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BIOLOGY EOC

STAAR® Preparation and Practice

2018 Streamlined TEKS

- 16 Readiness TEKS Lessons
- Over 225 authentic STAAR test items
- 3-step approach for remediation

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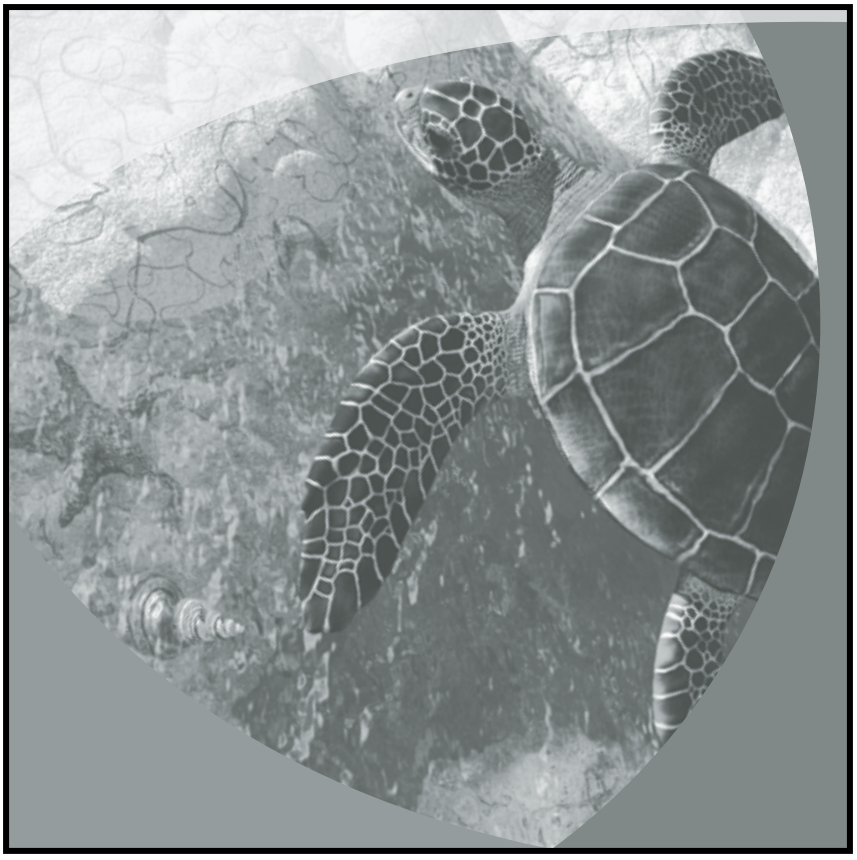

Streamlined TEKS
2018 Edition

SAMPLER

Use with Your Students!

TEKS Correlations—Where to Find Them

Readiness TEKS	Readiness Lesson
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B.4C	Lesson 2 (p. 21)
B.5A	Lesson 3 (p. 31)
B.6A	Lesson 4 (p. 45)
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Sampler

Included in Sampler

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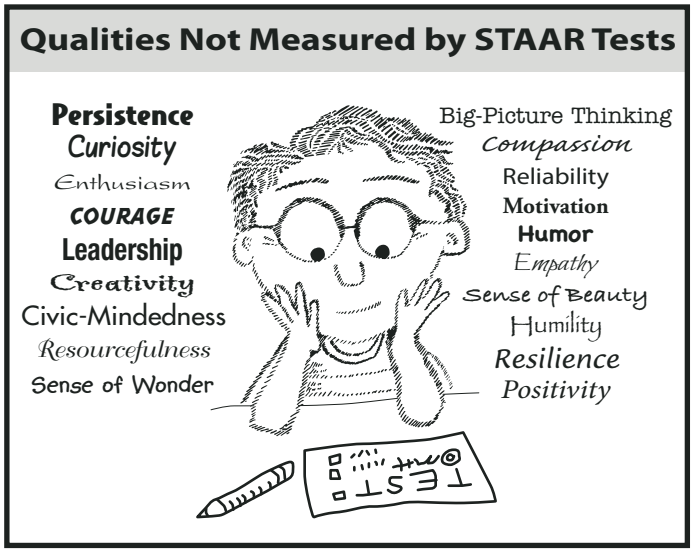
Dear Students,

The STAAR Biology assessment measures your knowledge of the Biology standards (TEKS). STAAR tests are not designed to measure many important qualities of character and intelligence — as this cartoon shows. But performing well on the STAAR tests is important, so you want to do all you can to succeed on them. That's where this workbook comes in!



What are some other important qualities of character and intelligence missing in STAAR tests?

This workbook was designed to help you prepare for the STAAR Biology test by

- reviewing the skills and concepts you need to answer STAAR test questions, and
- providing practice questions that are similar to those you will answer on the actual STAAR test.

Practicing Smart Is the Secret to STAAR Success

There is a secret to success on the STAAR tests—practice, practice, and more practice. This is good news, because you are in control of how much effort you put into practicing. But not all practice is the same… you need to practice smart.

First, practice with test questions that are very similar to the actual STAAR test. That's easy because this workbook is full of them! Next, focus on your weaknesses—spend extra time on questions you have trouble with. Think of it like this: if your basketball shot needs improvement, you don't practice dribbling. Instead, you practice shooting.

Focusing on your weaknesses also means carefully analyzing each test question you get wrong. Why did you get it wrong? Why is another answer correct? You can learn more from test questions you get wrong, so don't be afraid of making mistakes. If your basketball shot is off, you identify what you are doing wrong (too far left), and correct it with your next shot (aim further right).

When you practice, give each question your full attention. Do not take a break until *after* you answer the question. Your attention is like a muscle that you can build by using it, one practice test question at a time. Do you believe unfocused, sloppy practice of your basketball shot will help you perform during a big game? No! Your attention is your greatest power. You develop it with practice.

Preparing for the STAAR test can actually be a fun challenge. And when you practice smart, you are building life skills while you prepare for the STAAR test!

Your partners in STAAR success,

The Sirius Education Team

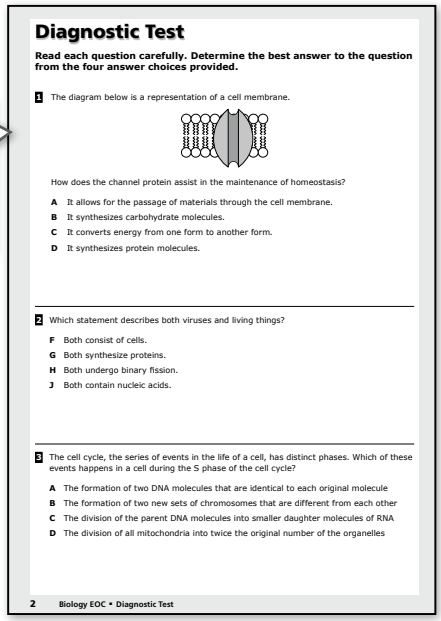
Using This Book for STAAR Success

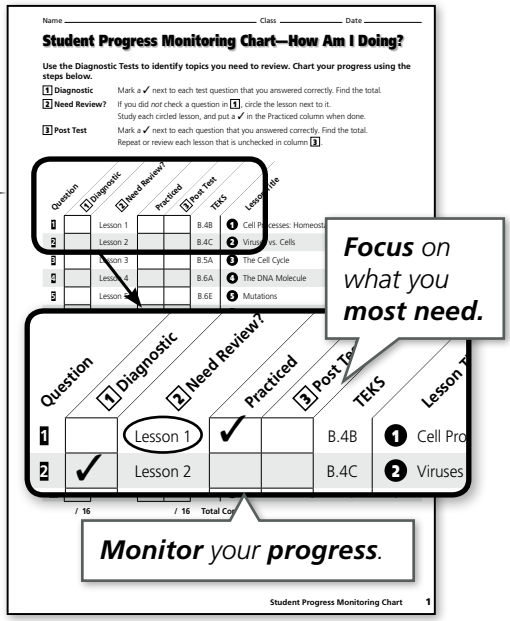
This interactive workbook includes **instruction** and **practice** in **all tested Biology TEKS**. It is **easily adapted** for different needs and includes a **3-step approach** to efficiently **prioritize** and **individualize remediation** when preparation time is limited.

STEP 1 Identify Your Needs—Unit Diagnostic Tests

Use the 16-item Diagnostic Test to identify what you know and what you need to review. Record your results in the Student Progress Monitoring Chart. (All Readiness TEKS are included.)

Each item correlates to a lesson.





Focus** on what you **most need.

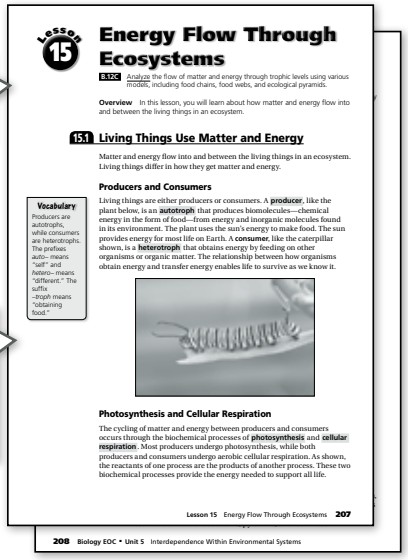
***Monitor** your **progress**.*

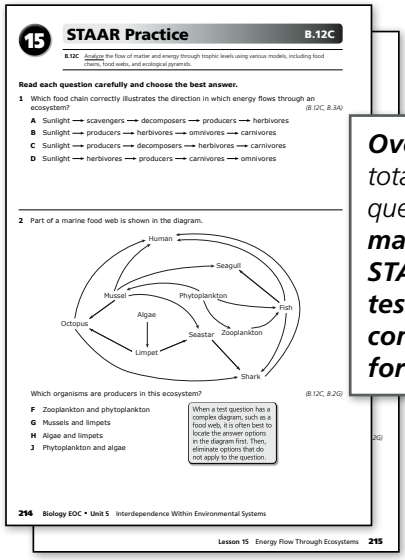
STEP 2 Focus Your Remediation—Instruction and Practice

Use your Diagnostic Test results to focus TEKS instruction and STAAR practice to meet your unique needs.

16 Lessons

Student-friendly TEKS instruction

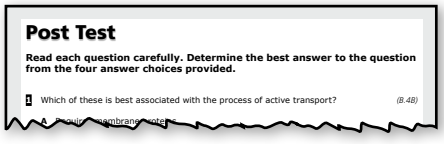




Over 225** total STAAR questions **match** the **STAAR tests** in **content** and **format.

STEP 3 Monitor Your Progress—Unit Post Tests

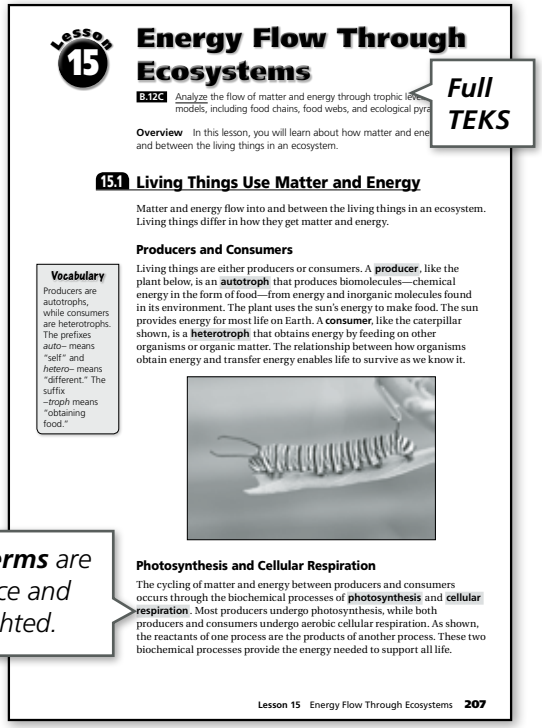
Use the 16-item Post Test to monitor your progress and to identify additional lessons for review. The Post Test questions cover the same Readiness TEKS in the same order as the Diagnostic Test.



