

## UNPACKING the TEKS | E1.8(B), E1.4(F), E1.5(C)

**Text structure** refers to the way an author organizes information. There are different ways to organize a text. Authors may use a **global** text structure, which is how the information is structured in the whole book or text. They may also use **text features** such as chapter headings, illustrations, bullets, and so on. Additionally, they may also use **local** text structures at the sentence and paragraph level.

**Chronological, process, or sequence** text structure present ideas or events in the order in which they happen. To identify this structure, look for words of order and time such as *first, second, third, later, next, then, finally, when, previously*, and so on. The use of dates may also indicate the text is written in a chronological, process, or sequence structure. To identify this structure, ask these questions.

- Are there items, events, or steps listed in time order?
- What sequence does the author describe?

A **cause-and-effect** structure present reasons for an action, event, decision, or condition. It describes a cause and the effects, or the results of the action, event, decision, or condition. Keywords for this text structure may include *if/then, reasons why, as a result, therefore, because, consequently, for, due to*, and so on. To determine a cause-and-effect structure, ask the following.

- What happened and why?
- What are the causes and effects?

A **problem/solution** structure outlines problems and explores possible solutions. Keywords for this text may include *problem, dilemma, because, so that, question/answer, puzzle*, and so on. Ask these questions to help determine if the text structure is problem/solution.

- Does the text describe a problem?
- What are the possible solutions the author suggests?

The **compare/contrast** text structure discusses two ideas, facts, or events by showing how they are the same and how they are different. Keywords to look for here include *however/yet, but, nevertheless, while, although, similarly, either/or, in contrast, in comparison*, and so on. Ask yourself these questions when determining if a text has a compare/contrast structure.

- What items does the text compare?
- In what ways are they similar or different?

When authors use **definition or description** as a text structure, they describe a topic by listing characteristics, features, attributes, or examples. Keywords include *for example, for instance, such as, including, to illustrate*, and so on. Look for the following.

- What are the most important characteristics?
- What does it look/smell/taste/sound/feel like?

Determining how a text is organized will help you understand an **author's purpose** for writing. The author may write to inform, entertain, or persuade the reader. Knowing about and identifying text structures when reading will also help you make better predictions and inferences as you gather **textual evidence** to support a **thesis** or position about the texts you read and help you think about interesting things to say about those texts.

### ► Words to Know

text structure  
 global  
 text feature  
 local  
 chronological  
 process  
 sequence  
 cause and effect  
 problem/solution  
 compare/contrast  
 definition/description  
 author's purpose  
 textual evidence  
 thesis

## GUIDED PRACTICE

**DIRECTIONS** Read the selection below. Follow the instructions and answer the questions in the side column. They will help you understand how to read to master the TEKS.

### They're Sneaky . . . They're Slimy . . . They're Biofilms

by Kathryn Hulick

- 1 Something slimy is hiding between your teeth, growing on your fish tank, and coating rocks in a nearby pond. It's even thriving inside your gut and helping to digest your food. But don't freak out—this "slime" is a part of natural life and is called a biofilm.
- 2 A *biofilm* is a colony of bacteria that lives stuck to a surface. Almost all kinds of bacteria can switch between two different lifestyles. **(a)** One is a free-swimming, or *motile*, life, where the bacteria go about their business separately. **(b)** But sometimes, when bacteria get signals from the environment telling them they have plenty of nutrients on which to grow, those motile bacteria transition into a *sessile* life, forming a group attached to a surface.
- 3 **(c)** The problem is, a biofilm colony of sessile bacteria is much more resistant to antibiotics than free-swimming bacteria. **(d)** To help combat diseases with biofilm infections, such as cystic fibrosis\*, where biofilms grow stuck inside the lungs and make breathing difficult, George O'Toole of Dartmouth Medical School in New Hampshire is trying to find out more about how these slimy colonies form and how they can be defeated. "We're trying to understand how they sense the nutrients in the environment," says O'Toole, "and then how they change what proteins they make to allow them to stick to a surface." That surface could be anything from the inside of a lung to a hospital table or a contact lens. Let's talk to George O'Toole to find out more about his important research.

#### What does a biofilm colony look like?

- 4 They're usually not easy to see with the naked eye. But if you floss your teeth, that white stuff that comes off, the plaque, is a biofilm. Also, if you have a fish tank, that green stuff that grows on the glass is a biofilm. Under the

\*Cystic fibrosis—A hereditary disease that usually develops during early childhood and is characterized by chronic respiratory infections.

### Guided Questions

Read sentences **(a)** and **(b)** in paragraph 2. What two lifestyles of bacteria do they contrast?

Read sentences **(c)** and **(d)** in paragraph 3. What text structures does the author use? Identify the words that signal this structure.

