



ANSWER KEY

FOUR SEASONS AND DAY LENGTH (K-2)

1. Summer
2. Seasons
3. Winter
4. Fall
5. Spring
6. Pattern
7. (d) Summer
8. (c) Winter
9. (a) Winter
10. (c) Summer
11. True

PATTERNS IN THE SKY (K-2)

1. Moon
2. Pattern
3. Stars
4. Sun
5. Circle
6. Noon
7. Morning
8. Night
9. Evening
10. The sun moving across the sky.

INTRODUCTION TO SOUND (K-2)

1. Sound Wave
2. Vibrate
3. Hear
4. Vocal Cords
5. Instrument.
6. You can put your hand on it to feel vibrations (other answers accepted).
7. (c) Vibrate
8. (b) Loud
9. (a) Vibrations
10. True

WHAT IS ENGINEERING? (K-2)

1. Solution
2. Imagination
3. Sketch
4. Test
5. Improve
6. Problems
7. Electrical Engineer
8. Aerospace Engineer
9. Chemical Engineer
10. You can build a bridge.

THE FIVE SENSES (K-2)

1. Seeing
2. Hearing
3. Tasting
4. Smelling
5. Touching
6. (b) The ability to find out information about the environment.
7. (c) 5
8. (a) Taste
9. (d) Sight
10. (d) All of these.

INTRODUCTION TO WEATHER (K-2)

1. Snowy
2. Cloudy
3. Windy
4. Rainy
5. Sunny
6. Stormy
7. (b) Patterns
8. (b) Water
9. (a) Rain gauge
10. (b) Tiny water drops

OCEANS, LAKES AND RIVERS (K-2)

1. Ocean
2. River
3. Glacier
4. Well
5. Lake
6. (c) Salt water
7. (b) Solid
8. (a) Freshwater
9. (b) Lake
10. True

SIMPLE MACHINES (K-2)

1. Lever
2. Screw
3. Pulley
4. Wheel and Axle
5. Inclined Plane
6. Wedge
7. (d) Direction
8. (b) Amount
9. (d) No
10. False

HEATING AND COOLING (K-2)

1. Heating
2. Cooling
3. Heating
4. Cooling
5. Heating
6. Cooling
7. (b) Reversible
8. (b) Heating
9. The change can be undone.

LIVING VS. NON-LIVING THINGS (K-2)

1. Living
2. Living
3. Non-Living
4. Non-Living
5. Non-Living
6. Living
7. (b) Frog
8. (d) Phone
9. (a) Tree
10. (c) Feet to move

INSPIRED BY NATURE (BIOMIMICRY) (K-2)

1. (c)
2. (a)
3. (b)
4. Structure
5. Inspired
6. Function
7. Biomimicry
8. Problem
9. Solution
10. True

INTRODUCTION TO LIGHT (K-2)

1. Translucent
2. Opaque
3. Transparent
4. Transparent
5. Opaque
6. Translucent
7. (c) Sun
8. (d) Radio
9. (d) Opaque
10. (b) Transparent

POLLINATION AND SEED DISPERSAL (K-2)

1. Pollen
2. Dispersal
3. Pollinator
4. Some animals carry seeds stuck to their fur.
5. Animals eat fruit which has seeds inside and then they poop out the seeds somewhere else.
6. Water
7. Wind
8. (c) Nectar
9. (b) They have hooks similar to Velcro.
10. (b) They Float

MATERIAL PROPERTIES AND PURPOSES (K-2)

1. Absorbency
2. Strength
3. Stretchiness
4. Strength
5. Strength
6. Absorbency
7. (b) It's stronger
8. (c) A paper towel
9. (b) It's not strong
10. Test both materials to see which one makes an object go farther.

