Extra Support for
Vocabulary and Concepts
Grade 5
To the Teacher

Some students may need extra support in learning new science vocabulary and concepts. The Extra Support for Vocabulary and Concepts pages are designed to fill that need. The pages accompany every content lesson in the ScienceFusion Student Edition and provide:

- Phonetic respellings, definitions, and tips for remembering the lesson’s vocabulary terms.
- Concept statements, written in simplified language, to reinforce the lesson’s main ideas.

These pages also reinforce tested content objectives and the Florida Science Benchmarks.

Ideas for Using These Pages

- Working in small groups, have students read each vocabulary word aloud and repeat it three times. Then have students alternate reading the definitions and tips for remembering the terms. Have students conclude by restating the meaning of each term in their own words.

- Working with a partner, have students take turns reading aloud the Science Ideas statements as if they were lines in a play. Challenge students to practice until they know the statements by heart.

- Suggest students read the pages at home with family members. Encourage them to enlist the help of family members in reviewing and remembering the information.

- Encourage students to use these pages as tools for reviewing unit content prior to unit reviews and tests or state science assessment.
• Have students select three or four Science Ideas statements, write them on drawing paper, and illustrate them.

• Students can cut and paste each vocabulary term and its definition into their science notebooks or onto index cards to make their own set of vocabulary cards. The cards can be used in vocabulary games and activities, such as Twenty Questions and Jeopardy®.

• Working in pairs, have students brainstorm and write a new tip for remembering each vocabulary word.

• Suggest students create a crossword puzzle with the vocabulary terms. Students can use or paraphrase the definitions provided on the page as clues.

• Have students turn each Science Ideas statement into a question. Suggest they write the question on one side or an index card and the answer on the other side. Students can use the index cards to play a question-and-answer game with a classmate.

• Suggest students rewrite each Science Ideas statement in their own words and give an example or detail that further illustrates the meaning of the statement.

• Have students select two or three vocabulary words and write as much as they can about each word, including examples, facts, and connections to other vocabulary words.
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What Is Science?

Science Words

Say each word quietly to yourself. Then read the meaning.

Read the tip to help you remember.

investigation [in•ves•tuh•GAY•shuhn] a procedure carried out to carefully observe, study, or test something in order to learn more about it

Investigation and question end in –tion. An investigation can answer a question.

science [SY•uhns] the study of the natural world. Science involves making observations and performing investigations.

Science, study, and search begin with the same sound. When people do science, they study nature and search for answers.

evidence [ev•uh•duhns] information collected during a scientific investigation

Evidence ends with the sound at the beginning of certain. Evidence can help you be certain your idea about something is correct.

The hat, gloves, coat, and snow are evidence of cold weather.

opinion [uh•PIN•yuhn] a belief or judgment

Opinion and open begin the same way. Have your opinion, but keep your mind open to evidence.
What Is Science?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. An investigation is a procedure used to find answers to questions about nature.
2. An investigation may involve observing, comparing, and testing.
3. Scientists look for evidence, or information, as they investigate a question.
4. Scientists draw conclusions from the results of their investigations.
5. A conclusion must be supported by evidence; an opinion need not be supported by evidence.
6. An inference is an idea based on an observation.
7. A person’s opinion should not affect how the person carries out an investigation.
8. Scientists communicate the results of their investigations.
9. Clear communication helps other scientists repeat an investigation and compare results.
10. Scientific knowledge grows when scientists can expand on one another’s ideas.
What Are Some Types of Investigations?

Science Words

Say each word quietly to yourself. Then read the meaning.

Read the tip to help you remember.

**scientific methods** [sy•uhnTIF•ik METH•uhd] ways that scientists perform investigations. Scientific methods use logic and reasoning.

You have a method for doing your homework. You might do it right after school or in the evening. You might do sitting in a particular chair or in a particular place. Your method is your way of doing something. *Scientific methods* are scientists’ way of doing their work.

**experiment** [ek•SPAIR•uh•muhnt] an investigation used to test an hypothesis in which all the conditions are controlled

*Experiment, explore, and exact* begin the same way. An *experiment* is an exact and careful way to explore a question.

**variable** [VAIR•ee•uh•buhl] any condition in an experiment that can be changed

*Variable* begins the same way as *vary*, which means “change.” *Variable* ends with –able. A *variable* is something that is able to be changed.

In this investigation, the variable is light. One plant is exposed to light. The other plant is not exposed to light. All other conditions are the same.

**control** [kuhn•TROHL] the setup to which all the other setups are compared

*Control* has one meaning in everyday conversation and a different meaning in science. In everyday conversation, if you have *control* over something, you are in charge of it. In science, a *control* is a standard other things are compared to.
Extra Support for
Vocabulary and Concepts

What Are Some Types of Investigations?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. A scientific investigation always begins with a question.
2. Scientists use scientific methods based on logic and reasoning.
3. Scientists may use repeated observations or make models for an investigation.
4. In an experiment, scientists test an idea by controlling the conditions around it.
5. An experiment begins with observations and a hypothesis that can be tested.
6. An experiment should have at least two setups, with one being the control.
7. Scientists must identify all the variables, but change only one variable at a time.
8. Scientists follow a careful procedure, or set of steps, to carry out their experiment.
9. Scientists record and analyze the data they collect; they draw conclusions from their data.
10. Scientists use charts, graphs, and diagrams to display data they have collected.
What Tools Do Scientists Use?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**microscopic** [my•kruh•SKAH•pik] too small to see with just your eyes alone

*Microscopic* and *microscope* are in the same word family. A microscope makes tiny things look bigger, so a microscope helps you see something that is *microscopic*.

**balance** [BAL•uhns] a tool used to measure mass, the amount of matter in an object

A *balance* may make you think of a seesaw. When a seesaw is balanced, both sides are at the same height. When both sides of a *balance* are the same height, the mass of the objects on the balance is the same.

**spring scale** [SPRING SKAYL] a tool used to measure the force, or pull, of gravity on an object

Using a *spring scale* may make you think of hanging a coat from a wire hanger. If the coat is heavy, it may pull on the hanger and cause it to stretch. When an object hangs from a *spring scale*, the force of gravity pulls on the spring, which stretches.

**accurate** [AK•yuhr•uht] correct, without error

*Accurate* and *actual* begin the same way. An *accurate* measure of something is the actual amount of it.
What Tools Do Scientists Use?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Field scientists may use nets, hand lenses, and cameras in their investigations.
2. An electron microscope can make something look a million times bigger than it really is.
3. A dropper releases liquid drop by drop; a pipette is like a dropper but more exact.
4. Measuring is making observations that involve numbers and units, such as kilograms.
5. Scientists and most people in the world use the metric or International System (SI).
6. The metric system is based on multiples of 10.
7. Length is measured in meters; mass is measured in grams; force is measured in newtons.
8. A meter stick measures length; a balance measures mass; a spring scale measures newtons.
9. A graduated cylinder measures the volume of a liquid in liters.
10. To find the volume of a solid multiply its length by its width by its height.
What Is the Design Process?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

engineering [en•juh•NEER•ing] using knowledge of science and mathematics to find solutions to everyday problems

Engineering and mathematics have four syllables, or parts. Engineering makes use of science and mathematics.

technology [tek•NAHL•uh•jee] any device that people use to meet their needs and solve practical problems

Technology, tools, and television begin with the same sound. Tools and televisions are examples of technology.

The car, the computers, and the toothbrush are examples of technology.

prototype [PRO•tuh•tayp] a working model

Prototype and product begin with the same sounds. Making a prototype is an important step in creating a new product.

criteria [kry•TEER•ee•uh] standards that help engineers measure how well their design is doing its job

Criteria and conditions begin with the same sound. Criteria are the conditions a design needs to meet.
What Is the Design Process?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Engineers find solutions to everyday problems in many fields.

2. Technology affects our lives: Machines makes work easier; medicine helps restore health; satellites help us predict weather and communicate.

3. To create new technologies, engineers follow a design process that involves several steps.

4. First, engineers find a need or a problem to solve and brainstorm possible solutions.

5. Next, they choose a solution and build a prototype, keeping records of everything they do.

6. Then they test their model to see if it stands up to their criteria, gathering data from the test.

7. If needed, engineers adjust their design and make a new prototype to test.

8. Lastly, engineers communicate their results in written reports.

9. It may take many years to reach the final product for a new technology.

10. Finding materials that work well for the product affects the design process.
How Does Technology Improve Our Lives?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**bioengineering** [beye•oh•en•juh•NEER•ing] applying the engineering design process to living things

*Alive* and *bio* have the same long *i* vowel sound. *Bio* refers to things that are alive. *Bioengineering* refers to engineering for living things—things that are alive.