16 Lessons with TEKS Instruction and STAAR Practice

TEKS Instruction—Engaging Interactive Learning

Concise and **student-friendly** instruction reviews each Readiness TEKS. Students actively participate in learning with **interactive** and **scaffolded** Your Turn questions.



Lesson 15

Energy Flow Through Ecosystems

B.12C Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyra

Overview In this lesson, you will learn about how matter and ene and between the living things in an ecosystem.

15.1 Living Things Use Matter and Energy

Matter and energy flow into and between the living things in an ecosystem. Living things differ in how they get matter and energy.

Producers and Consumers

Living things are either producers or consumers. A **producer**, like the plant below, is an **autotroph** that produces biomolecules—chemical energy in the form of food—from energy and inorganic molecules found in its environment. The plant uses the sun's energy to make food. The sun provides energy for most life on Earth. A **consumer**, like the caterpillar shown, is a **heterotroph** that obtains energy by feeding on other organisms or organic matter. The relationship between how organisms obtain energy and transfer energy enables life to survive as we know it.

Vocabulary
Producers are autotrophs, while consumers are heterotrophs. The prefixes *auto–* means "self" and *hetero–* means "different." The suffix *–troph* means "obtaining food."

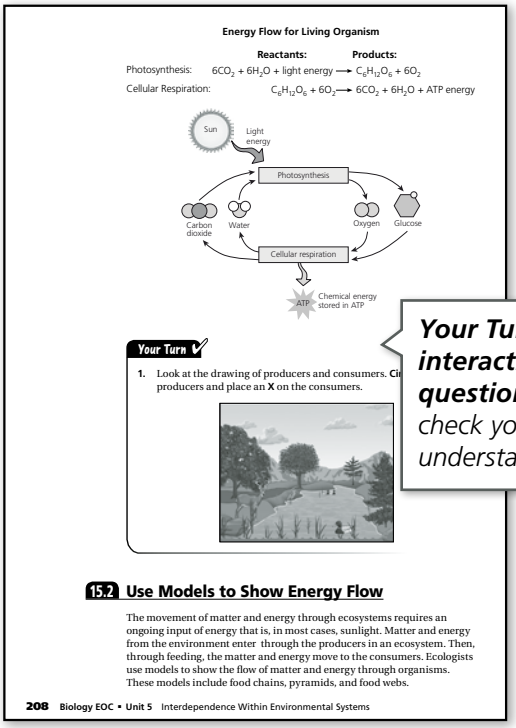
Photosynthesis and Cellular Respiration

The cycling of matter and energy between producers and consumers occurs through the biochemical processes of **photosynthesis** and **cellular respiration**. Most producers undergo photosynthesis, while both producers and consumers undergo aerobic cellular respiration. As shown, the reactants of one process are the products of another process. These two biochemical processes provide the energy needed to support all life.

Lesson 15 Energy Flow Through Ecosystems **207**

Full TEKS

***Key terms** are boldface and highlighted.*



Energy Flow for Living Organism

	Reactants:	Products:
Photosynthesis:	$6CO_2 + 6H_2O$ + light energy	$C_6H_{12}O_6 + 6O_2$
Cellular Respiration:	$C_6H_{12}O_6 + 6O_2$	$6CO_2 + 6H_2O$ + ATP energy

Sun, Light energy, Photosynthesis, Carbon dioxide, Water, Oxygen, Glucose, Cellular respiration, ATP, Chemical energy stored in ATP

Your Turn

1. Look at the drawing of producers and consumers. Ci producers and place an **X** on the consumers.

15.2 Use Models to Show Energy Flow

The movement of matter and energy through ecosystems requires an ongoing input of energy that is, in most cases, sunlight. Matter and energy from the environment enter through the producers in an ecosystem. Then, through feeding, the matter and energy move to the consumers. Ecologists use models to show the flow of matter and energy through organisms. These models include food chains, pyramids, and food webs.

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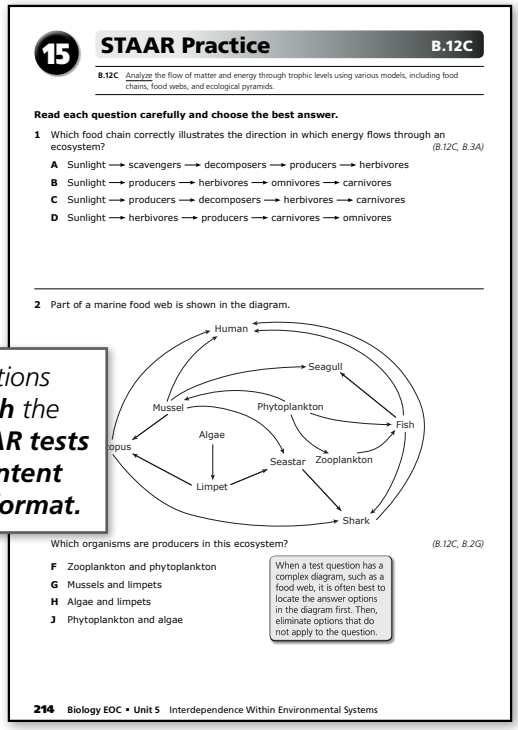
***Your Turn** interactive questions check your understanding.*

STAAR Practice—Abundant and Systematic Practice

Each lesson includes **authentic STAAR practice** with **test-taking tips** and and practice filling in grids.



STAAR Practice B.12C

B.12C Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids.

Read each question carefully and choose the best answer.

1 Which food chain correctly illustrates the direction in which energy flows through an ecosystem? *(B.12C, B.3A)*

A Sunlight → scavengers → decomposers → producers → herbivores
B Sunlight → producers → herbivores → omnivores → carnivores
C Sunlight → producers → decomposers → herbivores → carnivores
D Sunlight → herbivores → producers → carnivores → omnivores

2 Part of a marine food web is shown in the diagram.

Human, Seagull, Mussel, Phytoplankton, Fish, Algae, opus, Seastar, Zooplankton, Limpet, Shark

Which organisms are producers in this ecosystem? *(B.12C, B.2G)*

F Zooplankton and phytoplankton
G Mussels and limpets
H Algae and limpets
J Phytoplankton and algae

When a test question has a complex diagram, such as a food web, it is often best to locate the answer options in the diagram first. Then, eliminate options that do not apply to the question.

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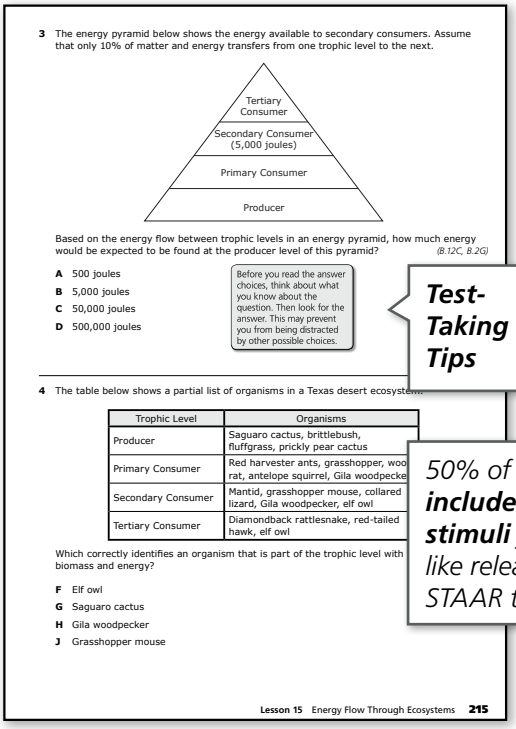
*Questions **match** the **STAAR tests** in **content** and **format.***



3 The energy pyramid below shows the energy available to secondary consumers. Assume that only 10% of matter and energy transfers from one trophic level to the next.

Tertiary Consumer
Secondary Consumer (5,000 joules)
Primary Consumer
Producer

Based on the energy flow between trophic levels in an energy pyramid, how much energy would be expected to be found at the producer level of this pyramid? *(B.12C, B.2G)*

A 500 joules
B 5,000 joules
C 50,000 joules
D 500,000 joules

Before you read the answer choices, think about what you know about the question. Then look for the answer. This may prevent you from being distracted by other possible choices.

4 The table below shows a partial list of organisms in a Texas desert ecosystem.

Trophic Level	Organisms
Producer	Saguaro cactus, brittlebush, fluffgrass, prickly pear cactus
Primary Consumer	Red harvester ants, grasshopper, woo rat, antelope squirrel, Gila woodpecke
Secondary Consumer	Mantid, grasshopper mouse, collared lizard, Gila woodpecker, elf owl
Tertiary Consumer	Diamondback rattlesnake, red-tailed hawk, elf owl

Which correctly identifies an organism that is part of the trophic level with biomass and energy?

F Elf owl
G Saguaro cactus
H Gila woodpecker
J Grasshopper mouse

Lesson 15 Energy Flow Through Ecosystems **215**

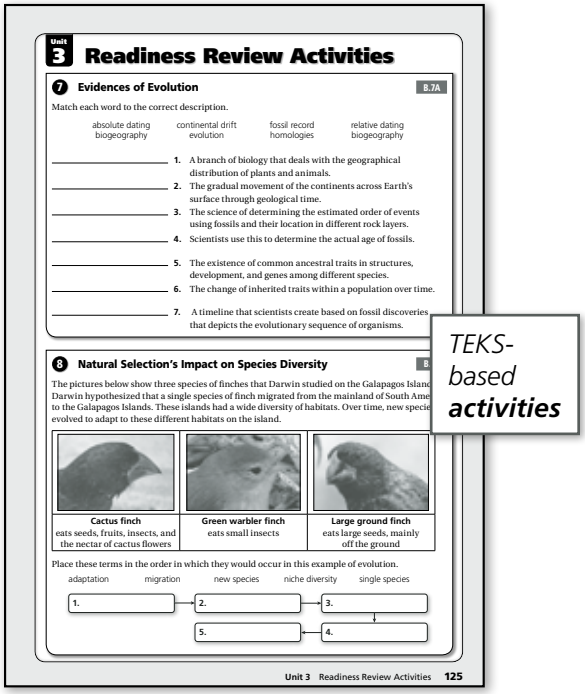
Test-Taking Tips

*50% of items **include a stimuli** just like released STAAR tests.*

Additional In-Book Resources for STAAR Success

Unit Activities

Get Ready and Review activities provide practice in a **variety of formats**.


Unit 3 Readiness Review Activities

7 Evidences of Evolution B.7A

Match each word to the correct description.

absolute dating biogeography | continental drift evolution | fossil record homologies | relative dating biogeography

1. A branch of biology that deals with the geographical distribution of plants and animals.
2. The gradual movement of the continents across Earth's surface through geological time.
3. The science of determining the estimated order of events using fossils and their location in different rock layers.
4. Scientists use this to determine the actual age of fossils.
5. The existence of common ancestral traits in structures, development, and genes among different species.
6. The change of inherited traits within a population over time.
7. A timeline that scientists create based on fossil discoveries that depicts the evolutionary sequence of organisms.

