

CHAPTER

10

SUMMARY AND REVIEW

10-1 Analyzing Text

You have now examined nine different skills or thought patterns that will help you successfully read and understand your science (or any other subject) textbooks. You need to see how these patterns work together to help you understand the scientific way of thinking. In this final chapter, you will examine how these different skills fit together to support or reinforce one another. You will also work on developing your ability to use these different thought patterns in your writing.

Table 10-1 shows the different patterns used by writers of science texts. You have seen these patterns separately in Chapters 1 through 9. Throughout this text, you have been asked to look at different passages, and identify one of these patterns in that passage. But passages in a textbook, or any other book for that matter, will not simply contain one of these patterns. They will contain many of them. In fact, the passages that you have already seen throughout this book have actually had multiple patterns in each passage. You were asked to look for only one pattern at a time.

The passage in Exercise 1 first appeared in Chapter 3. You were asked to study it for patterns involved in defining terms. Now you will be asked to look at the passage again and find all of the different patterns it contains. One of the ways you learned to identify different patterns was by looking for markers, or words and phrases that pointed out specific thought patterns. Exercise 2 gives you practice looking for many different types of markers in a single passage. To complete these exercises, you may need to turn back to the previous chapters in this text. The tables containing the different pattern markers in those chapters will also be helpful.

TABLE 10-1 THOUGHT PATTERNS

Thought Patterns		
spatial order	classifying	hypotheses
time order	cause and effect	quantifying
defining	comparison	examples

Exercise 1 Finding Thought Patterns

Read the passage on the following page and pick out the different thought patterns you have studied. Simply write down the kind of thought pattern or patterns (there may be more than one) in the lettered sentences. The first item is done for you as an example.

Section 10-1 Analyzing Text, continued**Fog**

^a Fog, like clouds, is the result of the condensation of water vapor in the air. ^b The chief difference between fog and clouds is that fog forms very near the surface of Earth when air close to the ground is cooled. ^c For example, you may be familiar with one type of fog that results from the nightly cooling of Earth. This type of fog is called *ground fog*. Ground fog usually forms on calm, clear nights. ^d It is thickest in valleys and low-lying places because the dense, cold air in which it forms sinks to the lower elevations.

Two other types of fog often form inland. ^e An *upslope fog* is formed by the lifting and cooling of air as it rises along land slopes. Upslope fog is really a kind of cloud formation at ground level. ^f A type of fog known as *steam fog* usually forms over inland rivers and lakes. Steam fog is a shallow layer of fog formed when cool air moves over a warm body of water.

(from *Modern Earth Science*)

a. *comparison, cause and effect*

b. _____

c. _____

d. _____

e. _____

f. _____

Exercise 2 Markers

Determine which words in the lettered sentences are markers for the given pattern. If a pattern is unmarked, simply write "unmarked" on the line provided.

Pangaea

^a As explorers such as Columbus and Magellan sailed the oceans of the world, they brought back information about new continents and their coastlines. Mapmakers used the information to make the first reliable world maps. ^b As people studied the maps, they were impressed by the similarity of the continental shorelines on either side of the Atlantic Ocean. ^c The continents looked as though they would fit together, like the parts of a giant jigsaw puzzle. ^d Were the

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continents once part of the same huge landmass? If so, what caused this landmass to break apart? What caused the continents to move to their present locations? These questions eventually led to the formulation of hypotheses.

^e In 1912, a German scientist Alfred Wegener, proposed a hypothesis called continental drift, which stated that the continents had moved. ^f Wegener hypothesized that the continents once formed part of a single giant landmass, which he named Pangaea, which means "all lands."

^g In addition to the similarities in the coastlines of the continents, Wegener soon found other evidence to support his hypothesis. ^h If the continents had once been joined, research should uncover fossils of the same plants and animals in areas that had been adjoining parts of Pangaea. ⁱ Wegener knew that identical fossil remains had already been found in both eastern South America and western Africa. The age and type of rocks in coastal regions of widely separated areas, such as western Africa and eastern Brazil, matched closely.

(from Modern Earth Science)

a. cause and effect _____

b. comparison _____

c. analogy _____

d. hypothesis _____

time _____

e. time _____

hypothesis _____

informal definition _____

f. hypothesis _____

time _____

g. comparison _____

time _____

h. cause and effect _____

i. comparison _____

Section 10-1 Analyzing Text, continued

Exercise 3 Patterns and Markers

List the thought patterns found in the sentences below, as you did in Exercise 1. Then list any markers that indicate those thought patterns, as you did in Exercise 2. If a pattern is unmarked, simply write "unmarked" on the line provided.