**biotechnology** [beye•oh•tek•NAHL•uh•jee] a product used to benefit organisms or their environment

*Biotechnology* has two parts: *bio* and *technology*. The meaning is the sum of the two parts—a type of technology that helps living things—things that are alive.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Technology meets human needs; pencils and light bulbs are technology as well as cell phones.
2. The way people meet their needs changes over time.
3. Technology has made it possible to communicate across the country in less and less time.
4. Technology can have positive effects, or benefits and negative effects or risks.
5. A benefit of cars is personal freedom; a risk is their use of gasoline, a limited resource.
6. Engineers who work with living things are bioengineers.
7. A bioengineer may design a fish farm to raise large numbers of fish.
8. A bioengineer may design biotechnology to help find or treat disease in a patient.
9. Something that replaces a human body part, like an artificial leg, is an example of biotechnology.
10. Scanners that allow doctors to look inside the body are examples of biotechnology.
What Are Cells?

Science Words

Say each word quietly to yourself. Then read the meaning.

Read the tip to help you remember.

cell [SEL] basic unit of structure and function in a living thing

Cell and cent begin with the same sound. The basic unit of our money is a cent, or a penny. A cell is the basic unit of a living thing.

organism [AWR•guh•niz•uhm] living thing

Organism and organ are in the same word family. An organ is a part of the body. An organism is the whole body.

cell membrane [SEL MEM•brayn] the part of a cell that surrounds the cell and controls what enters and leave the cell

Membrane and contain end with the same sound. A cell membrane contains the nucleus and other parts of the cell.

nucleus [NOO•klee•uhs] the part of a cell that directs all the cell’s activities

Nucleus ends with the sound at the beginning of cell and center. The nucleus is at the center of a cell.

inherited trait [in•HAIR•uh•tuhd TRAYT] a characteristic passed from parents to their offspring

Inherited and received end with the same sound. An inherited trait is a trait you receive from your parents.

dominant trait [DAHM•uh•nuhnt TRAYT] a strong trait

Dominant and dominate are in the same word family. Someone who dominates a situation takes charge of it, like a boss. When two traits are present, the dominant trait is the boss.

recessive trait [rih•SES•ihv TRAYT] a weak trait

The short e vowel sound in less is the same as the vowel sound in the middle of recessive. A recessive trait is less strong than a dominant trait.
What Are Cells?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. The cell theory: All living things are made of cells; all the processes of life take place in the cell; new cells come from existing cells.

2. All cells have a cell membrane; plant cells also have a cell wall to protect the cell.

3. For an organism to grow, the cells of the organism divide and make more cells.

4. Genes, which are part of an organism’s DNA, control the organism’s features.

5. Chromosomes in the nucleus of each cell are made of DNA.

6. Mitosis is cell division that allows for the body’s growth.

7. Meiosis is cell division that forms sex cells with half the number of chromosomes.

8. Genetic differences are a result of meiosis; offspring receive genes from both parent.

9. If an offspring gets different traits from its parents, the dominant trait appears in the offspring.

10. A recessive trait appears only if an organism has a recessive gene from both parents.
How Do Cells Work Together?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**tissue** [TISH•oo] cells of the same type that work together to do a certain job

The middle sound in *tissue* (sh) is made up of two letters that stand for one sound. All the cells in a *tissue* work together to do one job.

**organ system** [AWR•guhn SIS•tuhtm] a group of organs that work together to do one type of job

A system is a group of things that act together as a whole.
An organ is a body part that does a certain job.
You can put these ideas together: An *organ system* is a group of organs that act together as a whole.

**skin** [SKIN] a protective layer that covers the body

When you think of *skin*, think of *skinny*. Skinny people are extremely thin. They have very little fat and muscle under their skin.

**organ** [AWR•guhn] a body part that is made up of smaller parts that work together to do a certain job

*Organ* has more than one meaning. An *organ* is a large musical instrument with many smaller parts that work together to make sound. An *organ* is also a body part with many smaller parts that work together.

**brain** [BRAYN] the organ that processes information

*Brain* ends with the sound at the beginning of *nerve*. The *brain* is made up of millions of nerve cells.
*Brain* and *broadcast* begin with the same sounds. Your *brain* broadcasts instructions to all the parts of your body.
How Do Cells Work Together?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. You have four types of tissue—muscle, connective, nerve, and epithelial tissue.
2. The outer layer of skin is epithelial tissue; the brain and spine are nerve tissue.
3. Connective tissue includes tendons in your arms and legs that connect muscles to bones.
4. The nervous system lets you sense your surroundings and sends information to your brain.
5. Chains of nerve cells carry information to and from the brain, where it is processed.
6. The spinal cord, a rope-like bundle of nerve tissue, is the main pathway of information.
7. The retina at the back of your eye has nerve cells that sense light and send the brain signals.
8. The sense of smell is from structures in your nose that send signals about chemicals in the air.
9. Vibrations are passed from tiny hairs in your ear to nerves, which send messages to your brain.
10. Skin, part of the integumentary system, helps protect the inside of your body.
How Do Our Bodies Move, Breathe, and Circulate Blood?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

bone [BOHN] organs that protect and support the body, store minerals, and allow movement
  Squeeze your first finger. You feel hard bone below the skin.

muscles [MUHS•uhl] organs that contract to produce body movement
  Muscles and move begin with the same sound.
  You need your muscles to move.

lungs [LUHNG] the main organs of the respiratory system
  Lungs begins with the sound in middle of balloon.
  When you think of lungs, think of the two balloons in your chest that take in air.

heart [HART] the organ that pumps blood throughout your body
  Heart, start, and part rhyme. Your heart starts blood on its way to all parts of your body.
How Do Our Bodies Move, Breathe, and Circulate Blood?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Bones protect and support the body and store minerals.
2. The place where two or more bones meet is called a joint.
3. Muscles, organs that contract and produce movement, often work in pairs.
4. An exoskeleton is a hard outer layer, like the covering of a cicada.
5. Your respiratory system takes oxygen from the air and gives off carbon dioxide.
6. Air flows through a tube, called the trachea, to your lungs, the main respiratory organ.
7. The trachea branches into two tubes; one tube goes into each lung and then branches again.
8. An asthma attack may take place if pollen or pollution causes the tubes, or bronchi, to swell.
9. Your heart, your blood vessels, and your blood make up your circulatory system.
10. Arteries are blood vessels that carry blood away from your heart; veins carry blood back.
How Do Our Bodies Digest Food, Remove Wastes, and Send Messages?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

stomach [STUHM•uk] a muscular bag that mashes food into a liquid and mixes the food with digestive juices

   Stomach and small begin with the same sound. Food moves from your stomach to your small intestine.

liver [LIV•er] the organ that breaks large blobs of fat into tiny droplets so that the fats can be broken down more easily.

   Try to remember this tongue twister: The liver makes large lumps of lard, called fat, littler.

pancreas [PAN•kree•uh•s] the organ that makes juices that are released into the small intestine. The juices break down fats and proteins into small pieces that can be absorbed.

   Pancreas and produce begin with the same sound. The pancreas produces juices that help the body digest food.

kidneys [KID•nee•z] organs that remove waste from the blood

   Kidneys and clean begin with the same sound. The kidneys help keep the blood clean by removing waste from it.

bladder [BLAD•er] the organ that stores urine and then releases it from the body

   Bladder and balloon begin with the same sound. The bladder can stretch like a balloon.
How Do Our Bodies Digest Food, Remove Wastes, and Send Messages?