8 Natural Selection's Impact on Species Diversity

The pictures below show three species of finches that Darwin studied on the Galapagos Island... Darwin hypothesized that a single species of finch migrated from the mainland of South Ame... to the Galapagos Islands. These islands had a wide diversity of habitats. Over time, new specie... evolved to adapt to these different habitats on the island.

Cactus finch — eats seeds, fruits, insects, and the nectar of cactus flowers
Green warbler finch — eats small insects
Large ground finch — eats large seeds, mainly off the ground

Place these terms in the order in which they would occur in this example of evolution.

adaptation | migration | new species | niche diversity | single species

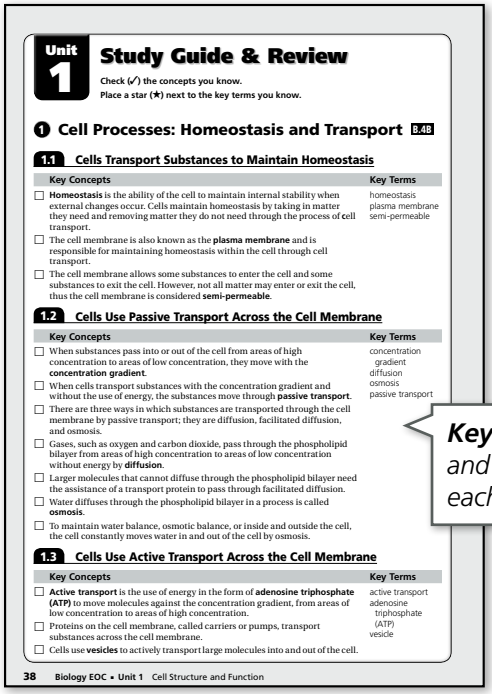
1. → 2. → 3. → 4. → 5.

Unit 3 Readiness Review Activities 125

TEKS-based ***activities***

Unit Study Guide & Review

Checklists organize the lesson content for quick review of **Key Concepts** and **Key Terms.**


Unit 1 Study Guide & Review

Check (✓) the concepts you know.
Place a star (★) next to the key terms you know.

1 Cell Processes: Homeostasis and Transport B.4B

1.1 Cells Transport Substances to Maintain Homeostasis

Key Concepts
- ☐ **Homeostasis** is the ability of the cell to maintain internal stability when external changes occur. Cells maintain homeostasis by taking in matter they need and removing matter they do not need through the process of cell transport.
- ☐ The cell membrane is also known as the **plasma membrane** and is responsible for maintaining homeostasis within the cell through cell transport.
- ☐ The cell membrane allows some substances to enter the cell and some substances to exit the cell. However, not all matter may enter or exit the cell, thus the cell membrane is considered **semi-permeable**.

Key Terms: homeostasis, plasma membrane, semi-permeable

1.2 Cells Use Passive Transport Across the Cell Membrane

Key Concepts
- ☐ When substances pass into or out of the cell from areas of high concentration to areas of low concentration, they move with the **concentration gradient**.
- ☐ When cells transport substances with the concentration gradient and without the use of energy, the substances move through **passive transport**.
- ☐ There are three ways in which substances are transported through the cell membrane by passive transport; they are diffusion, facilitated diffusion, and osmosis.
- ☐ Gases, such as oxygen and carbon dioxide, pass through the phospholipid bilayer from areas of high concentration to areas of low concentration without energy by **diffusion**.
- ☐ Larger molecules that cannot diffuse through the phospholipid bilayer need the assistance of a transport protein to pass through facilitated diffusion.
- ☐ Water diffuses through the phospholipid bilayer in a process is called **osmosis.**
- ☐ To maintain water balance, osmotic balance, or inside and outside the cell, the cell constantly moves water in and out of the cell by osmosis.

Key Terms: concentration gradient, diffusion, osmosis, passive transport

1.3 Cells Use Active Transport Across the Cell Membrane

Key Concepts
- ☐ **Active transport** is the use of energy in the form of **adenosine triphosphate (ATP)** to move molecules against the concentration gradient, from areas of low concentration to areas of high concentration.
- ☐ Proteins on the cell membrane, called carriers or pumps, transport substances across the cell membrane.
- ☐ Cells use **vesicles** to actively transport large molecules into and out of the cell.

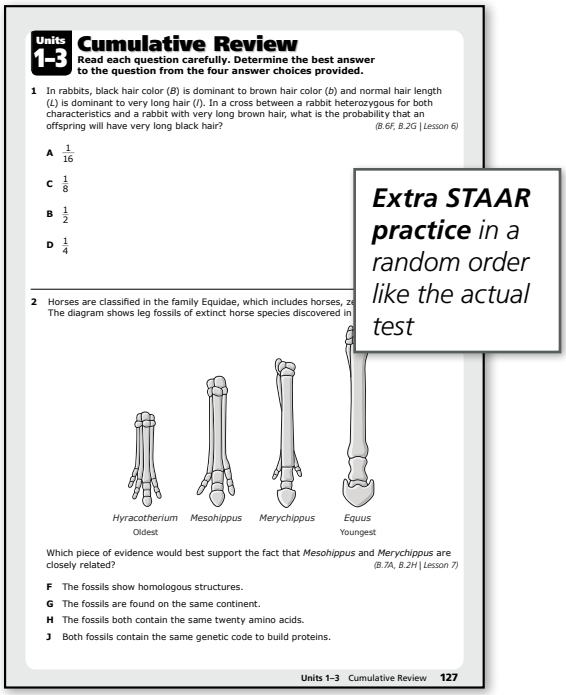
Key Terms: active transport, adenosine triphosphate (ATP), vesicle

38 Biology EOC • Unit 1 Cell Structure and Function

Key Concepts *and* ***Terms*** *for each lesson*

Cumulative STAAR Review

Mixed-practice provides spaced review to help students remember what they learn.


Units 1–3 Cumulative Review

Read each question carefully. Determine the best answer to the question from the four answer choices provided.

1 In rabbits, black hair color (*B*) is dominant to brown hair color (*b*) and normal hair length (*L*) is dominant to very long hair (*l*). In a cross between a rabbit heterozygous for both characteristics and a rabbit with very long brown hair, what is the probability that an offspring will have very long black hair? (B.6F, B.2G | Lesson 6)

A $\frac{1}{16}$
C $\frac{1}{8}$
B $\frac{1}{2}$
D $\frac{1}{4}$

2 Horses are classified in the family Equidae, which includes horses, z... The diagram shows leg fossils of extinct horse species discovered in...

Hyracotherium (Oldest) | *Mesohippus* | *Merychippus* | *Equus* (Youngest)

Which piece of evidence would best support the fact that *Mesohippus* and *Merychippus* are closely related? (B.7A, B.2H | Lesson 7)

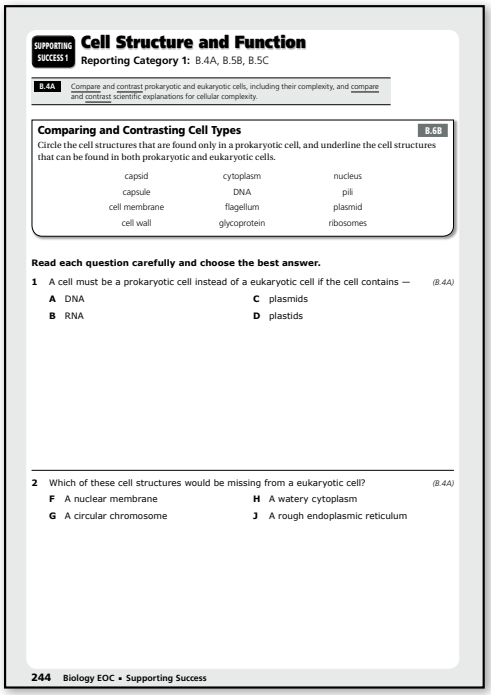
F The fossils show homologous structures.
G The fossils are found on the same continent.
H The fossils both contain the same twenty amino acids.
J Both fossils contain the same genetic code to build proteins.

Units 1–3 Cumulative Review 127

Extra STAAR practice *in a random order like the actual test*

Supporting Success

Activities and **STAAR Practice** for each of the 19 Supporting TEKS.


Supporting Success 1 Cell Structure and Function

Reporting Category 1: B.4A, B.5B, B.5C

B.4A Compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity.

Comparing and Contrasting Cell Types B.6B

Circle the cell structures that are found only in a prokaryotic cell, and underline the cell structures that can be found in both prokaryotic and eukaryotic cells.

capsid | cytoplasm | nucleus
capsule | DNA | pili
cell membrane | flagellum | plasmid
cell wall | glycoprotein | ribosomes

Read each question carefully and choose the best answer.

1 A cell must be a prokaryotic cell instead of a eukaryotic cell if the cell contains — (B.4A)
A DNA
B RNA
C plasmids
D plastids

2 Which of these cell structures would be missing from a eukaryotic cell? (B.4A)
F A nuclear membrane
G A circular chromosome
H A watery cytoplasm
J A rough endoplasmic reticulum

244 Biology EOC • Supporting Success

Name _____ Class _____ Date _____

Student Progress Monitoring Chart—How Am I Doing?

Use the Diagnostic Tests to identify topics you need to review. Chart your progress using the steps below.

[1] Diagnostic Mark a ✓ next to each test question that you answered correctly. Find the total.

[2] Need Review? If you did *not* check a question in [1], circle the lesson next to it. Study each circled lesson, and put a ✓ in the Practiced column when done.

[3] Post Test Mark a ✓ next to each question that you answered correctly. Find the total. Repeat or review each lesson that is unchecked in column [3].

Question	[1] Diagnostic	[2] Need Review?	Practiced	[3] Post Test	TEKS	Lesson Title
1		Lesson 1			B.4B	1 Cell Processes: Homeostasis and Transport
2		Lesson 2			B.4C	2 Viruses vs. Cells
3		Lesson 3			B.5A	3 The Cell Cycle
4		Lesson 4			B.6A	4 The DNA Molecule
5		Lesson 5			B.6E	5 Mutations
6		Lesson 6			B.6F	6 Mendelian and Non-Mendelian Genetics
7		Lesson 7			B.7A	7 Evidence of Evolution
8		Lesson 8			B.7E	8 Natural Selection
9		Lesson 9			B.8B	9 Classification Systems
10		Lesson 10			B.9A	10 Building Blocks of Cells
11		Lesson 11			B.10A	11 Animal Systems
12		Lesson 12			B.10B	12 Plant Systems
13		Lesson 13			B.11B	13 Ecological Succession
14		Lesson 14			B.12A	14 Community Interactions
15		Lesson 15			B.12C	15 Energy Flow Through Ecosystems
16		Lesson 16			B.12E	16 Environmental Change and Ecosystem Stability
	/ 16			/ 16	Total Correct	

Included in Sampler

Unit 5

Interdependence Within Environmental Systems

Reporting Category 5
The student will learn about the interactions that occur within environmental systems and their significance.

13 Ecological Succession B.11B
- **13.1** Ecological Systems Are Highly Organized
- **13.2** Communities and Ecosystems Change Over Time

14 Community Interactions B.12A
- **14.1** Each Species Has a Niche in a Community
- **14.2** Species Interact in a Community

15 Energy Flow Through Ecosystems B.12C
- **15.1** Living Things Use Matter and Energy
- **15.2** Use Models to Show Energy Flow

16 Environmental Change and Ecosystem Stability B.12E
- **16.1** Environmental Change Can Disrupt Food Webs
- **16.2** Environmental Change Impacts Ecosystem Stability

Get Ready Activities

15 Energy Flow in a Food Chain B.12C

Place the following organisms into the food chain, starting with producers. Then match the organisms with the correct trophic level.

frog grass grasshopper snake

_____ → _____ → _____ → _____

_____ **1.** Producer

_____ **2.** Primary consumer

_____ **3.** Secondary consumer

_____ **4.** Tertiary consumer

5. Which organism has the most energy available? _____

6. Which organism is a top predator? _____

Lesson 15

Energy Flow Through Ecosystems

B.12C Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids.