Read paragraph 4. What characteristic of a biofilm colony does it discuss? Which text structure does this suggest?



microscope, they look like little mushrooms—they have a thin stalk and a big cap on top.

### What makes biofilms so slimy?

- 5 There's a web of long sugar strands connecting the bacterial cells. We call this an *extracellular matrix*. It surrounds the bacteria and helps the biofilms stay stable and strong. It's slimy because the sugar absorbs lots of water like a sponge.

### What special equipment do you have in your microbiology lab?

- 6 We have a big microscope that allows us to look directly at the bacteria. We also have things called *Petri plates*, which are small plates containing a bacterial growth medium, which looks a little bit like brown Jell-O. We have a whole room the size of a walk-in closet that's kept at body temperature, so 98.6 degrees Fahrenheit (F). Our bacteria like to grow at body temperature. Walking in is like stepping into a hot summer's day! We also have a big bench that's completely covered in purple dye.

### Why do you need purple dye?

- 7 Biofilms are not so easy to see unless the bacteria themselves are colored. One way to get around that is [to] add the color. We stain them with a dye called crystal violet. The dye binds to the bacteria, but it also binds to your clothes and everything else, so you have to be careful when you use it.

### What happens if a biofilm gets into your body?

- 8 Biofilms and bacteria are a part of you! You have ten times more bacteria in your body than human cells—so you're more bacteria than a person. In your intestines, there are biofilms and free-swimming bacteria that help keep you healthy. If you've taken antibiotics, and your stomach has gotten upset, it's because you've gotten rid of the good bacterial biofilms in your gut.

### What's an example of a bad bacterial biofilm?

- 9 One of the most common causes of biofilm-associated disease is something called *otitis media*. You will know this as an earache. It's the number one reason that kids are brought to the doctor and the number one reason for getting antibiotics.

## Guided Questions

Read paragraph 5. What kind of text structure is it? How do you know?

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Read paragraph 6. What impact does the author's use of the definition/description text structure have on the reader?

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Read paragraph 7. What is the text structure?

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Read paragraph 8. Identify the cause-and-effect structure.

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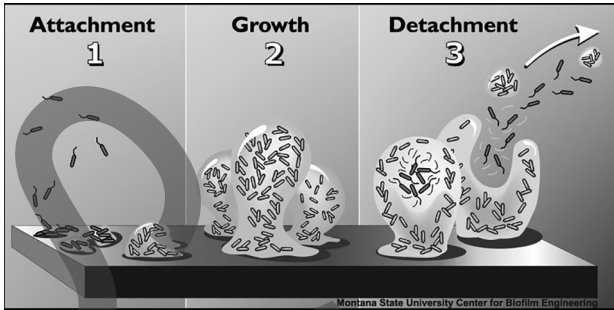


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In that case, the bacteria are attaching to the inside of your ear and are very hard to treat with antibiotics. Often, the infection keeps coming back.



(e) This illustration shows the life cycle of a biofilm. In panel 1, free-swimming bacteria attach to a surface and create colonies. In panel 2, the colony grows and matures as the cells divide and other cells attach to it. In panel 3, some bacteria split off individually or in clusters, and attach to another surface to start a new colony.

### Guided Questions

Read paragraph 9. What is the text structure in sentence (e)? What is the author's purpose in using this structure?

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## CRITICAL THINKING

**DIRECTIONS** Reread the selection. Mark it up as you would like. Then answer the following questions.

1. Reread paragraph 1. What was the author's purpose in starting the article this way?

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2. Reread paragraph 3. Why is a biofilm colony of sessile bacteria that is more resistant to antibiotics than free-swimming bacteria a "problem"?

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3. Beginning with paragraph 4, the author uses a question/answer format of text structure. Would you consider this a *global*, whole-text, structure or a *local*, sentence/paragraph, structure? Why?

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4. What are the text features in the article, and why do you think the author uses them?

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5. What is your opinion of sessile bacteria? What textual evidence from the article supports your ideas?