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Food passes down the esophagus to the stomach, where it is mashed and mixed with juices.
2. The liver makes bile, a juice that helps break down large blobs of fat into tiny droplets.
3. The pancreas releases juices that break fats and proteins into bits the body can absorb.
4. Using juices from the pancreas, the small intestine absorbs nutrients the body needs.
5. Solid waste passes out of the body through the large intestine.
6. Calories are a measure of how much energy your body will get from your food.
7. The body uses carbohydrates, proteins, and fats for energy.
8. The liver converts ammonia, a waste product when protein is broken down, to urea.
9. The kidneys clean the blood, and send urine to the bladder where it leaves the body.
10. Hormones, like insulin, carry messages that cause changes in the body.
How Are Living Things Grouped?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

classification [klas•uh•fuh•KAY•shuhn] a way to organize things into similar groups

Classification and organization end with the same sounds. Classification provides organization for all the living things on Earth.

dichotomous key [DY•koht•uh•muhs KEE] a chart with many choices that guide you to the name of the thing you want to identify

Dichotomous and divide begin with the same sound. A dichotomous key divides each group of things into two subgroups.

domain [duh•MAYN] the broadest level of classification

Domain contains the word main. A domain is the first or main way to classify living things.

genus [JEE•nuhs] in the classification system, a subdivision of a family

Genus and group begin with the same letter. A genus is a group of animals that are different, but closely related.

species [SPEE•sheez] unique organisms

Species and specific begin with the same sounds. A species is a specific type of animal.
How Are Living Things Grouped?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Cell type, cell structure, genetic information, shape, and size are used to classify organisms.
2. Organisms are separated into domains by their cell structure.
3. The classification system includes: kingdom, phylum, class, order, family, genus, and species.
4. Plants are grouped into those with long, narrow tubes called vascular tissue and those without.
5. Trees have vascular tubes that carry materials throughout the plant; moss does not.
6. Plants are classified by how they reproduce–seeds in flowers, seeds in cones, no seeds at all.
7. Animals are divided into two main groups–vertebrates that have backbones and invertebrates.
8. Mushrooms and mold make up the Fungi Kingdom; the Kingdom Protista includes algae.
9. Bacteria are grouped by shape, size, how they get food, and whether they use oxygen.
10. There are more bacteria on Earth than any other living thing; some bacteria are helpful and some are harmful.
How Do Plants Grow and Reproduce?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

nonvascular plant [NAHN•vas•kyuh•ler PLANT] a small plant that lacks vascular tissue.

*Non* and *not* begin the same way. A *nonvascular plant* is a plant that does not have vascular tissue.

vascular plant [VAS•kyuh•ler PLANT] a plant with vascular tissue that allows it to move water, nutrients, and sugars across long distances

*Vascular* and *vein* begin the same way. A vein is a tube that carries blood. A *vascular plant* has tubes that carry water and other things the plant needs.

spore [SPAWR] a single reproductive cell that can grow into a whole new plant

*Spore* and *more* end with the same sounds. *Spores* make more plants.

gymnosperm [JIM•noh•sperm] a plant that does not produce seeds in flowers

The middle syllable in *gymnosperm* is *-no-*. A *gymnosperm* is a plant that has no flowers.

This diagram shows how gymnosperms like pine trees produce seeds.
angiosperm [AN•jee•oh•sperm] a plant that produces seeds in flowers

When you think of angiosperm, think of an apple. An apple is a fruit with seeds in it. An angiosperm is a plant that makes seeds in flowers, which produce fruit like apples.

This drawing shows some parts of a flower involved in pollination and fertilization needed to produce seeds.

germinate [JER•muh•NAYT] start to grow

Germinate and grow begin with different sounds, but the same letter. When the tiny plant in a seed germinates, it starts to grow.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Without tubes to carry water and nutrients, nonvascular plants rarely grow taller than 10 cm.
2. Most plants, including trees, grasses, and shrubs are vascular plants with true leaves and roots.
3. Mosses (nonvascular plants) and ferns (vascular plants) use spores to reproduce.
4. Most gymnosperms are cone-producing plants, or conifers, like pine trees.
5. With a seed coat for protection, spores must stay moist and sprout soon after they are released.
6. More than 85% of all types of plants are angiosperms, plants that produce seeds in flowers.
7. During pollination, pollen reaches the stigma in a flower and fertilizes the eggs in the ovules.
8. The ovules develop into seeds and the ovary becomes a fruit, such as a pumpkin or an apple.
9. The outer coat of a seed protects the seed until the environment is right for growing.
10. The seed contains an embryo plant, which begins to grow when the ground is warm and moist.
How Do Animals Grow and Reproduce?

Science Words

Say each word quietly to yourself. Then read the meaning.

Read the tip to help you remember.

**vertebrates** [VER•tuh•bri茨] animals with backbones

You can connect the *b* sound in *vertebrates* with the *b* sounds in *backbone*. *Vertebrates* have backbones.

**invertebrates** [in•VER•tuh•bri茨] animals without backbones

*Invertebrates* and *inexperienced* begin the same way. Someone who is inexperienced does not have experience. An organism that is an *invertebrate* does not have *vertebrates*, a backbone.

**complete metamorphosis** [kuhm•PLEET met•uh•MAWR•fuh•sis] a life cycle in which the animal goes through four different stages: egg, larva, pupa, adult (ELPA)

Think of *complete metamorphosis* as a square. Since *complete metamorphosis* has four stages, the square has one stage at each corner.

**incomplete metamorphosis** [IN•kuhm•PLEET met•uh•MAWR•fuh•sis] a life cycle in which the animal goes through three different stages: egg, nymph, adult (ENA)

Think of *incomplete metamorphosis* as a triangle. Since *incomplete metamorphosis* has three stages, the triangle has one stage at each corner.

**life cycle** [LYF SY•kuhl] the stages an organism goes through

*Cycle* and *circle* begin with the same sound. A *life cycle* moves in a circle—a parent has young, which grow and become parents themselves.
How Do Animals Grow and Reproduce?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. One major way to group animals is according to whether they do or do not have a backbone.
2. Most backbones are made up of bones that are linked together.
3. The five classes of vertebrates include mammals, birds, reptiles, amphibians, and fish.
4. Corals, sponges, jellyfish, earthworms, and arthropods (insects, spiders, and crustaceans) are invertebrates.
5. There are more insects on Earth than all other species combined.
6. Every life cycle begins with a fertilized egg; the egg may be in a protective shell or inside the mother’s body.
7. Insects are the most common animals that undergo metamorphosis.
8. Ladybugs go through the four stages of a complete metamorphosis: egg, larva, pupa, adult.
9. The cicada goes through the three stages of incomplete metamorphosis: egg, nymph, adult.
10. The nymph looks like a small version of the adult, but cannot fly or reproduce.
What Are Physical and Behavioral Adaptations?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

adaptation [ad•uhp•TAY•shuhn] a characteristic that helps a living thing survive

Adaptation and adapt are in the same word family. When you adapt to something, you change in order to fit in or get what you need. An adaptation is the change you made in order to adapt.

A duck’s webbed foot is an adaptation for swimming.

instinct [IN•stinkt] behaviors that animals know how to do without being taught

Instinct contains the word in. Instincts are behaviors that are built in. For example, no one needs to teach a puppy to drink milk from its mother because this behavior is an instinct.

A spider knowing how to spin a web is an instinct.
What Are Physical and Behavioral Adaptations?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Physical adaptations are differences in the bodies of organisms.
2. An organism with a characteristic that helps it survive has an advantage over other organisms.
3. A penguin’s layer of fat is a characteristic that helps it survive in a cold environment.
4. A jackrabbit’s large ears are an adaptation that keep it cool in the hot habitat where it lives.
5. The sharp spines of a cactus are leaves modified to minimize water loss in the dry desert.
6. Thorns, sharp teeth, and camouflage are adaptations that protect living things from being eaten.
7. Instincts, such as spiders knowing how to spin webs, are behaviors that help animals survive.
8. Migration, moving to different locations at certain times of the year, is an instinct.
9. Hibernation, a long period when an animal’s body processes slow down, is an instinct.
10. Tadpoles and frogs live in different places and eat different foods; this is an adaptation.
What Is an Ecosystem?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**environment** [en•VY•ruhn•muhnt] all the living and nonliving things that surround and affect an organism

*Environment* and *everything* begin with the same sound. An *environment* is made up of everything in a place, including climate and light.

**ecosystem** [EE•kih•sis•tuhm] all the organisms living in a place together with their environment

*Ecosystem* contains the word *system*. A system is a group of things that act together as a whole. The “things” in an *ecosystem* are the plants, animals, water, soil and other nonliving things.

**population** [pahp•yuh•LAY•shuhn] a group of organisms of the same species in the same ecosystem

What is the *population* of your city? The question asks about the number of *people* in the city, not the number of dogs, cats, or birds. *Population* is about only one kind of living thing.

**community** [kuh•MYOO•nuh•tee] the populations that live and interact in an area

Your neighborhood is a *community*. The *community* includes the children and adults who live and work there. It also includes the plants and animals. The people, plants, and animals in your *community* are connected.

**habitat** [HAB•i•tat] the place where an organism lives within an ecosystem

*Habitat* and *home* begin with the same sound. Your home—and your community—are your *habitat*, the place where your needs are met.

