach

- 8 Each new challenge for rescue robots has brought improvement as well as failure—and each failure has led to ideas for further improvement. For example, since many robots at disaster sites must be very small (to get into tight places), they have a limited battery size. This triggered Murphy's development of the "marsupial robot." The 'bot is large (and so has a large battery) but its purpose is to carry several smaller robots (with smaller batteries) close to a disaster area, where they can then be deployed.
- 9 Murphy understands not only the potential of rescue robots, but also the need for them. She is confident that "one day you'll see rescuers and dogs at a disaster site, but if you don't see a robot you'll say, 'Where are they?' because they'll have become so commonplace. They'll do things dogs and people can't."

It's OK. Here Comes Survivor Buddy.

- 10 You wake up in the midst of a nightmare. The last thing you remember before losing consciousness is someone yelling, "tornado!" You're pretty banged up, but the worst part is you can't move—trapped beneath collapsed ceiling plaster, steel beams, and who knows what else? How long have you been here? Where is everyone? You yell for help—but in the chaos outside, can anyone hear you?
- 11 What's that soft whirring sound? It's behind you, but you can't turn around. Then you hear a strange voice saying, "We know you're there. We can see you on our camera. Tell us if you're hurt."
- 12 It's Survivor Buddy. You've been found!
- 13 Survivor Buddy (currently under development) is a type of rescue robot designed to keep victims company and provide emotional support until human help arrives. It can be hours or even days before a trapped victim is rescued, and that wait can be terrifying, even if a victim knows help is on the way. Dr. Robin Murphy is designing Survivor Buddy to communicate with the victim, offer a drink of water, and during delayed rescues even provide pictures or video of family members. The robot's purpose is simply to calm victims by keeping them company. And Survivor Buddy has help—it can play soft, soothing music. (Sorry, though—no heavy metal. The vibrations might shake the rubble.)

- 1 Read the sentence below, and pay close attention to the underlined word.

Among those working was Dr. Robin Murphy, a University of South Florida engineering professor who offers help in such disasters in the form of rescue robots.

What prefix and root do you see in disasters?

- A Dis + aster
B Dis + ast
C Di + ast
D Di + ast + er

- 2 What word in paragraph 4 has a similar meaning to disasters?

- F *specific*
G *catastrophes*
H *microphones*
J *maneuverable*

- 3 By using the meaning of the root, the reader can determine that prototypes are —

- A several models developed at different times
B early models of something
C the final models of something
D models that have faults and do not function properly

- 4 In paragraph 10, the word consciousness means —

- F the science of thought and ideas
G not aware
H full of knowledge
J the state of being awake and aware

- 5 Which of the follow sentences shows the key idea of the passage?

- A *On August 6, 2006, 16 coal miners working 1,500 feet underground in the Crandall Canyon mine in Emery County, Utah, felt the earth shift and buckle beneath them.*
B *Among those working was Dr. Robin Murphy, a University of South Florida engineering professor who offers help in such disasters in the form of rescue robots.*
C *Each new challenge for rescue robots has brought improvement as well as failure—and each failure has led to ideas for further improvement.*
D *Survivor Buddy (currently under development) is a type of rescue robot designed to keep victims company and provide emotional support until human help arrives.*

★ **Assessment**

Choose the best answer to each question.

1 Which suffix should be added to the word “robot” to create a word that means “the scientific study of computer-controlled machines”?

- A -al C -ist
B -ology D -ics

2 What is the key idea in paragraphs 10–13?

- F Survivor Buddy is the only robot to enter disaster sites.
G Survivor Buddy is being developed to offer comfort and support to trapped victims.
H Dr. Robin Murphy is the head of the development team for Survivor Buddy.
J Survivor Buddy is the only robot to play soft music to victims.

3 Read the sentence below, and pay close attention to the underlined word.

The 16 miners, along with three rescue workers who died in the effort to save them, were among 47 coal mining fatalities in 2006.

What word can replace the word fatalities?

- A deaths C survivors
B workers D members

4 Which of the following sentences shows the correct use of the word conscious/consciousness?

- F When your conscious is clear, does that mean you are innocent?
G He was fond of peace and actuated by the consciousness of a great mission.
H His eyes dropped and he lost consciousness again.
J One thought had been gnawing at her conscious since the first time she suspected him.

5 Which of the follow sentences shows the benefit of using robots in rescue situations?

- A *Although their use was limited, the robots were able to explore spaces too small and too dangerous for people, and were able to find remains within the wreckage.*
B *She is confident that “one day you’ll see rescuers and dogs at a disaster site, but if you don’t see a robot you’ll say, ‘Where are they?’ because they’ll have become so commonplace.*
C *But they all do serve one general purpose: to extend the senses of human rescue teams.*
D *After the Oklahoma City bombing in 1995, which claimed 168 lives and injured 800, researchers began to see how robots could have been used to search the collapsed Federal Building.*



Exit Ticket

Now that you have mastered the art of determining meaning of unfamiliar words using the affixes, let us revisit Michael and the Real-World Connection.

Michael has found a few careers he is interested in exploring, but he needs help creating the names of each field of study. Add the suffix *-ology* to each root below to form each new word. (Hint: If the root ends in *o*, add *-logy*.) Are there any other words that you can add to the chart? Use the empty rows at the bottom to list your own career names.

Meaning	Root	New Word
heart	cardio	
life	bio	
disease	path	
time	chrono	
writing	graph	
earth	geo	
nerves	neuro	
mind	psycho	