Overview In this lesson, you will learn about how matter and energy flow into and between the living things in an ecosystem.

15.1 Living Things Use Matter and Energy

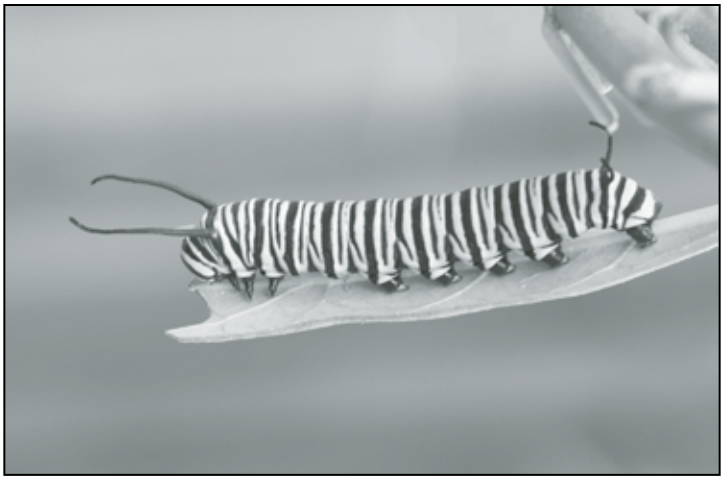
Matter and energy flow into and between the living things in an ecosystem. Living things differ in how they get matter and energy.

Producers and Consumers

Vocabulary

Producers are autotrophs, while consumers are heterotrophs. The prefixes *auto–* means "self" and *hetero–* means "different." The suffix *–troph* means "obtaining food."

Living things are either producers or consumers. A **producer**, like the plant below, is an **autotroph** that produces biomolecules—chemical energy in the form of food—from energy and inorganic molecules found in its environment. The plant uses the sun's energy to make food. The sun provides energy for most life on Earth. A **consumer**, like the caterpillar shown, is a **heterotroph** that obtains energy by feeding on other organisms or organic matter. The relationship between how organisms obtain energy and transfer energy enables life to survive as we know it.

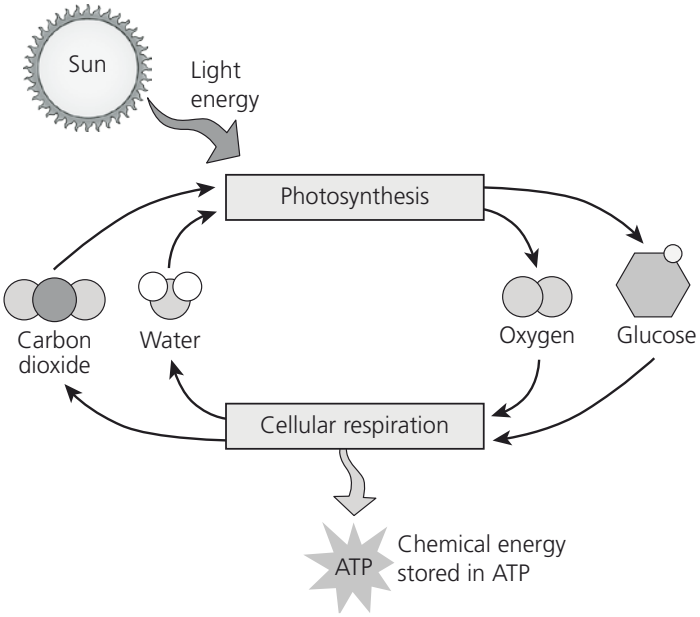


Photosynthesis and Cellular Respiration

The cycling of matter and energy between producers and consumers occurs through the biochemical processes of **photosynthesis** and **cellular respiration**. Most producers undergo photosynthesis, while both producers and consumers undergo aerobic cellular respiration. As shown, the reactants of one process are the products of another process. These two biochemical processes provide the energy needed to support all life.

Energy Flow for Living Organism

	Reactants:	Products:
Photosynthesis:	$6CO_2 + 6H_2O$ + light energy	$\longrightarrow C_6H_{12}O_6 + 6O_2$
Cellular Respiration:	$C_6H_{12}O_6 + 6O_2$	$\longrightarrow 6CO_2 + 6H_2O$ + ATP energy



Your Turn

1. Look at the drawing of producers and consumers. **Circle** the producers and place an **X** on the consumers.

15.2 Use Models to Show Energy Flow

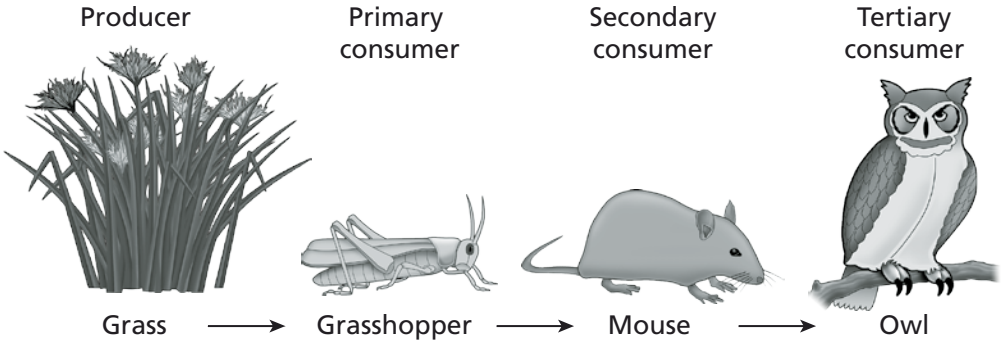
The movement of matter and energy through ecosystems requires an ongoing input of energy that is, in most cases, sunlight. Matter and energy from the environment enter through the producers in an ecosystem. Then, through feeding, the matter and energy move to the consumers. Ecologists use models to show the flow of matter and energy through organisms. These models include food chains, pyramids, and food webs.

Food Chains

A **food chain** is the simplest model of energy flow through an ecosystem. It shows feeding relationships, or "who eats whom." Like the example shown here, a food chain begins with a producer. One, two, or three successive consumers follow the producer in a food chain. The terms primary, secondary, and tertiary refer to the first, second, and third consumers. An arrow connects each organism to its food and shows the direction that matter and energy are transferred in an ecosystem.

Fun Fact

Mice get their energy by eating both plant material and other animals. This places them into two different trophic levels and makes them omnivores.



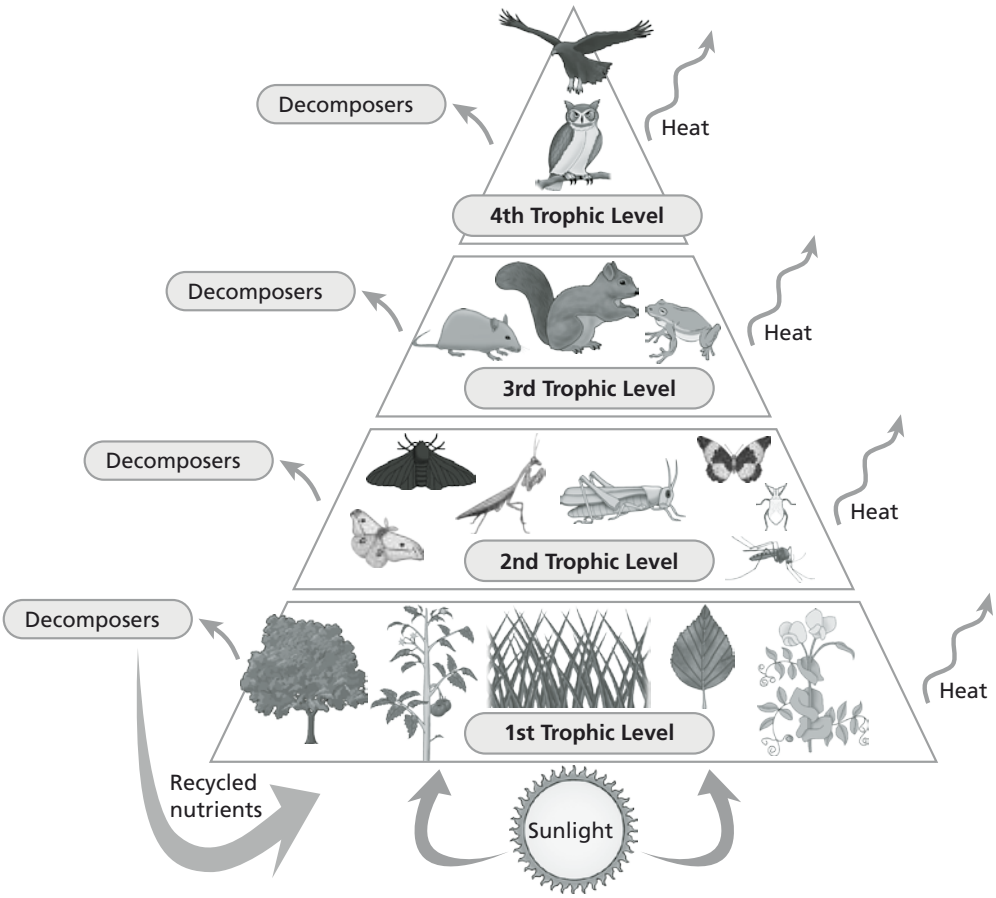
Each subsequent step in the flow of energy is called a **trophic level**. Food chains contain the following trophic levels:

- **Producers** trap energy from sunlight during photosynthesis. All plants and algae (phytoplankton), as well as many kinds of bacteria, are producers.
- **Primary consumers** eat producers and are often called **herbivores** because they eat plants (and algae). Insects, rodents, cows, and deer are primary consumers.
- **Secondary consumers** eat primary consumers and are often called carnivores because they eat meat, yet some are omnivores, because they eat plants and meat. Mice and frogs are secondary consumers.
- **Tertiary consumers** eat secondary consumers and are usually carnivores. Snakes, owls, and coyotes may be tertiary consumers. There can be another level of consumers that eats tertiary consumers. They are often at the top of the food chain and considered top predators because nothing eats them.
- **Decomposers**, like bacteria and fungi, are not usually shown in a food chain. They break down the remains of plants and animals, and thus feed at every level.

Ecological Pyramids

Organisms get energy from the sun or food they eat. Some energy is transferred, but most of this energy is lost along the way. **Ecological pyramids** are models that show the flow of energy through trophic levels and feeding relationships in an ecosystem. Organisms in one level of a pyramid eat organisms in the next level below it. Notice in the following pyramid that energy from the sun enters the producers, is passed on to the subsequent consumers, and that energy is lost as heat at every level.

Ecological Pyramid



The top of the pyramid, which is the smallest in size, represents the fourth trophic level, or the tertiary consumers.

Next, the third level represents the third trophic level, or the secondary consumers.