**niche** [NICH] an organism’s complete role or function in its ecosystem

The environment of an ecosystem is like the setting for a play. Each organism has a role in the play as if it were a character. The role an organism plays is its *niche*. 
What Is an Ecosystem?

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. The biotic parts of an environment are the living things, including plants and animals.
2. The abiotic parts are nonliving, including climate, water, soil, light, air, and nutrients.
3. Temperature and amount of water affect which plants can live in a place.
4. The populations in a community compete for resources to meet their needs so they can survive.
5. Competition also takes place in a population; stronger individuals get the most resources.
6. Several populations may live in a single habitat.
7. An organism’s niche includes how it finds food as well as the climate it needs.
8. Populations can share a habitat, but not the same niche.
9. Diversity is the variety of different species that live in an ecosystem.
10. Very diverse ecosystems are near the equator; less diverse ecosystems are far from the equator.
How Do Environmental Changes Affect Organisms?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

succession [ad•uhp•TAY•shuhn] the gradual change of organisms in an ecosystem

Succession contains the word success. Succession is the success of one type of organism after another.

extinction [ek•SINGK•shuhn] when all the members of a certain kind of living thing die

Extinction and extinguisher begin the same way. A fire extinguisher can wipe out, or destroy, a fire. Extinction is when all members of a plant or animal are wiped out, or destroyed.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Gradual changes in Earth’s land and weather patterns affect organisms in the environment.
2. An ice age is when Earth’s temperatures are colder than normal for a very long time.
3. Floods, droughts, and volcanic eruptions can change the environment quickly.
4. Primary succession begins on bare rock, such as after a volcano erupts.
5. The first organisms to colonize bare rock are called pioneer species; lichens are often pioneers.
6. Secondary succession occurs when an ecosystem has been disturbed by fire, for example.
7. Organisms, such as beavers, can cause both helpful and harmful changes in an environment.
8. Without enemies, species introduced into an environment can multiply quickly and be invasive.
9. Human activities, such as open pit mining and highways, can harm an ecosystem.
10. Some living things, such as dinosaurs, became extinct when the environment changed.
What Are Roles of Organisms in Ecosystems?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**photosynthesis** [foh•tuh•SIN•thuh•sis] the process by which plants and plant-like organisms make food

*Photosynthesis* and *photograph* begin the same way. You need light in order to take a photograph. Plants need light in order to do *photosynthesis*.

**chlorophyll** [KLAWR•UH•FIL] a green molecule

*Chlorophyll* and *color* begin with the same sound. *Chlorophyll* gives plants their green color.

**producers** [pruh•DOOS•erz] organisms that make their own food

*Producers*, *produce*, and *plant* begin with the same sound. Plants are *producers* because they produce their own food.

**consumers** [kuhn•SOOM•erz] organisms that cannot make their own food

*Consumer* and *consume* are in the same word family.
You may have heard someone say, “I can’t believe how much spaghetti he can consume!”
*Consume* means eat. *Consumers* consume plants and animals as food.
What Are Roles of Organisms in Ecosystems?

deecomposers [dee•cuhm•POHZ•er] organisms that break down, or decompose, wastes and the remains of dead organisms

*Decompose* contains the word *compose*. When you compose something—a story or a piece of music—you put things together to make something new. *Decomposers* take things apart by breaking them down.

Mushrooms are decomposers.

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. The carbon dioxide-oxygen cycle is the movement of gases between plants and animals.
2. Plants take in carbon dioxide and sunlight to make food; plants give off oxygen.
3. Animals take in oxygen and give off carbon dioxide.
4. Herbivores eat only plants; carnivores eat only animals; omnivores eat both plants and animals.
5. Rabbits and deer are herbivores; penguins and lions are carnivores; some turtles are omnivores.
6. Animals that hunt and eat other animals are predators; the animals that predators hunt are prey.
7. The numbers of predators and prey are linked.
8. Decomposers and scavengers like vultures eat plants and animals that have died.
9. Bacteria are decomposers that use enzymes to break down the remains of plants and animals.
10. When a habitat is protected, all the organisms within the habitat are also protected.
How Does Energy Move Through Ecosystems?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

food chain [FOOD CHAYN] the transfer of energy from one organism to the next in an ecological community

Think of the links in a chain necklace. Each link is connected to the next. The links in a food chain are plants and animals. The links are connected in an order that shows which animal is eating which.

food web [FOOD WEB] a diagram that shows how food chains overlap

Think of the threads holding a spider web together. The arrows showing who eats what in a food web make the food web look like a spider web.

energy pyramid [EN•er•jee PEER•uh•mihd] a diagram that shows how much energy passes from one organism to another up a food chain

The faces of a pyramid are triangles with less space at the top than at the bottom. Similarly, the population of organisms at the top of the energy pyramid is smaller than the population of organisms at the bottom.
How Does Energy Move Through Ecosystems?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Most food chains begin when producers take in energy from the sun.
2. Through photosynthesis, producers change the sun’s light energy into sugars they use as food.
3. Producers store unused food, which is passed on to herbivores, plant-eating animals.
4. Herbivores are first-level consumers; meat-eaters and omnivores are second-level consumers.
5. Third-level consumers eat second-level consumers; decomposers get energy from dead organisms.
6. Decomposers return nutrients to soil, which are then used by producers to make food.
7. The organisms in a food web are interdependent; when something happens to one, all are affected.
8. The organisms in a layer of the energy pyramid feed on those in a lower layer.
9. Producers in the bottom layer of the pyramid are the most numerous.
10. One change in the flow of energy through an ecosystem affects every species in the system.
How Do People Use Resources?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

natural resource [NACH•er•uhl REE•sawrs] anything useful or necessary for living beings that occurs naturally on Earth

Resource contains the word source. A resource is a source of help. A natural resource is a source of help from nature.

renewable resource [rih•NOO•uh•buhl REE•sawrs] a resource that nature can replace when it is used

Renewable has three parts: re- -new- -able
Renew and redo begin the same way. When you redo something, you do it again. A renewable resource is a resource that can be made new again.

nonrenewable resource [nahn•rih•NOO•uh•buhl REE•sawrs] a resource that nature cannot replace after it is used

Nonrenewable has four parts: non- -re- -new- -able
Nonrenewable and not begin the same way. A nonrenewable resource is not renewable.

pollution [puh•LOO•shyhn] the contamination of air, water, or soil by materials that are harmful to living things

Pollution and poison begin with the same sound. Pollution poisons the environment by making it harmful to living things.
How Do People Use Resources?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Wind, water, sunlight, soil, and coal are natural resources.
2. Trees, water, plants, air, wind, and sunlight are examples of renewable resources.
3. Minerals, soil, coal, oil, and natural gas are examples of nonrenewable resources.
4. Coal, gas, and oil are fossil fuels formed from the remains of organisms that lived long ago.
5. Most natural resources travel long distances to reach the places where they are needed.
6. The United States imports oil; an import is brought into a country to be sold or traded.
7. Products people use, such as paper and plastics, are made from one or more natural resources.
8. Burning fossil fuels causes pollution, especially air pollution.
9. Chemicals from manufacturing, farming, and landfills can cause water pollution.
10. Soil polluted by chemicals leaking from storage sites cannot be used for growing crops.
How Do People Conserve Resources?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

conservation [[kahn•ser•VAY•shuhn] using resources carefully and not wasting them

If you were in a desert, you would want to make your water last as long as possible. To do that, you would be careful not to spill it. You would not waste the water. You would conserve it. Conservation and conserve are in the same word family. Conservation is conserving our natural resources so they last as long as possible.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Garbage that is not thrown away properly pollutes natural resources.
2. Reducing the amount of waste means less ends up in landfills or burned in incinerators.
4. Reusing something means turning it into something else; an old tire can be reused as a swing.
5. Recycling is reprocessing materials to make something new, such as a park bench or a carpet.
6. Farmers conserve soil by rotating crops, planting corn one year and soy beans the next.
7. Intercropping, planting more than one crop in the same field, helps prevent erosion.
8. Water is a renewable resource, but only if it is available; it is important to conserve water.
9. Fixing leaky faucets and catching rainwater for watering plants help conserve water.
10. Using LED light bulbs and turning off unused lights and electronics conserve energy.
How Do Weathering and Erosion Shape Earth’s Surface?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

weathering [WETH•er•ing] the process of rocks breaking apart

*Weathering* may be caused by weather, such as strong winds blowing sand and raindrops that contains chemicals.

erosion [uh•ROH•zhuhn] the process of moving weathered rock from one place to another

*Erosion* and *ocean* have similar sounds. A kind of *erosion* takes place at the ocean when big waves move around the sand on the beach.

deposition [dep•uh•ZISH•uhn] the dropping of weathered rock by wind or moving water

*Deposition* contains the word *deposit*. A deposit in a bank is money left there for safekeeping. *Deposition* leaves a deposit of weathered rock.

sediment [SED•uh•muhnt] bits of rock carried by slow-moving water

*Sediment, sand, silt,* and *settle* begin with the same sound. *Sediment* is sand and silt that have not settled out of the water. Sediment moves with the water’s flow.