Biomes

^a Earth is covered by hundreds of types of ecosystems. ^b For convenience, ecologists divide these into a few biomes. ^c Biomes are areas that have distinctive climates and organisms. ^d Each biome contains many individual ecosystems. ^e Biomes are named according to their plant life because the plants that can grow in an area determine what other organisms can live there. But what determines which plants can grow in a certain area? ^f The main determinant is climate.

^g Climate refers to weather conditions in an area—temperature, precipitation, humidity, and winds—over a long period of time.

^h Temperature and precipitation (rain, sleet, and snow) are the two most important factors in a region's climate.

(from *Holt Environmental Science*)

Thought pattern	Marker
a. <u>quantifier</u>	<u>hundreds</u>
<u>classification</u>	<u>types</u>
b. _____	_____
_____	_____
c. _____	_____
_____	_____
d. _____	_____
e. _____	_____
f. _____	_____
g. _____	_____
_____	_____
h. _____	_____
_____	_____

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10-2 Fitting Patterns Together

Identifying different thought patterns is very important, but without knowing how they work together to support each other, the identifications are useless. The best way to study how patterns work together is to look at a sample passage. Take another look at this passage on glaciers, from Chapter 3. It starts off with a **formal definition** of a glacier. It **classifies** two types of glaciers and **compares** them to each other. It then gives an **example** of where each type of glacier can be found.

Glaciers

Glaciers are masses of moving ice. There are two main types of glaciers; they are distinguished by their size and where they are formed. One type of glacier is formed in mountainous areas. As the ice moves down a valley, it produces a *valley glacier*, which is a long, narrow, wedge-shaped mass of ice. Valley glaciers are best developed in the high mountainous regions of the world, such as in coastal Alaska, the Himalayas, the Andes, the Alps, and New Zealand.

The other type of glacier covers large land areas. These masses of ice, called *continental ice sheets*, occupy millions of square kilometers. Today, continental ice sheets are found only in Greenland and Antarctica.

(from *Modern Earth Science*)

Exercises 4, 5, and 6 ask you to analyze three different passages to see how they are built from different thought patterns. The thought patterns work together to tell a complete story, just as the patterns did in the passage on glaciers. The following passage is also one you have seen before. It first appeared in Chapter 4. Below the passage, you will find a step-by-step analysis of the patterns in the passage.

On the Rocks

Geologists study the forces and processes that act upon the rocks of Earth's crust. Based on these studies, geologists have classified rocks into three major types: igneous, sedimentary, and metamorphic. The classification is based on the way the rocks are formed. Igneous rock forms when magma cools and hardens. Magma is called *lava* if it cools at Earth's surface. Sedimentary rock is formed when fragments of rock, minerals, and organic matter harden after being compressed and cemented together. The word *metamorphic* means "changed

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form." Metamorphic rocks come from other rocks that are changed by certain forces and processes, including tremendous pressure, extreme heat, and chemical processes. Any of the three major types of rock can be changed into another type.

(from Modern Earth Science)

1. The passage is about rocks: the different kinds of rocks and how they are formed.
2. It starts off by **classifying** the rocks into three types.
3. It then gives the basis for the **classification**—the way rocks are formed.
4. At the same time, it is **comparing** the different types of rocks. There are no comparison words stating that it is a comparison. In other words, the comparison is **implied** but not **stated** (it is **implicit**, not **explicit**).
5. The different origins or causes also provide **informal definitions** for the different types of rocks. For example, the passage tells you that igneous rock forms when magma cools and hardens. This **cause-and-effect** pattern serves to define what igneous rock is, and to separate it (or **compare** it) from sedimentary and metamorphic rock.

Exercise 4 Analyzing for Patterns

Using the lines below, analyze the following passage the same way that "On the Rocks" was analyzed for you.

Fossils and Evolution

According to biologists, all organisms living today evolved from earlier, simpler life-forms. The modern horse, for example, evolved from an ancestor that existed 50 million years ago. The earlier relative was the size of a dog and had four toes on its front foot, compared to its modern version, which has only one.

Animals with backbones are called vertebrates. Penguins, alligators, bats, and humans all have backbones and are thus considered vertebrates. The front limbs (known as forelimbs) of all these vertebrates have similar sets of bones. The functions of these structures have evolved into different uses. And yet, the similarity in the structure of these bones can still be seen, suggesting that all vertebrates share a common ancestor.

(from Biology Principles and Explorations)

Section 10-2 Fitting Patterns Together, continued

Exercise 6 Interacting Thought Patterns

Read the following passage and answer the questions that follow.