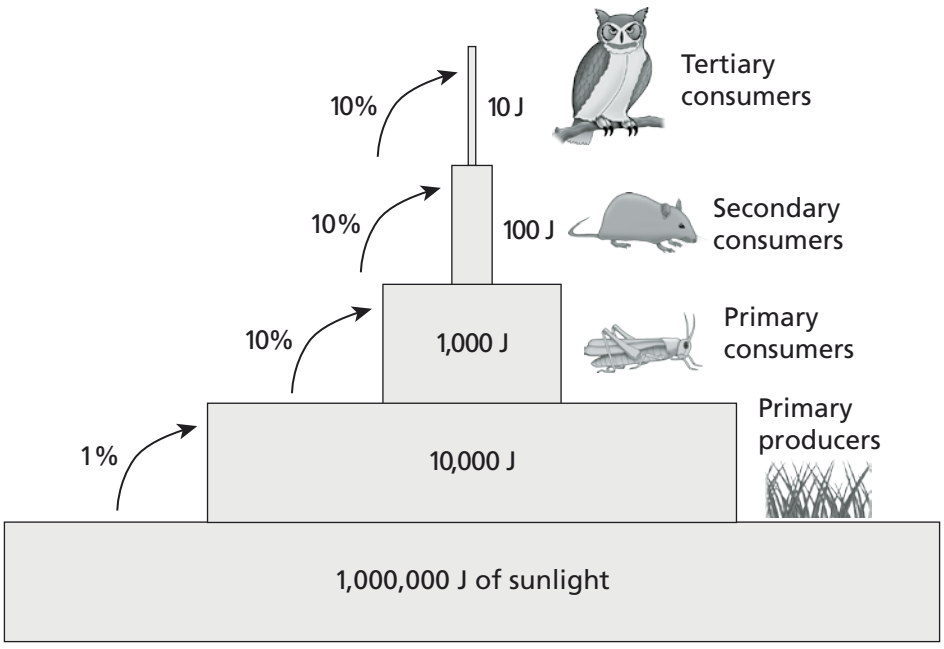
The next represents the second trophic level, or primary consumers.

The largest level of a pyramid is its base, which represents the first trophic level, or the producers.

Did You Know?

The efficiency of energy transfer between trophic levels is so low that ecosystems generally are not able to support more than four to five trophic levels.

Energy Pyramids A pyramid that shows the total amount of energy stored in the organisms is called an **energy pyramid**. Not all the energy stored in producers is passed on to the next trophic level. In fact, only about 10% of the matter and energy in the organisms of each trophic level transfers to the next level. The rest of the matter and energy (90%) is passed on to decomposers, used by the organism to carry out life functions, or lost to the environment in the form of heat.



The bottom trophic level contains the most energy and the top trophic level contains the least energy. Examine the pattern of energy transfer. Notice how the energy pyramid gradually decreases in size as you move up the pyramid. This decrease represents the amount of available energy that transfers from one trophic level to the next. Notice that the same amount of energy is transferred between tropic levels (10%), however the amount of energy that the producers receives from the sun is much less (about 1%).

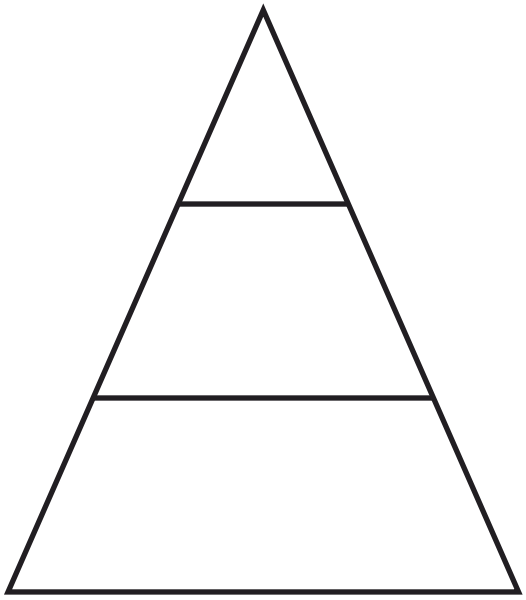
Your Turn ✔

2. Place the following organisms into a food chain, starting with the producers.

mouse red-tailed hawk rattlesnake grass

_____ → _____ → _____ → _____

3. The model below shows an ecological pyramid. Circle the area where the top predators are found. Then, place a box around where producers are found.



4. Circle the values to make the sentence correct.

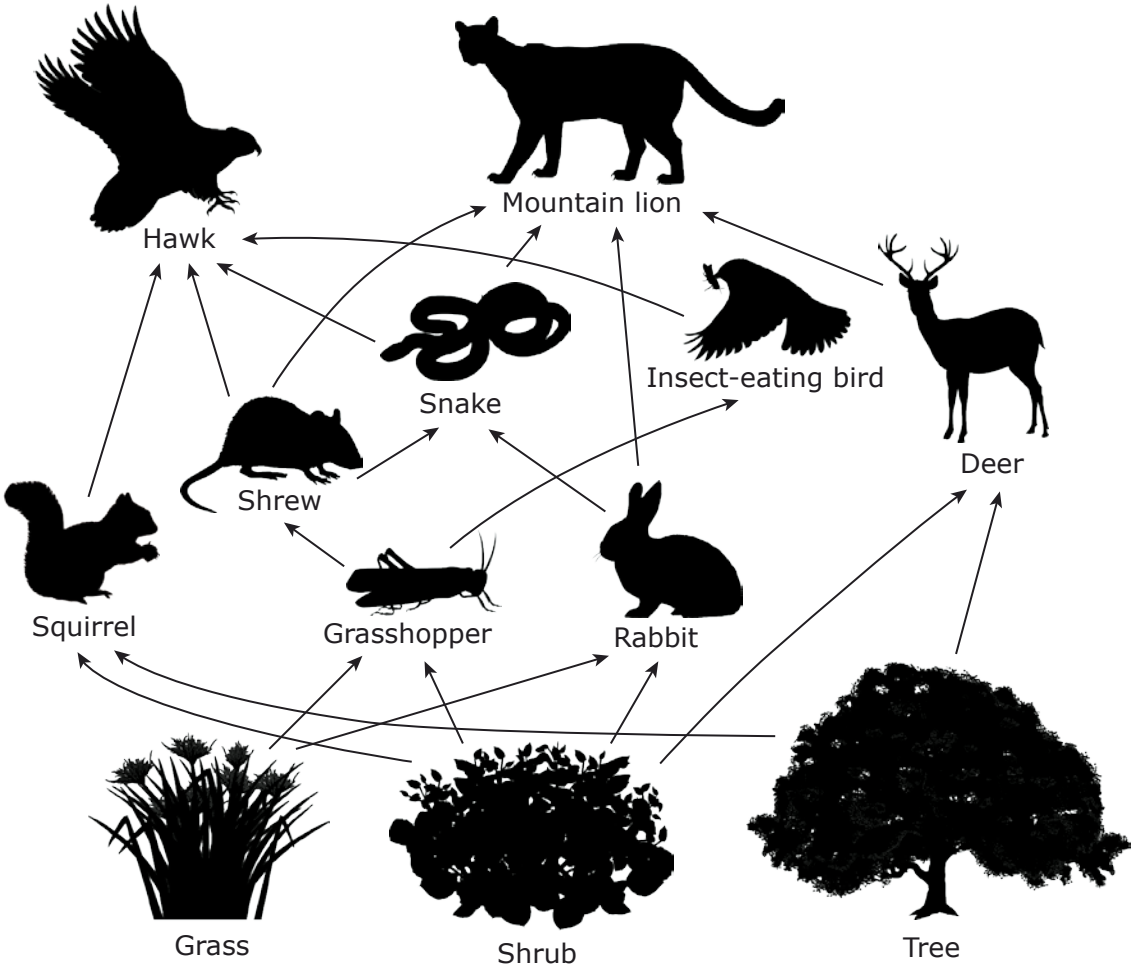
In an ecosystem, the producers have 50,000 J of energy. In turn, the primary consumers will receive **5,000 J | 500 J** because only **10% | 1%** is available for the next trophic level.

Remember

Food webs do not show decomposers, even though they are a part of the ecosystem at every level. Without decomposers, matter would not be recycled.

Food Webs

Any one species may be part of several different food chains. Therefore, a web is a more realistic model of the feeding relationships in an ecosystem. The diagram below shows a complex network of interconnected food chains with multiple pathways of matter and energy in a **food web**. Notice that the same animals can be parts of two or more chains in a food web, meaning their role in an energy pyramid can differ. For example, hawks in the food web below can be placed into three different trophic levels. Can you determine the three levels? Trace each chain to the hawk to determine their placement. Hint: Look at the snake. Hawks can be secondary consumers, tertiary consumers, and even fourth-level consumers.

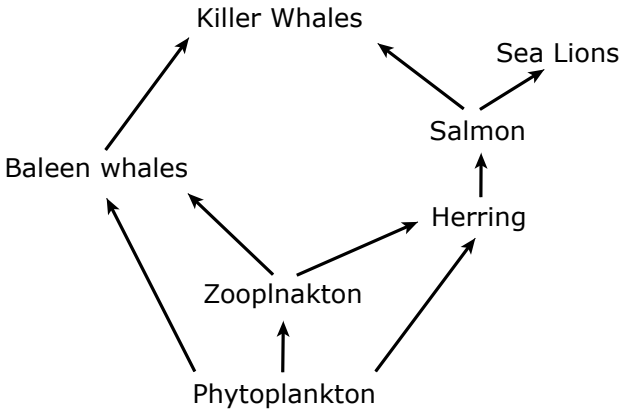


Your Turn

Use the aquatic food web below to complete the activities.

5. Place an **X** on all the consumers that have the most energy available to them.

6. **Circle** all the secondary consumers.

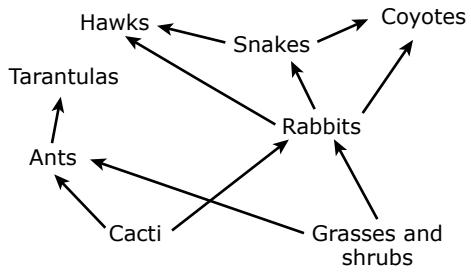


Diagnostic Test Item

B.12C, B.2G

15 The food web below shows the feeding relationships in a South Texas community.

South Texas Food Web



In this community, the rabbits in the food web function as —

A producers

B decomposers

C primary consumers

D secondary consumers

Explanation

A Grasses and shrubs as well as cacti are the producers in this food web. They do not get food from any other organisms, like rabbits do.

B Decomposers are not shown in the food web. Decomposers break down and recycle organic matter from all trophic levels.

C Correct! The arrows that point directly to rabbits from either grasses and shrubs or cacti indicate that rabbits eat these plants and are the first, or primary, consumer in this food web.

D Hawks, snakes, and coyotes, which all eat rabbits, are the secondary consumers in this food web.

15 STAAR Practice B.12C

B.12C Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids.

Read each question carefully and choose the best answer.