Weathering has changed the shape of these rocks.
How Do Weathering and Erosion Shape Earth’s Surface?

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Roots can grow into rocks and break them apart; wind and water can wear away rocks.
2. Gravity can cause rocks to fall and break; flowing water can cause rocks to scrape each other.
3. Chemicals in water and rain can combine with rock to break it down and wear it away.
4. Wind and rain can cause erosion, the moving of weathered rock from one place to another.
5. Fast-flowing river water pulls rocks along the bottom of the river.
6. Slow-moving water deposits rocks on the river bottom in a process called deposition.
7. Slow-moving water carries along tiny bits of sand and silt, called sediment.
8. Sand dunes form when wind deposits a lot of sand in one area.
9. Huge sheets of ice called glaciers pick up rocks as they move along like very slow rivers.
10. River water can carve deep canyons, a narrow valley between cliffs of rock.
How Do Movements of the Crust Change Earth?

Science Words
Say each word quietly to yourself. Then read the meaning. Read the tip to help you remember.

**crust** [KRUHST] the thin, rocky outer layer of Earth

The crust on a slice of bread is the outer part. The crust of Earth is also the outer part.

**mantle** [MAN•tuhl] the thickest layer of Earth, just below the crust

*Mantle* and *middle* begin with the same sound. The mantle is the middle layer of Earth.

**core** [KAWR] the center of Earth, made of metal

The core of an apple is at the center of the apple. Earth’s core is at the center of Earth.

**plate tectonics** [PLAYT tek•TAHN•uhks] the theory that Earth’s crust is divided into plates that are always moving

*Crust* ends with the sound at the beginning of *tectonics*. *Plate tectonics* is a theory about Earth’s crust.

**earthquake** [ERTH•kwayk] the release of energy and shaking of the ground

*Shake* and *quake* end with the same sounds. An earthquake is when part of Earth’s covering shakes.

**epicenter** [EP•uh•sen•ter] the point on Earth’s surface directly above the focus of an earthquake

*Above* ends with the letter at the beginning of *epicenter*. The epicenter of an earthquake is right above the focus, or place where the earthquake begins.

**fault** [FAWLT] a break in Earth’s crust where rock on one side can move in relation to rock on the other side

*Fault* and *flaw* begin with the same sound. A fault is a flaw in Earth’s crust.

**volcano** [vahl•KAY•noh] an opening that allows magma to reach Earth’s surface

*Volcano* begins with *v*. A volcano may be the same shape as an upside down *v*.
How Do Movements of the Crust Change Earth?

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Earth’s crust is thinnest under the oceans and thickest under mountains.
2. Heat and pressure in the mantle cause it to flow slowly, like warm plastic.
3. Earth’s inner core is solid metal; Earth’s outer core is molten, or liquid metal.
4. Earth’s crust is broken into plates that fit together like a jigsaw puzzle and move very slowly.
5. Plates moving toward each other push up mountains; as plates pull away ridges form.
6. As plates move, pressure builds up and then releases; the release of pressure is an earthquake.
7. The place in Earth where an earthquake forms is the focus.
8. Energy travels away from the focus; the energy and motion is greatest at the epicenter.
9. The Richter scale measures the magnitude or amount of energy released on a scale from 1-10.
10. A volcano that erupts explosively has steep sides; a slower eruption results in a shield volcano.
What Are Minerals?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

mineral [MIN•er•uhl] any nonliving solid that has a crystal form. All minerals form in nature. No minerals are made by people.

Mineral contains the word mine. Many minerals are found in mines. People may create a mine or a mine may form naturally as an underground cave.

These are examples of different minerals.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. There are over 4,700 different minerals on Earth.
2. Minerals can form under the ground, in caves, and in the air.
3. The particles in a crystal combine to form a shape that is repeated again and again.
4. Each mineral is made of a set of nonliving things called elements.
5. Hardness is a property of minerals; a harder mineral can scratch a softer mineral.
6. Frederick Mohr created a scale to compare how hard different minerals are.
7. A mineral with a higher number on the scale can scratch a mineral with a lower number.
8. Another property of minerals is luster, or how they reflect light.
9. Copper, gold, and silver have a metallic luster.
10. Another property of a mineral is the color of the streak it leaves on a streak plate.
How Can Rocks Be Classified?

Science Words

Say each word quietly to yourself. Then read the meaning.

Read the tip to help you remember.

**rock** [RAHK] a natural solid that is made of one or more minerals

If people say, “She’s my rock,” they mean that the person is steady, that she doesn’t change, that you can count on her. A rock in nature also seems steady and unchanging.

**igneous rock** [IG•nee•uhs RAHK] rock that forms when melted rock, called magma or lava, cools and hardens

*Igneous* tells how rock forms.

*Igneous* and *ignite* begin in the same way.

*Ignite* means “burn” or “explode.” *Igneous rock* forms when a volcano erupts, or explodes. The tremendous heat and energy causes rock to melt.

**sedimentary rock** [sed•uh•MEN•ter•ee RAHK] rock that forms from sediment that gets cemented together under pressure

*Sedimentary* tells how rock forms.

*Sedimentary* begins with the same sound as *sediment, sand, silt* and *squeeze.*

*Sedimentary rock* forms when sediment made of sand and silt gets squeezed and becomes cemented together.

**metamorphic rock** [met•uh•MAWR•fik RAHK] rock that forms when Earth processes change the texture and the mineral content of rock

*Metamorphic* tells how rock forms.

*Metamorphic* and *metamorphosis* sound alike.

A frog goes through metamorphosis, a big change. *Metamorphic rocks* also goes through changes.

This diagram shows the rock cycle—how rocks change from one type to another.
How Can Rocks Be Classified?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Rocks are classified by how they form.
2. Igneous rock can form inside Earth as magma cools slowly; it can also form on Earth’s surface.
3. Igneous rock from magma has large mineral crystals; rock from lava has small crystals.
4. Sedimentary rock may contain fossils, the remains or trace of a living thing, such as a bone.
5. Sedimentary rock forms from the sediment of eroded or weathered rock collected in layers.
6. High temperature, high pressure, or super-hot fluids can cause metamorphic rock to form.
7. Marble is metamorphic rock that forms from heat and pressure on limestone.
8. Most metamorphic rock forms deep in Earth or when pieces of crust push to form mountains.
9. Any type of rock can become any other type of rock in a process known as the rock cycle.
10. Building materials, such as cement, are made from rocks; even toothpaste has minerals taken from rock.
What Are Fossils?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

fossil [FAHS•uhl] preserved remains or traces of a living thing

The vowel sound in rock is the same as the sound in the first part of fossil. Most fossils are found in rock.

mold [MOHLD] the hollow space left by a leaf pressed into soft mud

Mold and mud begin with the same sound. A mold is made when an organism or part of an organism is pressed into mud.

cast [CAST] what forms when a mold is filled with mud that hardens

Cast and cover begin with the same sound. A cast may form when mud covers a mold.

fossil fuel [FAHS•uhl FYOO•uhl] an energy-rich resource formed from the buried remains of once-living organisms

Fossil fuels are the cogs that keep our world moving. Coal, oil, and gas are fossil fuels.

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Most fossils are made from the hard parts of an organism, such as teeth, bones, and shells.
2. Most fossils are found in sedimentary rock.
3. A fossil may form when an animal is preserved in sediment at the bottom of a body of water.
4. A fossil, such as petrified wood, may form when minerals replace plant material.
5. The heat and pressure of sediment may turn dead plants into coal; coal is a fossil fuel.
6. Coal continues to form in peat bogs around the world.
7. Scientists who study fossils are paleontologists.
8. Fossils show that some types of plants and animals have changed a lot; others have not.
9. The first fish had no jaws, but fish today do have jaws.
10. A “living fossil,” like the ginkgo tree, is an organism that has not changed much over time.
What Was Ancient Earth Like?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

index fossil [IN•deks FAHS•uhl] a fossil that helps to identify a very short period of Earth’s history

An index in a book helps readers identify and find information in the book. An index fossil helps scientists identify a period in Earth’s history.

mass extinction [MAS ek•STINGK•shuhn] a time in Earth’s history in which many species became extinct at the same time

The meaning of mass extinction comes from the meaning of the two words. A mass of something is a huge amount of it. Extinction means dying out. A mass extinction is the dying out of a huge number of species.