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SAMPLE

## ★ PRACTICE

**DIRECTIONS** Read the selection below and choose the best answer to each question.

## The Ancient Library of Alexandria

by Anne Nolting



- 1 About 2,300 years ago, a great king ruled the country of Egypt. His name was Ptolemy I Soter, and he was a wise and inquisitive monarch with a deep longing for knowledge. His wish was for Egypt to become the most powerful nation in the world.
- 2 "You must read, great Ptolemy," his friend Demetrius urged. "This is the way to understand how to use power wisely."
- 3 Demetrius supplied Ptolemy with every document in Egypt. The books were written on thin, dried papyrus sheets and rolled into large scrolls.
- 4 As Ptolemy studied the Egyptian scrolls, he became more and more curious about the world outside his country. He realized that wealthy empires would trade their goods with Egypt if his country welcomed them with a safe port. In 300 B.C., the ruler ordered the building of a mighty fleet of ships to patrol the Mediterranean Sea. Within a few years, the beautiful capital city of Alexandria became the greatest center of trade in the world.
- 5 From his magnificent white marble palace, Ptolemy watched the ships from distant countries sail into port. The docks at Alexandria were covered with fabulous products from far-off lands. Tin came from the British Isles, silk from China, cotton from India. But it was in the captain's quarters of these great boats that Ptolemy discovered the most precious cargo of all. The ships carried scrolls describing life in remote lands.
- 6 Ptolemy addressed a letter to be carried from Alexandria on every departing ship. "To all the Sovereignities and Governors on Earth," he wrote. "Send me every kind of written work your country has to offer. I would like to read the words of your poets and historians, your doctors and inventors. I would like to study the works of your astrologers, mathematicians, and geniuses. Do not hesitate to send all of these!"
- 7 Ptolemy appointed Demetrius the first librarian for his collection of books. Demetrius organized the translations of the "ships' collection," and the number of scrolls grew

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rapidly. Ptolemy erected a colossal building next to his palace in Alexandria. He called it the Mouseion, or Shrine of the Muses, and dreamed it would become a treasury that would store every document in the world. A branch was established at the temple of Serapis. Thus the first universal library was born.

- 8 After Ptolemy I died, his successors continued to collect scrolls, and the great library of Alexandria flourished. The priest Manetho wrote a three-scroll work on Egypt's history and religion under Ptolemy II, who also authorized seventy Jewish scholars to translate the Old Testament from Hebrew into Greek. All these words were deposited in the great library. Scholars from distant lands traveled to Egypt. They came to study, to teach and to share their inventions. Poets, astronomers, physicists, mathematicians, zoologists, and doctors of many different races lived together at the library. They ate their meals in one gigantic dining hall, and the high ceiling reverberated with echoes from the lively debates.
- 9 The chambers of the great library were spacious and bright. Visitors sat on luxurious couches to enjoy the lilting voices of the poets and to listen to the melodies played by musicians. Across the hall, doctors carried out research in vast laboratories and dissecting rooms. In still another chamber, inventors gathered to assemble their new contraptions. Day and night the library pulsed with activity. At dusk, astronomers met on the rooftop observatory to map the constellations. At dawn, botanists could be seen ambling through terraced gardens where they observed new varieties of fruit trees and crops behind the library walls, animal keepers tended the world's first known zoo.
- 10 Open walkways, bordered by lovely fountains and lotus flowers, divided the courtyards
- from the library chambers. Along these walks stood the bibliothekai, the name given to the niches, or cubbyholes, filled with scrolls. The library stored 500,000 scrolls, and none of them ever left the library. Scholars sat on small stools near the niches to read, unrolling the papyrus sheets on their laps to view the columns of writing. Some of the scrolls were twenty feet long!
- 11 The most knowledgeable people in the world traveled to Egypt to study and lecture at the great Library of Alexandria. The names of many geniuses have been lost, but the few men and women who have been remembered offer us a glimpse into the exciting life of research at this great library.
- 12 The geographer Eratosthenes served as the director of the Library of Alexandria for forty years, beginning in 245 B.C. He was a brilliant mathematician and astronomer whose geometric calculations proved that the earth was a sphere. Eratosthenes calculated the size of the earth by measuring the lengths of shadows cast by sticks placed in the Egyptian cities of Alexandria and Elephantine. From measurements taken at noon on the summer solstice, he estimated Earth's diameter to be 7,850 miles (12,630 kilometers). This is very close to the measurement of 7,900 miles (12,700 kilometers) we use today. Building upon Eratosthenes' research, geographers began to map possible trade routes to India eastward across the Indian Ocean.
- 13 Another brilliant scholar who worked at the library was Aristarchus, a Greek astronomer. The earth, he claimed, is not stationary. He concluded that the world is one of many planets that revolve around a sun. He wrote treatises, or theories, proving his ideas. Democritus, a philosopher, added his thoughts. "The Milky Way is not the spilled milk of the goddess," Democritus explained. "It is composed of stars, millions of stars."