1 Which food chain correctly illustrates the direction in which energy flows through an ecosystem? *(B.12C, B.3A)*

A Sunlight → scavengers → decomposers → producers → herbivores

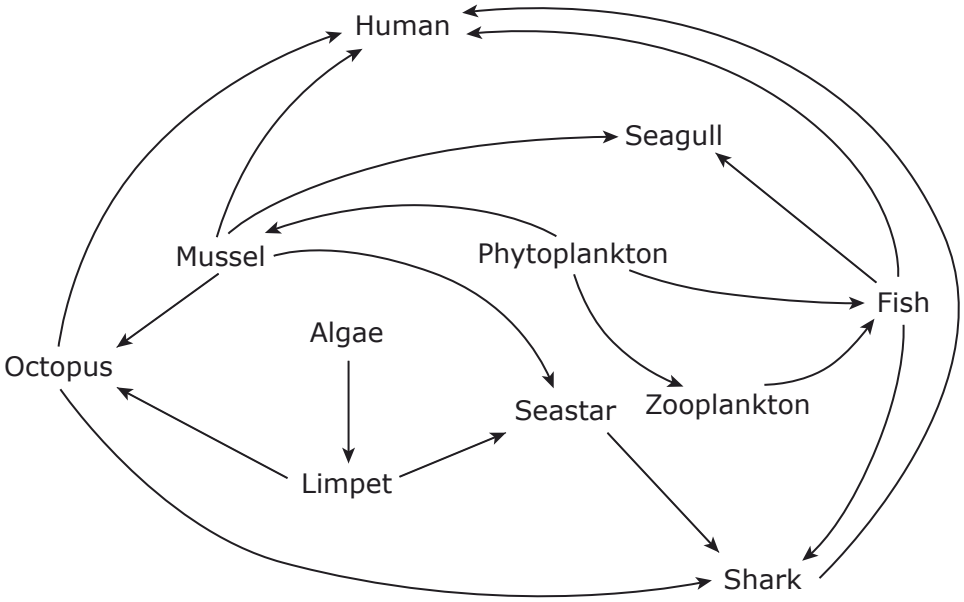
B Sunlight → producers → herbivores → omnivores → carnivores

C Sunlight → producers → decomposers → herbivores → carnivores

D Sunlight → herbivores → producers → carnivores → omnivores

---

2 Part of a marine food web is shown in the diagram.



Which organisms are producers in this ecosystem? *(B.12C, B.2G)*

F Zooplankton and phytoplankton

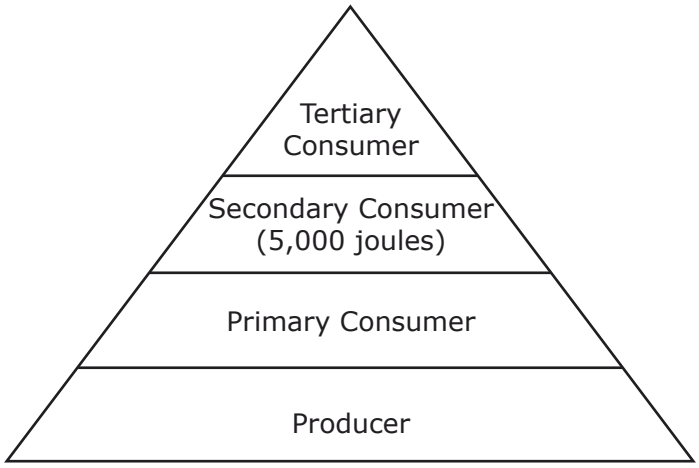
G Mussels and limpets

H Algae and limpets

J Phytoplankton and algae

When a test question has a complex diagram, such as a food web, it is often best to locate the answer options in the diagram first. Then, eliminate options that do not apply to the question.

3 The energy pyramid below shows the energy available to secondary consumers. Assume that only 10% of matter and energy transfers from one trophic level to the next.



Based on the energy flow between trophic levels in an energy pyramid, how much energy would be expected to be found at the producer level of this pyramid? *(B.12C, B.2G)*

A 500 joules

B 5,000 joules

C 50,000 joules

D 500,000 joules

Before you read the answer choices, think about what you know about the question. Then look for the answer. This may prevent you from being distracted by other possible choices.

---

4 The table below shows a partial list of organisms in a Texas desert ecosystem.

Trophic Level	Organisms
Producer	Saguaro cactus, brittlebush, fluffgrass, prickly pear cactus
Primary Consumer	Red harvester ants, grasshopper, wood rat, antelope squirrel, Gila woodpecker
Secondary Consumer	Mantid, grasshopper mouse, collared lizard, Gila woodpecker, elf owl
Tertiary Consumer	Diamondback rattlesnake, red-tailed hawk, elf owl

Which correctly identifies an organism that is part of the trophic level with the most biomass and energy? *(B.12C, B.2G)*

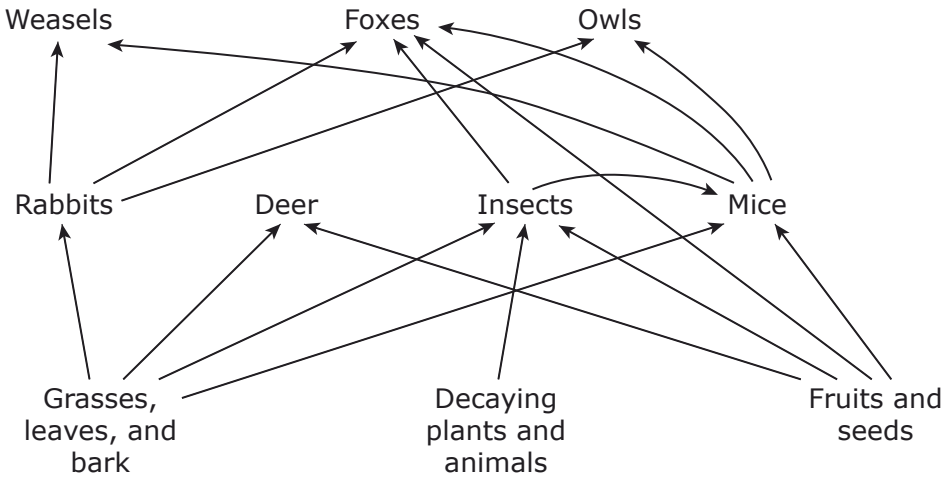
F Elf owl

G Saguaro cactus

H Gila woodpecker

J Grasshopper mouse

5 Part of a food web of a forest ecosystem is represented in the diagram.



Which organism is considered a primary and secondary consumer in this food web?

(B.12C,B.2G)

A Mice

B Owls

C Deer

D Rabbits

---

6 The table shows the food sources of some of the organisms living in the Hudson River in New York.

Hudson River Organisms	Food Sources
Zebra mussels	Phytoplankton, zooplankton
Sunfish	Insects, fish larvae, crayfish
Crayfish	Aquatic plants, fish, insects, tadpoles
Zooplankton	Phytoplankton
Shad (fish)	Zooplankton, shrimp larvae

In an energy pyramid for the Hudson River ecosystem, which organisms would be placed at the trophic level of primary consumer? *(B.12C, B.2G)*

F Phytoplankton and aquatic plants

G Sunfish, shad, and crayfish

H Zebra mussels, crayfish, and zooplankton

J Fish larvae and phytoplankton

Unit 5

Study Guide & Review

Check (✓) the concepts you know.
Place a star (★) next to the key terms you know.

15 Energy Flow Through Ecosystems B.12C

15.1 Living Things Use Matter and Energy

Key Concepts	Key Terms
☐ **Producers** are **autotrophs**, meaning they produce food from energy and inorganic molecules. They often use **photosynthesis** to make food.	autotroph cellular respiration heterotroph photosynthesis producer
☐ Consumers are **heterotrophs** and obtain food by eating other organisms.	
☐ Heterotrophs can also obtain their food by breaking down dead or decaying organisms.	
☐ Both autotrophs and heterotrophs undergo **cellular respiration** to convert energy that is used by the cells to carry out daily functions.	

15.2 Use Models to Show Energy Flow

Key Concepts	Key Terms
☐ Living things get matter and energy in one of three ways. They are either producers, consumers, or **decomposers**.	decomposer ecological pyramid energy pyramid food web primary consumer secondary consumers tertiary consumers trophic level
☐ Models, such as food chains, **ecological pyramids**, energy pyramids, and food webs, are often used to represent the flow of energy and matter from one trophic level to the next through an ecosystem.	
☐ There are typically five **trophic levels**. Producers are the lowest trophic level, and **primary consumers**, usually herbivores, eat producers. **Secondary consumers** eat primary consumers, and **tertiary consumers** eat secondary consumers.	
☐ An **energy pyramid** is a representation of the amount of energy transfer that occurs in an ecosystem. As energy moves from one trophic level to the next, energy is lost.	
☐ A more complex model is a **food web**, which consists of several interconnected food chains.	

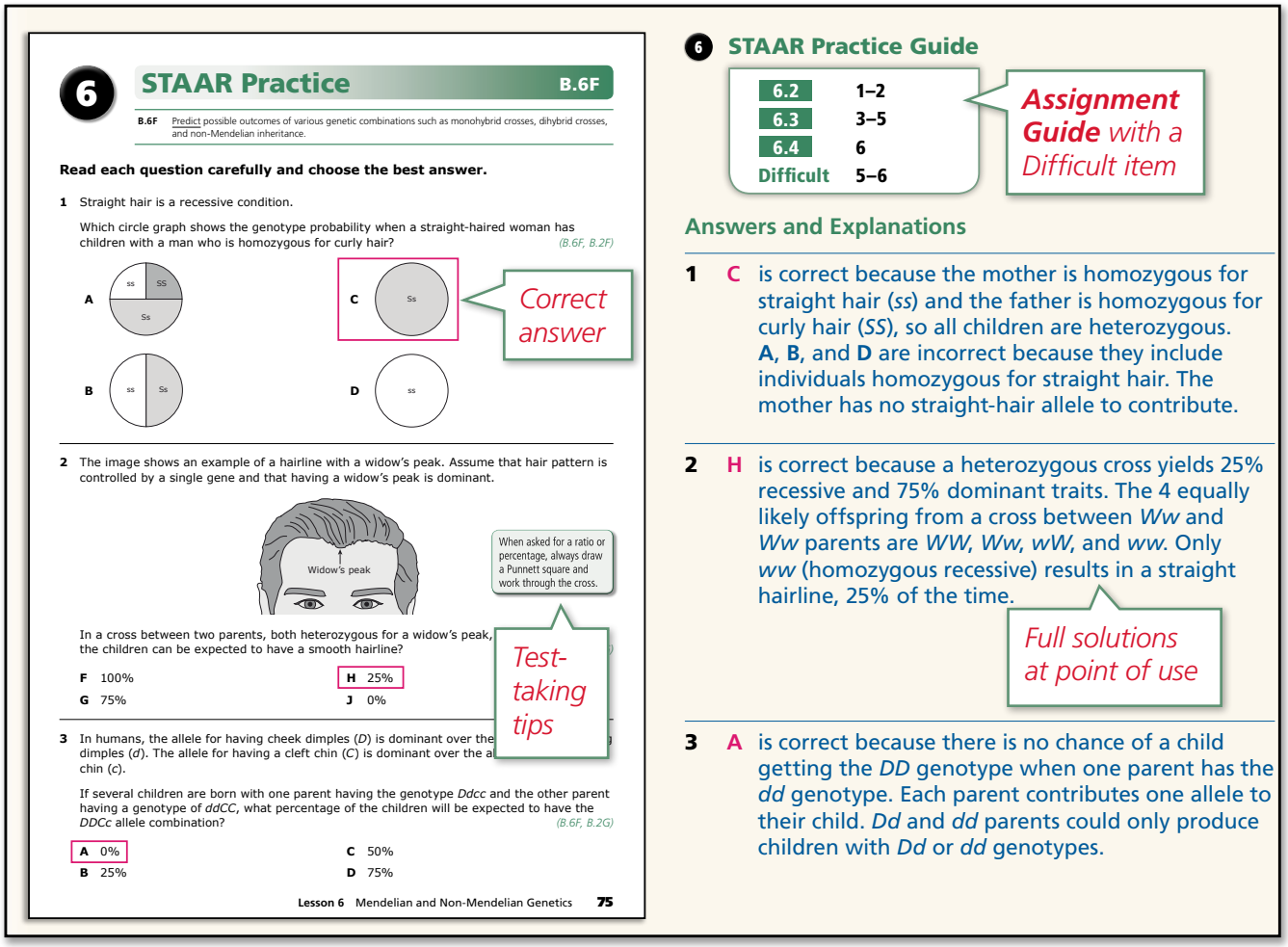
Using This Teacher's Edition

This workbook was created to support teachers in helping students succeed on the STAAR **Biology** exam. It provides comprehensive and systematic **instruction** and **practice** for the 16 Readiness TEKS, and activities and practice for the 19 Supporting TEKS.