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. The relative age of a layer of rocks is the age of the layer compared to other layers.
2. Scientists use fossils in rocks to help figure out the relative age of rock layers.
3. The fossil record shows how Earth and life on Earth has changed over time.
4. Index fossils must meet these criteria: 1) The organisms lived during a short period of Earth’s history; 2) The organisms had large populations; 3) The fossils are widespread; 4) The fossils are easily recognized.
5. Long ago, all of Earth’s land was part of one continent scientists call Pangea.
6. Fossils of the same kind and age that are found in different places support the idea that the continents were once joined.
7. The fossil record in an area tells about the environmental changes in the area.
8. Fossils in the La Brea Tar Pits suggest that the climate has not change much in 40,000 years.
9. Clam fossils in the Falls of Ohio suggest it was once a tropical sea.
10. Volcanic eruptions and objects from space can cause mass extinctions.
What Are the Oceans Like?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**salinity** [suh•LIN•uh•tee] the saltiness of water

*Salinity* and *salt* begin with the same sounds. Salt creates *salinity* in water.

**water pressure** [WAW•ter  PRESH•uhr] the force of water pressing against whatever it surrounds

*Pressure* contains the word press. *Water pressure* describes how hard water is pressing against something.

**continental shelf** [kahnt•uhn•ENT•uhl SHELF] the underwater border of each continent

*Continental* and *continent* are in the same word family. Something *continental* has to do with a continent.

*Shelf* and *sill* begin with different sounds but the same letter. A *shelf* is like the sill of a window. A *continental shelf* is like a sill at the edge of a continent.

**continental slope** [kahnt•uhn•ENT•uhl SLOHP] the steep area where the ocean rapidly gets deeper

*Slope*, *steep*, and *slant* begin with the same sound. A *slope* is steep and slanted. A *continental slope* is a steep, slanted drop-off of land at the edge of the continental shelf.

**abyssal plain** [uh•BIS•uhl PLAYN] a vast, flat area on the deep ocean floor

Think of the *b* sound in *abyssal* and *bottom*. The *abyssal plain* is at the bottom of the ocean.
What Are the Oceans Like?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. The world’s oceans (Atlantic, Pacific, Indian, Southern, Arctic) are one giant body of water.
2. The oceans contain 97% of the world’s water, which is not drinkable.
3. Salinity makes water denser than fresh water; as a result, boats can float more easily.
4. Divers need help in dealing with the cold, the dark, and the high water pressure of the deep sea.
5. Deep sea explorers travel in an underwater vehicle called a submersible.
6. Abyssal plains cover more than 50% of Earth’s surface.
7. Oceanic trenches form where two plates meet; magma comes out, building volcanic mountains.
8. Volcanic mountains can grow to become volcanic islands; over time they erode and disappear.
9. Coral reefs in tropical areas may grow around volcanic islands, which disappear over time.
10. The ring-shaped coral island left after a volcanic island sinks is called an atoll.
How Does Ocean Water Move?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

wave [WAYV] the up-and-down movement of surface water

When people wave good-bye, they might raise their arm and move their hand up and down. A water wave is water moving up and down.

current [KUR•uhnt] a steady flow of water in a regular pattern in the ocean

Current electricity is electricity flowing through a wire. An ocean current is water flowing through the ocean.

tide [TYD] the rise and fall in the water level of the ocean

Tide and rise have the same vowel sound. The tide rises and falls each day.

shore [SHAWR] land at the edge of the ocean

Shore and sandy begin with different sounds but the same letter. In many places the shore is sandy.

jetty [JET•ee] a structure often made of piles of rock that the current cannot move

Jetty and steady rhyme. A jetty stays steady in the current; it doesn’t move.
How Does Ocean Water Move?

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. A wave carries energy forward, not water.
2. The surface of the water collects energy from wind pushing on it, which causes waves.
3. Currents flow like rivers in the ocean; they move a huge amount of water long distances.
4. The Gulf Stream is a warm-water current flowing up the east coast of North America.
5. Tides are caused by the “pull” of the sun and moon on Earth’s oceans.
6. The moon’s gravity causes bulges to form in Earth’s oceans; the bulges are high tide.
7. Highest and lowest tides are when the sun and moon are in a straight line with Earth.
8. El Niño, produced by warm waters in the South Pacific, can cause extreme weather such as droughts and floods.
9. A storm can erode the sand on a beach quickly.
10. People build jetties to preserve beaches and keep sand from making waterways too shallow for boats.
What Are Some Ocean Ecosystems?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**intertidal zone** [in•ter•TYD•uhl ZOHN] the area between high- and low-tide lines

*Intertidal* and *international* begin the same way. Something international takes place between two or more nations. Something *intertidal* is the space between the two tides—high and low.

**coral reef** [KAWR•uhl REEF] the branch-like structures built by colonies of coral polyps

*Reef* and *ridge* begin with the same sound. A *reef* is a ridge under water. A *coral reef* is a ridge made of coral.

**plankton** [PLANK•tuhn] drifting organisms that inhabit the wide open ocean

*Plankton* and *petite* begin with the same sound. *Plankton* are petite ocean organisms.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. At high tide, an intertidal zone is completely underwater; at low tide it is open to the air.
2. Crabs and other animals live in tide pools formed by rocky bowls that hold water in low tide.
3. The near-shore zone includes coral reefs and fish, jellyfish, and seaweed.
4. Coral reefs are home to 25% of all the ocean’s species; if a reef dies, the ecosystem is affected.
5. Animals at the surface of the open-ocean zone are similar to those near shore.
6. Deep underwater, temperature and light drop; water pressure increases; there is little oxygen.
7. Shrimp, crabs, and other organisms live around hydrothermal vents, volcanic spots on the ocean floor.
8. Bacteria around hydrothermal vents eat chemicals in the water and start the food chain.
9. Most plankton are microscopic—so small that you cannot see them with your eyes alone.
10. Plankton include plantlike and animal-like organisms as well as bacteria.
What Objects Are Part of the Solar System?

Science Words

Say each word quietly to yourself. Then read the meaning.

Read the tip to help you remember.

solar system [SOH•ler SIS•tuhm] a group of objects in space made up of a star and the planets and other space objects that revolve around it

A system is a group of things that act together as a whole. Solar has to do with the sun, our star. You can put these ideas together: A solar system is the sun and a group of objects that act together as a whole.

planet [PLAN•it] a large, round body that revolves around a star

You can make a “mind model” of a planet: Imagine you are holding a string with a ball on the end of it. Use your arm to trace a large circle over your head. As you move your arm faster, the ball flies out and the string is pulled tight. In this model, the ball is a planet and your hand holding the string is a star.

dwarf planets [DWAWRF PLAN•its] nearly round bodies whose orbits cross the orbits of other bodies

Dwarf means small. Very little is known about dwarf planets because they are small, very far away, and hard to study.

Pluto is a dwarf planet. Notice that Pluto’s orbit crosses the orbits of the major planets.
What Objects Are Part of the Solar System?

**comet** [KAHM•it] a chunk of frozen gases, rock, ice, and dust

If you can imagine a snowball made of ice, dirt and rock, you can imagine a comet.

**asteroids** [AS•tuh•ROYDZ] rock and iron objects that orbit the sun

Asteroids ends with the sound at the beginning of salt. Asteroids are like the salt and pepper of the solar system—they are sprinkled generously over a wide area.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. In our solar system, Earth, the other plants, and other objects revolve around the sun, our star.
2. Our solar system has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
3. The inner planets—Mercury, Venus, Earth, Mars—are closest to the sun, dense, and rocky.
4. The outer planets—Jupiter, Saturn, Uranus, Neptune—are made of gases and much colder.
5. Earth has only one moon that revolves around it; the outer planets have many moons.
6. Dwarf planets, asteroids, meteoroids, and comets also orbit the sun.
7. Dwarf planets are bodies whose orbit crosses the orbit of other bodies, such as planets.
8. Asteroids, objects made of rock and iron, may be as small as a city block or a large as an ocean.
9. A comet is a chunk of frozen gas, dust, ice, and rock.
10. Meteoroids are pieces of asteroids that break off; meteorites are meteoroids that reach Earth.
What Are Stars and Galaxies?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.
astronomy [uh•STRAHN•uh•mee] the study of objects in space and their characteristics
   Astronomy and astronaut begin the same way. An astronaut is someone who travels in space.
   An astronaut may do astronomy while in space.
stars [STARZ] huge balls of hot, glowing gas that produce their own heat and light
   Some actors are stars because they shine or stand out from the others. Stars in space shine in
   the night sky because they give off their light.
universe [YOO•nuh•vers] everything that exists
   Universe, unite and unit begin the same way. When things or people unite, they come together
   to as a single unit. The universe is a way to talk about all things as a single unit.
galaxy [GAL•uks•see] a group of billions of stars, the objects that orbit the stars, gas, and dust
   Galaxy, group, gas, and gravity begin with the same sound. A galaxy is a huge group of stars
   and gas held together by gravity.