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- 14 The great inventors used the library courtyards to test their designs. Archimedes constructed many machines, including the lever. "Give me a place to stand on," Archimedes declared, "and I will move the earth." Heron, another inventor of Alexandria, added his works to the library. He wrote *Automata*, the first book of robots. Callimachus produced a 120-scroll catalog of authors and their works in the library.
- 15 Not all scholars who worked at the library were men. Hypatia was a gifted mathematician and an astronomer whose fame spread to many countries. She taught at the library, wrote manuscripts, and worked on many of her own inventions, including an astrolabe, an instrument to measure the angle of a star from the horizon.
- 16 For several centuries, the most brilliant minds in the world contributed their ideas to the storehouse of knowledge in Alexandria. Then, during one brief, chaotic time in history, the scrolls that told the stories of the world disappeared. What tragedies occurred to destroy this first great universal library?
- 17 First, in 47 B.C., a fire broke out in the great library's warehouses during Julius Caesar's Alexandrine War. Then, around A.D. 270, the Palace Quarter was destroyed and the library seriously damaged. Later, in A.D. 391, the branch library and the temple of Serapis were destroyed. The main library survived but in much diminished state. At the time Emperor Theodosius ruled the Roman Empire. He did not value learning and had no interest in mathematics, science, or literature. His beliefs differed from those of the scholars who taught at the Library of Alexandria. Most of the scholars based their studies on the Greek tradition of mathematics and philosophy. The Christian emperor believed that the ancient Greek scholars were pagans. He published edicts that closed the temples and destroyed written documents that did not agree with his doctrines. Theodosius sentenced many scholars to death.
- 18 Hypatia strongly disagreed with Theodosius's laws. The emperor insisted that the world was flat, like a table. Hypatia, drawing from the wisdom of the scrolls, argued that the earth was a sphere. Hypatia tried to protect the library, and when Theodosius ordered that the scrolls be destroyed, she refused.
- 19 Theodosius died in A.D. 395, but his ideas did not die with him. Antipagan feelings grew stronger, and in A.D. 415, Hypatia was set upon by a mob of religious fanatics in the streets and brutally murdered. Many scrolls, so faithfully collected for centuries, were burned as fuel for the public baths.
- 20 About A.D. 640, the Arabs invaded the city of Alexandria. The library was in ruins when the Arabs arrived, but they salvaged some of the remaining documents. As the Roman Empire fell the barbaric tribes and Europe entered the Dark Ages, the Arabs preserved the world's rich culture of mathematics, astronomy, and science.
- 21 Today there are libraries in every town, and books of every kind are available to everyone. The words of ancient and present-day writers are standing on open shelves, waiting for any reader to encounter them.





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- 1** Which of these is the main text structure in paragraph 1?
- A** Compare/contrast
  - B** Problem/solution
  - C** Cause/effect
  - D** Chronological, process, or sequence
- 2** Which key words indicate the text structure in paragraph 1?
- A** *2,300 years ago*
  - B** *a great king*
  - C** *Ptolemy I Soter*
  - D** *for Egypt*
- 3** Based on paragraphs 2–3, which of the following is the best inference about Ptolemy's friend Demetrius?
- A** He values learning.
  - B** He hates learning.
  - C** He values power.
  - D** He hates power.
- 4** Which of these is the main text structure of paragraph 5?
- A** Problem/solution
  - B** Compare/contrast
  - C** Cause/effect
  - D** Definition/description
- 5** Which question should you ask to determine if the author is using a cause-and-effect text structure?
- A** What sequence is described?
  - B** What happened and why?
  - C** Is there a problem being described?
  - D** What items are being compared?
- 6** Which of the following are keywords indicating the text structure of paragraph 17? Select all that apply.
- A** *First, in 47 B.C.*
  - B** *differed from those of the scholars*
  - C** *Then, around A.D. 270*
  - D** *Most of the scholars*
  - E** *that did not agree with his doctrines*
- 7** Through paragraphs 11–15, how does the text structure change, and what is the author's purpose for doing this? Use textual evidence to support your ideas.
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# ★ ASSESSMENT

**DIRECTIONS** Read each question and choose the best answer.

- 1 Which of the following best describes the author's main purpose in "The Ancient Library of Alexandria"?
  - A To inform the reader about the destructive tragedies of history
  - B To entertain the reader with tales from the life of Ptolemy I Soter
  - C To persuade the reader to use his or her local library
  - D To inform the reader about the history of the Library of Alexandria
  
- 2 When determining the text structure of paragraph 13, which is the best question to ask?
  - A What are the most important characteristics?
  - B What items are compared?
  - C What happened and why?
  - D Are there items, events, or steps listed in time order?
  
- 3 **Part A**  
Which of these is the main text structure in paragraph 8?
  - A Problem/solution
  - B Cause and effect
  - C Chronological
  - D Compare/contrast

- Part B**  
Which keywords indicate the text structure in paragraph 8?
- A *After Ptolemy I died*
  - B *the great library of Alexandria flourished*
  - C *All these words*
  - D *to share their inventions*

- 4 Identify the text structures in "The Ancient Library of Alexandria" and determine which are global and which are local. Use textual evidence to support your ideas.

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