The workbook can **easily be adapted** for individual use, small groups, or whole-class settings. The **Diagnostic Test** can serve as a baseline or to identify individual students' needs for intervention when prep time is limited. Teachers can created individualized instruction plans by assigning specific **lessons** with ample **STAAR practice**. Finally a **Post Test** can be used to monitor progress. (The Post Test questions are in the exact same order as the Diagnostic Test.)

STAAR Practice Support for Teachers

The workbook contains **over 225 STAAR** test items that closely match released STAAR tests. About 50% of the items include a stimulus such as diagrams, tables, graphs, photos, etc. Each STAAR item includes a **full solution** to help teachers or tutors provide meaningful feedback.



6 **STAAR Practice** B.6F

B.6F Predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses, and non-Mendelian inheritance.

Read each question carefully and choose the best answer.

1 Straight hair is a recessive condition.

Which circle graph shows the genotype probability when a straight-haired woman has children with a man who is homozygous for curly hair? (B.6F, B.2F)

A ss SS Ss

B ss Ss

C Ss

D ss

Correct answer

2 The image shows an example of a hairline with a widow's peak. Assume that hair pattern is controlled by a single gene and that having a widow's peak is dominant.

Widow's peak

When asked for a ratio or percentage, always draw a Punnett square and work through the cross.

In a cross between two parents, both heterozygous for a widow's peak, the children can be expected to have a smooth hairline?

F 100% H 25%
G 75% J 0%

Test-taking tips

3 In humans, the allele for having cheek dimples (*D*) is dominant over the ... dimples (*d*). The allele for having a cleft chin (*C*) is dominant over the a... chin (*c*).

If several children are born with one parent having the genotype *Ddcc* and the other parent having a genotype of *ddCC*, what percentage of the children will be expected to have the *DDCc* allele combination? (B.6F, B.2G)

A 0% C 50%
B 25% D 75%

Lesson 6 Mendelian and Non-Mendelian Genetics 75

6 **STAAR Practice Guide**

6.2	1–2
6.3	3–5
6.4	6
Difficult	5–6

***Assignment Guide** with a Difficult item*

Answers and Explanations

1 **C** is correct because the mother is homozygous for straight hair (*ss*) and the father is homozygous for curly hair (*SS*), so all children are heterozygous. **A**, **B**, and **D** are incorrect because they include individuals homozygous for straight hair. The mother has no straight-hair allele to contribute.

2 **H** is correct because a heterozygous cross yields 25% recessive and 75% dominant traits. The 4 equally likely offspring from a cross between *Ww* and *Ww* parents are *WW*, *Ww*, *wW*, and *ww*. Only *ww* (homozygous recessive) results in a straight hairline, 25% of the time.

Full solutions at point of use

3 **A** is correct because there is no chance of a child getting the *DD* genotype when one parent has the *dd* genotype. Each parent contributes one allele to their child. *Dd* and *dd* parents could only produce children with *Dd* or *dd* genotypes.

Unit 5

Interdependence Within Environmental Systems

Reporting Category 5
The student will learn about the interactions that occur within environmental systems and their significance.

13 Ecological Succession B.11B
- **13.1** Ecological Systems Are Highly Organized
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- **15.1** Living Things Use Matter and Energy
- **15.2** Use Models to Show Energy Flow

16 Environmental Change and Ecosystem Stability B.12E
- **16.1** Environmental Change Can Disrupt Food Webs
- **16.2** Environmental Change Impacts Ecosystem Stability

Get Ready Activities

15 Energy Flow in a Food Chain B.12C

Place the following organisms into the food chain, starting with producers. Then match the organisms with the correct trophic level.

frog grass grasshopper snake

grass → grasshopper → frog → snake

grass 1. Producer

grasshopper 2. Primary consumer

frog 3. Secondary consumer

snake 4. Tertiary consumer

5. Which organism has the most energy available? grass

6. Which organism is a top predator? snake

Lesson 15

Energy Flow Through Ecosystems

B.12C Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids.

Overview In this lesson, you will learn about how matter and energy flow into and between the living things in an ecosystem.

15.1 Living Things Use Matter and Energy

Matter and energy flow into and between the living things in an ecosystem. Living things differ in how they get matter and energy.

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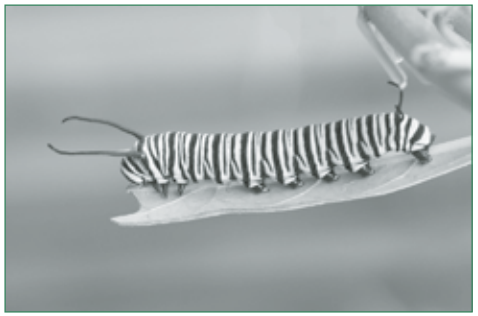

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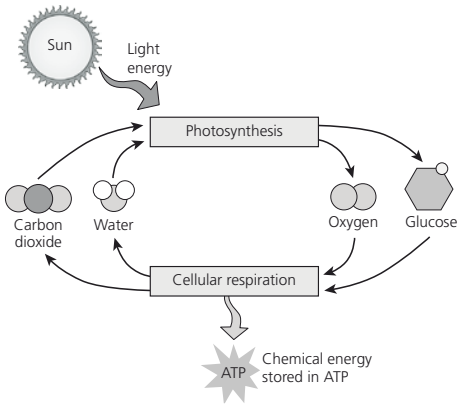
The cycling of matter and energy between producers and consumers occurs through the biochemical processes of **photosynthesis** and **cellular respiration**. Most producers undergo photosynthesis, while both producers and consumers undergo aerobic cellular respiration. As shown, the reactants of one process are the products of another process. These two biochemical processes provide the energy needed to support all life.

Energy Flow for Living Organism

	Reactants:	Products:
Photosynthesis:	$6CO_2 + 6H_2O$ + light energy	$\rightarrow C_6H_{12}O_6 + 6O_2$
Cellular Respiration:	$C_6H_{12}O_6 + 6O_2$	$\rightarrow 6CO_2 + 6H_2O$ + ATP energy



Your Turn

1. Look at the drawing of producers and consumers. **Circle** the producers and place an **X** on the consumers.

Students should circle the plants and place an X on the animals.

15.2 Use Models to Show Energy Flow

The movement of matter and energy through ecosystems requires an ongoing input of energy that is, in most cases, sunlight. Matter and energy from the environment enter through the producers in an ecosystem. Then, through feeding, the matter and energy move to the consumers. Ecologists use models to show the flow of matter and energy through organisms. These models include food chains, pyramids, and food webs.

15 STAAR Practice B.12C

B.12C Analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids.

Read each question carefully and choose the best answer.

1 Which food chain correctly illustrates the direction in which energy flows through an ecosystem? *(B.12C, B.3A)*

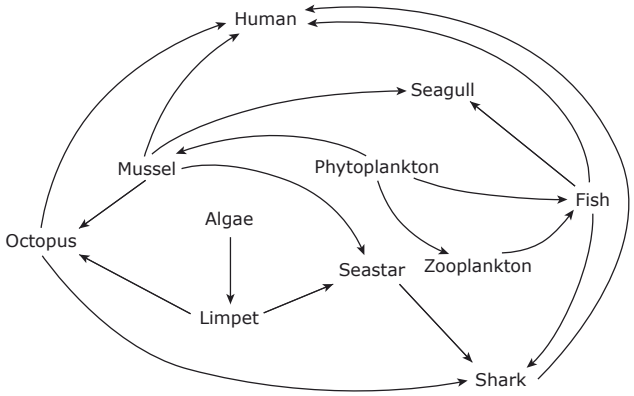
A Sunlight → scavengers → decomposers → producers → herbivores

B Sunlight → producers → herbivores → omnivores → carnivores

C Sunlight → producers → decomposers → herbivores → carnivores

D Sunlight → herbivores → producers → carnivores → omnivores

2 Part of a marine food web is shown in the diagram.



Which organisms are producers in this ecosystem? *(B.12C, B.2G)*

F Zooplankton and phytoplankton

G Mussels and limpets

H Algae and limpets

J Phytoplankton and algae

When a test question has a complex diagram, such as a food web, it is often best to locate the answer options in the diagram first. Then, eliminate options that do not apply to the question.

15 STAAR Practice Guide

15.2	1–6
Difficult	6

Answers and Explanations

1 **B** is correct because it shows energy flowing from sunlight through autotrophs, then into a chain of heterotrophs correctly arranged in order of plant eaters, plant and animal eaters that would include predators of the herbivores, and then animals that would survive solely by consuming other animals.

2 **J** is correct because only algae and phytoplankton produce their own food in the food web. Producers can be identified by the observation that no arrows point to them because they do not eat anything in the food web.

SAMPLER

BIOLOGY EOC CONTENTS

UNIT 1 Cell Structure and Function

1 Cell Processes: Homeostasis and Transport
2 Viruses vs. Cells
3 The Cell Cycle

UNIT 2 Mechanisms of Genetics

4 The DNA Molecule
5 Mutations
6 Mendelian and Non-Mendelian Genetics

1–2 CUMULATIVE REVIEW

UNIT 3 Biological Evolution and Classification

7 Evidence of Evolution
8 Natural Selection
9 Classification Systems

1–3 CUMULATIVE REVIEW

UNIT 4 Biological Processes and Systems

10 Building Blocks of Cells
11 Animal Systems
12 Plant Systems

1–4 CUMULATIVE REVIEW

UNIT 5 Interdependence Within Environmental Systems

13 Ecological Succession
14 Community Interactions
15 Energy Flow Through Ecosystems
16 Environmental Change and Ecosystem Stability

1–5 CUMULATIVE REVIEW

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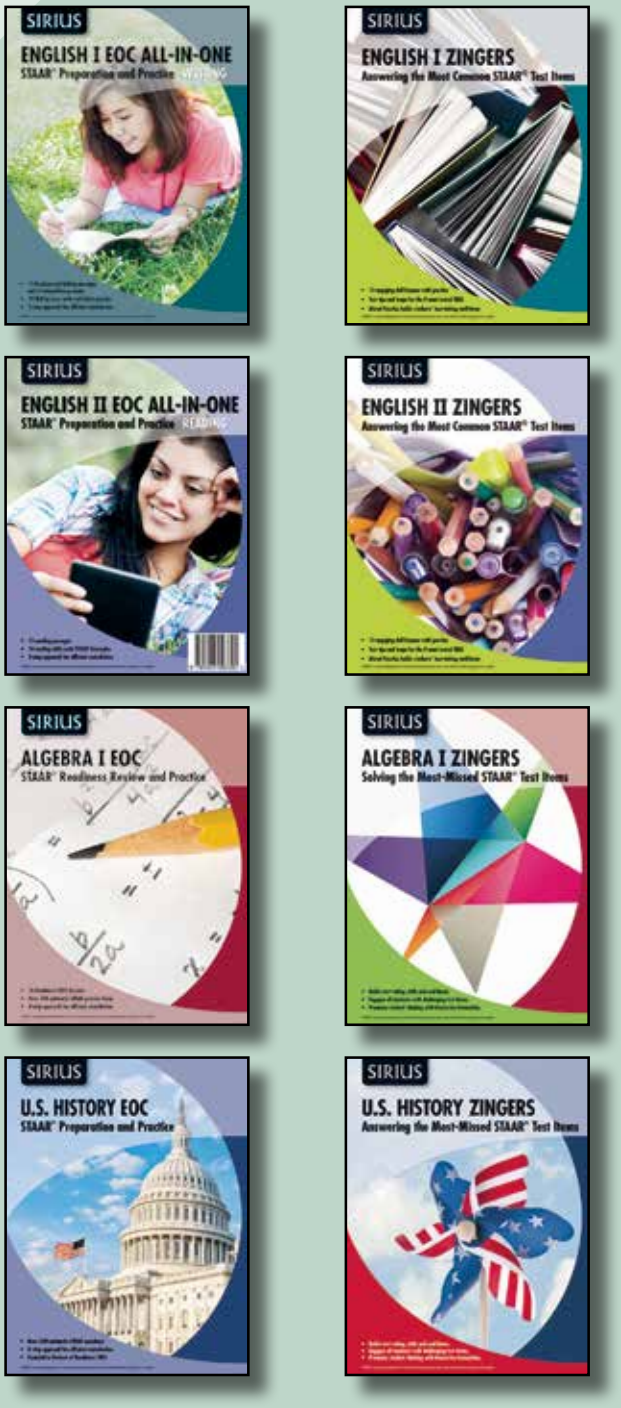