Science Concepts
Read the Ideas more than once. Do your best to remember them.
1. Astronomy is the study of space and everything in it.
2. Stars form when energy stored in particles squeezed together is given off as light and heat.
3. Stars are grouped by color, temperature, brightness, and size.
4. Blue stars are the hottest; the sun is a medium-sized, yellow star.
5. A galaxy is made up of billions of stars, objects, gas, and dust held together by gravity.
6. Our solar system is in the Milky Way Galaxy.
7. The universe is made up of everything that exists.
8. Astronomer Edwin Hubble was the first scientist to study galaxies, in the 1920s.
9. Most galaxies in the universe are elliptical, egg-shaped; the Milky Way has a spiral shape.
10. When gravity pulls galaxies toward each other, they may crash, or collide.
What Are Solids, Liquids, and Gases?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**matter** [MAT•er] anything that has mass and volume

*Matter and mass* begin with the same sounds. If something has mass, it is *matter.*

**temperature** [TEM•per•uh•cher] a measure of the energy of motion of the particles in matter

*Temperature* and *degrees* have three e’s. You use a thermometer to measure *temperature* in degrees.

**liquid** [LIK•wid] a substance that has definite volume but does not have a definite shape

*Liquid* and *lack* begin with the same sound. A *liquid* lacks a definite shape. It takes the shape of its container.

**solid** [SAHL•id] a substance with a definite shape and volume

*Solid* and *set* begin with the same sound. Something definite is set or fixed. A *solid* has a set size and shape.

**gas** [GAS] a substance that does not have a definite shape or volume

*Gas* and *fits* end with the same sound. A *gas* fits into the size and shape of the space it has. An amount of *gas* will spread out to fill a big container and contract to fit into a small container.

**volume** [VAHL•yoom] the amount of space something takes up

When someone asks you to turn up the *volume* on a TV, the person wants more, or louder, sound. In the science of matter, something with more *volume* takes up more space. *Volume* ends with the sound at the beginning of *milliliter.* You measure the *volume* of a liquid in milliliters.
What Are Solids, Liquids, and Gases?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Matter cannot be created or destroyed, but it can change form from solid to liquid to gas.
2. You can observe physical properties of matter without changing the matter into something new.
3. Temperature—a measure of how fast particles in matter are moving—is a physical property.
4. Density—how much matter is in a specific volume—is a physical property.
5. To find the density of an object, divide the mass of the object by its volume.
6. Matter is made of tiny particles; the particles have energy and are always moving.
7. Particles in a solid vibrate close together, so the solid keeps its shape.
8. Particles in a gas have a lot of energy and are far apart, so a gas spreads out.
9. When water gives off energy, it cools and may change from a liquid to a solid, ice.
10. When water takes in energy, it heats up and may change from a liquid to a gas, water vapor.
How Does Matter Change?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**physical change** [FIZ•ih•huhl CHAYNJ] a change in matter that does not affect the type of matter

Matter has physical properties, such as color, size, shape, and mass. A *physical change* is a change in a physical property.

Soaking, shredding, and crumpling paper are *physical changes* because they change the physical properties of the paper. They do not change the paper into something new.

**chemical change** [KEN•ih•kuhl CHAYNJ] a change in matter that results in a change in the identity of the matter

*Chemical* and *create* begin with the same sound. A *chemical change* creates matter with different properties. A cooked apple has different properties from a raw apple, so the apple has undergone a chemical change.

**reaction** [ree•AK•shuhn] the process in which new substances are formed during a chemical change

*Reaction* contains the word *react.* When someone says something funny, you might react by smiling. The *reaction* in you produces a smile. The smile is a change. In science, a *reaction* also produces a change.

**conservation of mass** [kahn•ser•VAY•shuhn uhv MAS] the idea that matter may change in its appearance or identity, but the total mass of the matter before and after the change remains the same

*Conservation* and *constant* begin in the same way. *Conservation of mass* is the idea that mass stays constant.
How Does Matter Change?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Physical changes don’t affect the properties of the matter being changed; chemical changes do.
2. You can observe the physical properties of matter without changing the type of matter.
3. You cannot observe the chemical properties of matter without changing the matter.
4. A chemical change, such as rotting, results in a change in the identity of the matter.
5. Except for water, matter expands when it heats up and contracts when it cools down.
6. Water expands when it cools and becomes less dense, which is why ice floats in water.
7. The rate of change is how quickly a change in matter takes place.
8. Warmer air causes ice to melt faster—have a faster rate of change—than cooler air.
9. The amount of mass in matter stays the same during physical and chemical changes.
10. The mass of wood and air equals the mass of the smoke, ashes, and gases produced when the wood burns.
What Are Mixtures and Solutions?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

mixture [MIKS•cher] a combination of two or more substances that keep their identities

Mixture contains the word mix. To mix things is to combine them. To make a mixture, you mix things together.

solution [suh•LOO•shuhn] a mixture that has the same composition throughout

Solution, specific, and same begin with the same sound. A solution is a specific kind of mixture—it is the same throughout.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Everything that is part of a mixture keeps its own identity.
2. The matter in a mixture may not be spread evenly throughout the mixture.
3. A solution is a mixture in which the matter is spread evenly throughout.
4. A solution forms when one kind of matter dissolves in another kind of matter.
5. Air is a solution of different gases; the ocean is a solution of salt and water.
6. Some solids, such as salt, dissolve in liquids, but others, such as sand, do not.
7. Physical properties, such as size and color, can be used to separate the matter in mixtures.
8. A magnet can be used to separate a mixture that contains objects made with iron.
9. Water can be used to separate a mixture with some objects that float and some that do not.
10. An alloy is a mixture of metals; steel is an alloy made from iron and other metals such as nickel.
What Is the Atomic Theory?

Science Words

Say each word quietly to yourself. Then read the meaning. Read the tip to help you remember.

atom [AT•uhm] the smallest unit of an element that maintains the properties of that element

Atom ends with the sound at the beginning of minute. An atom is minute—very, very tiny.

atomic theory [uh•TAHM•ik THEER•ee] a scientific explanation of the structure of atoms and how they interact with other atoms

Theory and thought begin with the same sound. Atomic theory is scientists’ thoughts on what atoms are made of and how atoms behave.

element [EL•uh•muhnt] substances that can’t be broken into simpler substances

In the word element, all the vowels are the same. In a real element, all the atoms are the same.

molecule [MAHL•uh•kyool] two or more atoms joined together chemically

Molecule has two e’s and two l’s. Let these two’s remind you that a molecule is two or more atoms.

compound [KAHM•pownd] a substance made of atoms of at least two different elements

A compound word is made of two or more words that are put together. In science, a compound is made of two of more kinds of atoms.
What Is the Atomic Theory?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Atoms, the building blocks of all matter, are made of protons, neutrons, and electrons.
2. An atom has a nucleus that contains protons, which are positively charged particles, and neutrons, which are particles with no charge.
3. The nucleus is surrounded by negatively charged particles called electrons.
4. All atoms of an element have the same number of protons; no other element has that number.
5. The electrons of an atom can be gained or lost, but the protons stay the same.
6. Different atoms of the same element can contain different numbers of neutrons.
7. The properties of a compound may be different from the properties of the elements that form it.
8. There are more than 100 elements.
9. Water is a compound of two hydrogen atoms and one oxygen atom.
10. Salt is a combination of nine sodium atoms and nine chlorine atoms.
What Is Sound?