Forests

How do forest ecosystems differ? One way is in their location. Tropical rain forests are located in a belt around Earth near the equator. In contrast, deciduous forests generally occur between 30° and 50° north latitude, while coniferous forests, or taiga, stretch in a broad band across the Northern Hemisphere just below the Arctic Circle. As a result, tropical rain forests are always humid and wet, whereas deciduous regions can have extreme seasonal variations. In deciduous regions, summer temperatures can soar to 35°C (95°F), and winter temperatures often plummet well below freezing. Coniferous forests have short, cool summers and long, cold winters. Average subfreezing temperatures often plummet to -20°C (-4°F).

Coniferous forests also get very little precipitation (20–60 cm or 9–27 inches), most of which falls as snow. Deciduous forests are moist and receive 75–250 cm (34–114 in.) of precipitation annually. The tropical rain forests get about 250 cm (114 in.) of rain a year.

The rain and snow in a deciduous forest aid in the decomposition of fallen leaves and make the soil rich and deep. Conifer needles contain acidic substances, and when they die and fall, they acidify the soil. As a result, the soil of coniferous forests is less fertile. Rapid

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decay in tropical rain forests returns nutrients to the soil, but these nutrients are washed away by rainfall, so the soil is usually thin and poor. Still, the rain forest has the greatest variety of plants and animals of any region of the world. Deciduous forests have a wide variety of plants and animals, but not nearly as many as tropical rain forests have. Most plants cannot grow in acidic soil, which is one reason that coniferous forests have a limited variety of plants.

(from Holt Biology Visualizing Life)

a. What are the two main thought patterns in the following passage?

b. Give three examples of how these two thought patterns interact in the passage.

i. _____

ii. _____

iii. _____

CHAPTER

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10-3 Using Thought Patterns in Your Writing

You have now learned how the nine different thought patterns can work together. You have looked at some examples covering many different topics. You have even taken these examples apart to see how they are put together. But do you really understand how to integrate these thought patterns? The best test of whether you fully understand a concept is to try to put the concept to use.

The following exercises will lead you through a process to help you improve your own writing. Throughout your practice, you may wish to review the first nine chapters of this book. You will need to be familiar with many types of markers so that you can successfully include them in your writing. Try to be as creative as possible. Use as many thought patterns and different markers as you can.

Exercise 7 Fill In the Markers

Fill in the blanks. The kind of marker you will need is indicated in parentheses. The first item is done for you as an example.

A Star Is Born

A star begins as a nebula, a cloud of gas and dust. The particles in a nebula are held together loosely. When an explosion from a nearby star puts force on the nebula, **(quantifier)** some of the particles are compressed, and the nebula begins to contract.

Gravity **(cause and effect)** _____ the nebula to continue to shrink. As the nebula becomes smaller, it begins to spin more rapidly. You may have seen the effect of decreasing diameter on the speed of a spinning object, **(example)** _____ an ice skater. The rate of spin increases as a spinning skater pulls his or her arms in closer to the body.

The shrinking, spinning nebula begins to flatten into a disk of matter with a central core called a protostar. That protostar begins to heat up **(cause and effect)** _____ two factors. **(example)** _____ is collision. **(cause and effect)**

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_____ the particles move together, they collide and produce heat energy. (example) _____ is pressure. As the nebula shrinks and the force of gravity pulls matter toward its center, the pressure in the core increases. All materials become warmer when compressed.

(from Modern Earth Science)

Exercise 8 What Kind of Marker Is It?

Using Exercise 7 as a model, list the type of marker in the spaces provided. The marker will follow the space for its type.

Formation of the Solar System

(_____ *quantifier* _____) About 4 billion to 5 billion (_____) years ago, shock waves from a supernova (a (_____) giant exploding star) or some other force (_____) caused a cloud of dust and gas to contract. The cloud of dust and gas that formed our solar system over time is called the solar nebula. (_____) When the temperature at the center of the nebula became hot enough, hydrogen fusion began and the sun was formed. About 99 percent of the matter in the solar nebula became part of the sun.

During a period of roughly 100 million years, the small bodies of matter in the solar nebula came together to form what are called planetesimals. (_____) Through collisions and the force of gravity, some of these planetesimals gradually joined to form much larger bodies called protoplanets. (_____) Eventually, the protoplanets condensed into our existing moons and planets.

(from Modern Earth Science)

Section 10-3 Using Thought Patterns in Your Writing, continued

Exercise 9 Define, Categorize, and Give Examples

Choose one of your favorite topics and write one or two paragraphs on it. Define it, divide it into different categories, and give some examples of items in the different categories. For instance, if your topic is music, what are some of the different types of music?

[illegible]

Section 10-3 Using Thought Patterns in Your Writing, continued

Exercise 10 Using Thought Patterns

Write a short essay on animals. Choose any aspect that you like. Try using several different thought patterns in your writing. You must use at least three thought patterns, but use as many as possible.

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