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STAAR BIOLOGY

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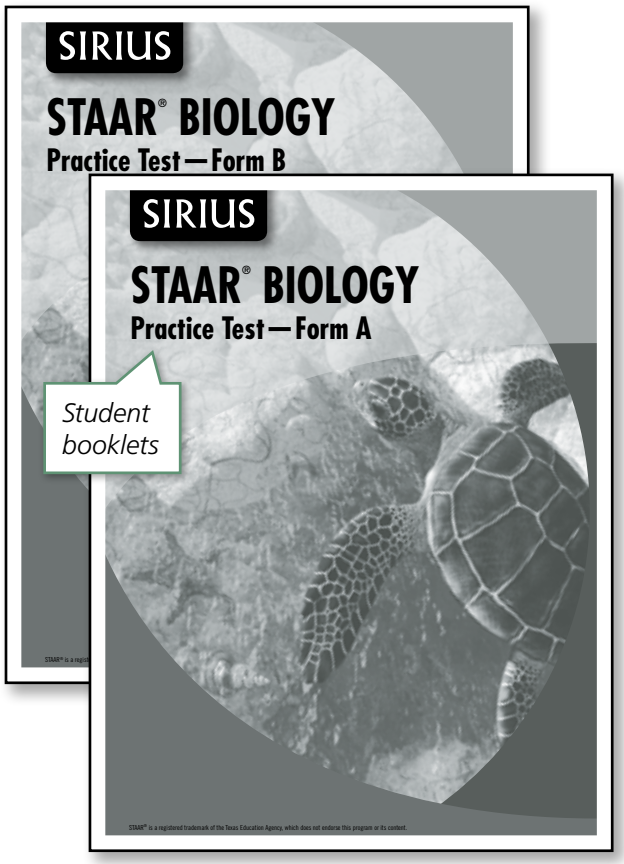
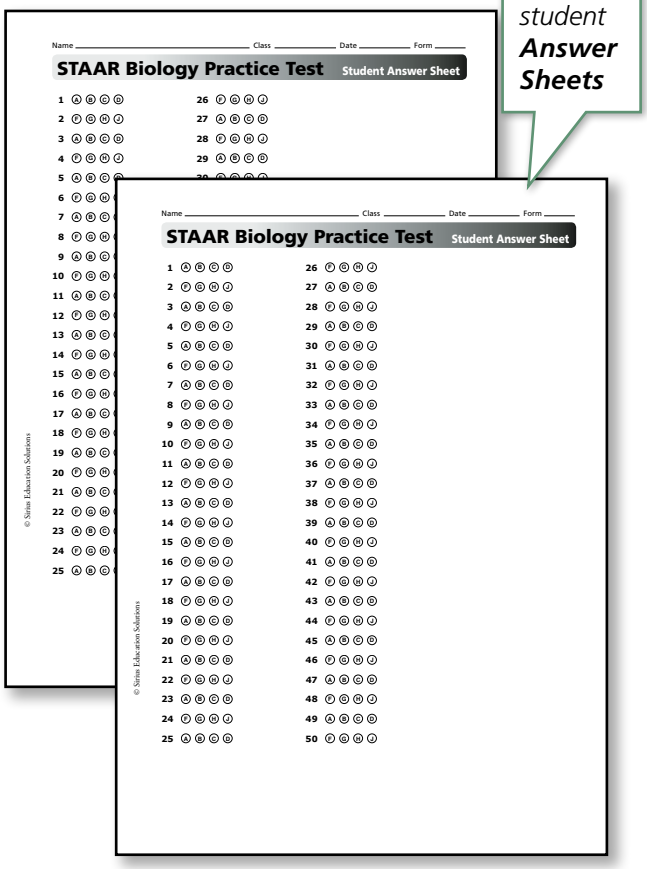
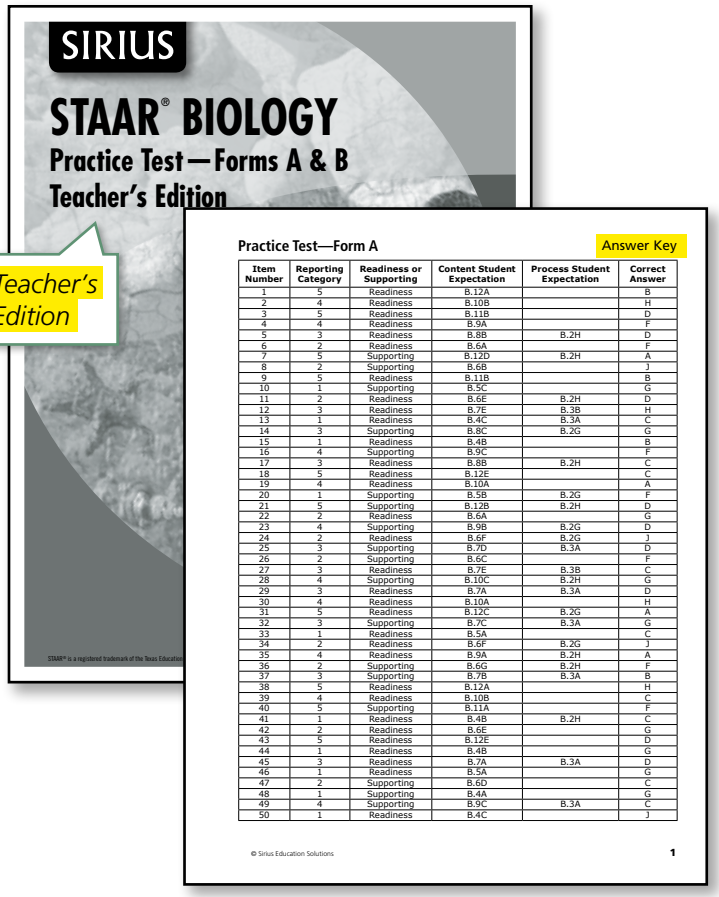
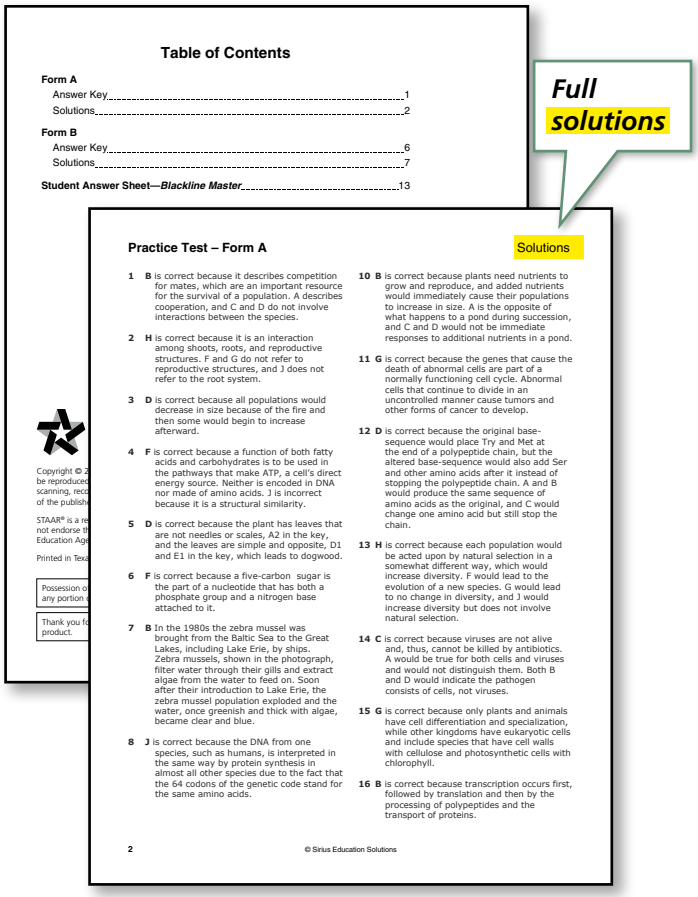






Practice Test—Form A — Answer Key

Item Number	Reporting Category	Readiness or Supporting	Content Student Expectation	Process Student Expectation	Correct Answer
1	5	Readiness	B.12A		B
2	4	Readiness	B.10B		H
3	5	Readiness	B.11B		D
4	4	Readiness	B.9A		F
5	3	Readiness	B.8B	B.2H	D
6	2	Readiness	B.6A		F
7	5	Supporting	B.12D	B.2H	A
8	2	Supporting	B.6B		J
9	5	Readiness	B.11B		B
10	1	Supporting	B.5C		G
11	2	Readiness	B.6E	B.2H	D
12	3	Readiness	B.7E	B.3B	H
13	1	Readiness	B.4C	B.3A	C
14	3	Supporting	B.8C	B.2G	G
15	1	Readiness	B.4B		B
16	4	Supporting	B.9C		F
17	3	Readiness	B.8B	B.2H	C
18	5	Readiness	B.12E		C
19	4	Readiness	B.10A		A
20	1	Supporting	B.5B	B.2G	F
21	5	Supporting	B.12B	B.2H	D
22	2	Readiness	B.6A		G
23	4	Supporting	B.9B	B.2G	D
24	2	Readiness	B.6F	B.2G	J
25	3	Supporting	B.7D	B.3A	D
26	2	Supporting	B.6C		F
27	3	Readiness	B.7E	B.3B	C
28	4	Supporting	B.10C	B.2H	G
29	3	Readiness	B.7A	B.3A	D
30	4	Readiness	B.10A		H
31	5	Readiness	B.12C	B.2G	A
32	3	Supporting	B.7C	B.3A	G
33	1	Readiness	B.5A		C
34	2	Readiness	B.6F	B.2G	J
35	4	Readiness	B.9A	B.2H	A
36	2	Supporting	B.6G	B.2H	F
37	3	Supporting	B.7B	B.3A	B
38	5	Readiness	B.12A		H
39	4	Readiness	B.10B		C
40	5	Supporting	B.11A		F
41	1	Readiness	B.4B	B.2H	C
42	2	Readiness	B.6E		G
43	5	Readiness	B.12E		D
44	1	Readiness	B.4B		G
45	3	Readiness	B.7A	B.3A	D
46	1	Readiness	B.5A		G
47	2	Supporting	B.6D		C
48	1	Supporting	B.4A		G
49	4	Supporting	B.9C	B.3A	C
50	1	Readiness	B.4C		J



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