Science Words

Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

wave [WAYV] a disturbance that transmits energy

A wave of your hand disturbs the surrounding air. A water wave disturbs the surface of the water. Sound waves disturb the “quiet.”

volume [VAHL•yoom] the loudness of a sound

If you press V+ on a television remote control, the sound gets louder. If you press V–, the sound gets softer. The V stands for volume; V+ is more volume or louder; V– is less volume.

pitch [PICH] the highness or lowness of a sound

In baseball, as a pitch travels toward home plate it moves higher and then lower. The pitch of a sound describes how high or low it is.

frequency [FREE•kwuhn•see] the number of vibrations that occur during a unit of time

Frequently and frequency are in the same word family. If something happens frequently, it happens many times. Frequency is also about the number of times something happens.

wavelength [WAYV•length] the distance from one crest of a wave to the next

Wavelength is made up of two smaller words—wave and length. To measure the length of something you find the distance from one end to the other end. The length of a wave is the distance from one crest, or peak, to the next.

The vowel sound in crest is the same as the vowel sound in the second syllable of wavelength. Wavelengths are measured from crest to crest.
What Is Sound?

**amplitude** [AM-pluh-tood] the amount of energy in a wave

*Amplitude and amount* begin with the same sounds. *Amplitude* is the amount of energy in a wave.

**Science Concepts**

*Read the Ideas more than once. Do your best to remember them.*

1. Sound is a series of vibrations traveling in waves; vibrations are back-and-forth movements.
2. Sound vibrations travel in compression waves.
3. As the wave moves, molecules of air are compressed, or pushed together and then spread apart.
4. The bunching and spreading of molecules is repeated over and over again as the energy moves.
5. A sound with a high pitch has a high frequency; a low-pitched sound has a lower frequency.
6. The volume of sound is measured in decibels (dB); a refrigerator’s humming is about 40dB.
7. A diagram of a wave consists of a line that curves up and down; the high point is the crest and the low point is the trough.
8. The taller the wave, the larger the amplitude and the more energy the wave carries.
9. Sound travels only if there are particles to vibrate; air, liquids, and solids are made of particles.
10. Since the moon has no atmosphere—no particles to vibrate—no sounds are produced.
What Is Light?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

light [LYT] a form of energy that moves in waves and can travel through space

Light and sound are both forms of energy that travel in waves. But light can travel through space from the sun and stars to Earth; sound cannot.

electromagnetic spectrum [ee•kej•troph•mag•NET•ik SPEK•truhm] a range of light waves organized by frequency and wavelength

Spectrum and spectacles begin the same way. Spectacles, or eyeglasses, help a person see. The electromagnetic spectrum includes all light, including light we can see and light we cannot see.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. Light can travel through a vacuum because it does not need matter to transfer its energy.
2. Light moves in a straight line in all directions from its source; shadows form when objects block light.
3. Light does not need matter to carry its energy, which is why sunlight can reach Earth.
4. Light travels faster than anything else in the universe.
5. Humans are not able to see most wavelengths of light, only those near the middle of the electromagnetic spectrum.
6. Infrared waves and microwaves have long wavelengths; X-rays and UV sunlight have short wavelengths.
7. Visible light looks white, but is actually made up of many colors, from red to violet.
8. A laser is a beam of light focused in only one direction.
9. A laser beam contains only one wavelength of light.
10. Never look into the source of a laser’s light; doing so can damage your eyes.
What Are Some Properties of Light?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

**opaque** [oh•PAYK] materials that do not let light pass through them

*Opaque* begins with the sound at the end of *shadow*. *Opaque* materials cast shadows because they block light.

**transparent** [tranz•PAIR•uhnt] materials that let light pass through them

*Transparent* and *travel* begin the same way. Light travels through *transparent* materials.

**translucent** [tranz•LOO•suhnt] materials that transmit some light and absorb some light

Notice that some letters in *translucent* are one side of the *l*, and some are on the other side. In a similar way, *translucent* materials let some light pass through and block some light.

**reflection** [rih•FLEK•shuhn] the bouncing of light off an object

*Reflection* begins with the sound at the end of *mirror*. When you look in a mirror, you see your *reflection*.

The arrows show how light reflects off a smooth surface, such as a mirror.

The arrows show how light reflects off a rough surface, such as a wall.

**refraction** [rih•FRAK•shuhn] the bending of light as it passes at an angle from one type of matter into another

The middle syllable in *refraction* is *frac*. A fracture is a broken or cracked bone. It is not straight until it heals. *Refraction* is light with a path that is not straight.

Refraction makes the spoon appear broken.
What Are Some Properties of Light?

**prism** [PRIZ•uhm] a transparent material that separates white light into its component colors by refraction

If you turn the last letter in *prism* upside down, you have a *w* for white light. A *prism* reveals all the colors in white light.

This diagram shows light entering and leaving a prism.

Science Concepts

**Read the Ideas more than once. Do your best to remember them.**

1. Light behaves in different ways depending on the type of matter it meets.
2. When a material absorbs light, energy from the light passes to the material.
3. Opaque objects cause shadows because they absorb or reflect all the light that hits them.
4. Air and clear glass are transparent objects; ice and frosted glass are translucent.
5. When light strikes a smooth shiny surface, like a mirror, it is reflected in a single new direction.
6. Cloth and wood are rough, so light is reflected in many directions and you don’t see an image.
7. An object appears yellow because its material reflects yellow light, but absorbs all other colors.
8. The speed of light changes depending on the material it is passing through; the change causes bending, or refraction.
9. When white light enters a prism, the different colors of light bend at different angles to form a rainbow.
10. Telescopes and eyeglasses have lenses—curved, transparent objects that reflect light.
What Are Forces?

Science Words

Say each word quietly to yourself. Then read the meaning. Read the tip to help you remember.

**force** [FAWRS] a push or a pull

You can use a *force* to make something happen. For example, a *force* can force a door to open or stop a ball from moving.

**friction** [FRIK•shuhn] a force that opposes motion

*Force* and *friction* begin with the same sound, but they work in opposite ways. A *force* can cause something to move. *Friction* can cause something to slow or stop moving.

**gravity** [GRAV•ih•tee] a force of attraction between two objects

*Gravity* ends with the letter at the beginning of *you*. You and everything else have *gravity*. The effect of Earth’s *gravity* is to pull you down, toward Earth.

**balanced forces** [BAL•uhnst FAWRS•uhz] forces on an object that are equal in size and opposition in direction

Imagine that you and a friend are playing tug-of-war. You are pulling a rope in one direction. Your friend is pulling the rope in the opposite direction. If both of you are pulling equally hard, the forces are balanced. *Balanced forces* means no movement…… and no winner!

**unbalanced forces** [uhn•BAL•uhnst FAWRS•uhz] forces that cause a change in motion

Imagine that you and your friend are still playing tug-of-war. But now your friend is tired and doesn’t pull quite so hard. When that happens, the forces become unbalanced. *Unbalanced forces* cause movement. Your friend moves toward you, and you are the winner!
What Are Forces?

Science Concepts

Read the Ideas more than once. Do your best to remember them.

1. Forces can cause an object to start moving, slow down, stop moving, or change direction.
2. A spring scale is the tool used to measure forces in newtons.
3. Gravity pulls objects toward each other; objects with greater mass have a greater pull.
4. Friction acts against motion in objects that are touching each other.
5. Balanced forces are forces on an object that are equal in size and opposite in direction.
6. Forces are unbalanced when one force is greater than another.
7. Unbalanced forces cause a change in motion.
8. When one cue ball hits another, the force transfers and causes the second cue ball to move.
9. The more force applied to an object, the faster its acceleration is.
10. The less mass an object has, the less force is needed to change its motion.
What Are Newton’s Laws?

Science Words
Say each word quietly to yourself. Then read the meaning.
Read the tip to help you remember.

inertia [in•ER•shuh] the tendency of objects to resist a change in motion

Inertia and continue both have three syllables. Objects have inertia, which means they continue until something changes.

Science Concepts
Read the Ideas more than once. Do your best to remember them.

1. In the 1600s, Isaac Newton investigated how objects move in the physical world.
2. Newton’s first law is, objects at rest don’t move unless an unbalanced force acts on them.
3. Objects in motion don’t slow down, speed up, stop, or turn unless a force makes them do it.
4. Newton’s second law is about the effects of mass and force on motion.
5. The law is, an object’s acceleration depends on the amount of force applied to the mass of the object.
6. More force is needed to move an object with a greater mass.
7. Newton’s third law describes the way different forces relate to each other.
8. The law is, when one object applies a force to a second object, the second object applies an equal and opposite force to the first object.
10. For example, to launch a rocket, as gases push downward the rocket is pushed upward with an equal force.