GRAVITY PULLS THINGS DOWN (K-2)

- 1-6. Circle all objects.
7. (c) Fall
8. (d) Think
9. (b) Force
10. (c) Down

PUSHES AND PULLS (K-2)

1. Push
2. Pull
3. Pull
4. Push
5. Push
6. Pull
7. (c) A force makes things move.
8. False
9. (a) You can push or pull a shopping cart.
10. True

PLANT GROWTH CONDITIONS (K-2)

1. (d) Sunlight
2. Sand
3. Clay
4. Loam
5. (b) Plant B
6. Plants need both sunlight and water.
7. (b) Light/Warm
8. False
9. (a) Dry up and die
10. False

INTRODUCTION TO TRAITS (K-2)

1. Fur Color
2. Ear Size
3. Body Size
4. Spotted Fur
5. Eye Color
6. Tail Length
7. (c) Trait
8. (b) Offspring
9. (a) Kind
10. True

SOLIDS, LIQUIDS AND GASES (K-2)

1. Gas
2. Liquid
3. Solid
4. Liquid
5. Gas
6. Solid
7. (c) It takes up space and has weight.
8. (b) Takes the shape of its container and has weight.
9. (d) All of the Above
10. Solid, Liquid and Gas

ANIMALS HELP THEIR BABIES SURVIVE (K-2)

1. Parent
2. Baby
3. Communicate
4. Feeding
5. Marsupial
6. Protect
7. (a) Offspring
8. (c) Survive
9. (a) Food
10. Animals feed their babies. Some animals also carry and protect their babies. They might also teach them things like help them hunt for food.

PLANTS NEED WATER AND LIGHT (K-2)

1. Water
2. Seeds
3. Soil
4. Plant
5. Sun
6. Grow
7. Circle water and sunlight
8. (b) Seeds
9. False
10. Water it and give it sunlight.

SUNLIGHT WARMS THE EARTH (K-2)

1. Melt
2. Shade
3. Thermometer
4. Sunlight
5. Temperature
6. You can move to a shady area, so that the sunlight can't heat up the popsicle.
7. (b) Warms
8. (c) Melt it
9. (b) thermometer
10. True

COMMUNICATION OVER DISTANCES (K-2)

1. Circle
2. Underline
3. Circle
4. Underline
5. Circle
6. Animals might warn other animals about danger nearby. Crickets might chirp to let other crickets know where they are. Birds often sing to tell other birds where they are.
7. (a) Sound
8. (c) Light and sound
9. (b) Stop
10. Answers can vary: talking, beeping a horn and ringing a bell are examples of using sound to communicate. Some of the ways we use light to communicate include traffic lights and the flashing lights of a police car or fire truck.

HABITATS (K-2)

1. Arctic
2. Jungle
3. Desert
4. Ocean
5. Pond
6. Backyard
7. (b) Habitat
8. (c) Adaptations
9. (b) Water
10. True
11. No. It will not survive in the arctic, it is too cold.

PARTS OF A PLANT (K-2)

1. Flower
2. Roots
3. Seeds
4. Fruit
5. Leaves
6. Stem
7. (d) Roots
8. (a) Tomato
9. (b) Celery
10. (c) Potato

CLASSIFICATION OF MATERIALS (K-2)

1. (a) Smooth
2. (b) Soft
3. (c) Rough
4. (b) Hard
5. (c) Classify
6. (a) Red
7. (c) Classify
8. (a) Property
9. (b) How firm something is
10. (c) How smooth or rough something is

NATURAL RESOURCES (K-2)

1. Wood
2. Water
3. Metal
4. Rubber
5. Recycle
6. Fossil fuel
7. (a) True
8. (d) Air and water
9. (b) Conservation
10. (d) All of the above

CHANGING THE SHAPE OF LAND (K-2)

1. Water erosion
2. Water erosion
3. Wind erosion
4. Water erosion
5. Wind erosion
6. Slowly
7. (a) Grass
8. (a) Stone Wall
9. Erosion
10. False

WHAT IS SCIENCE? (K-2)

1. Senses
2. Evidence
3. Experiment
4. Hear
5. Touch
6. Observe
7. (d) Science
8. (c) Hearing
9. (b) Fair test
10. False

REDUCING OUR IMPACT ON EARTH (K-2)

1. Paper
2. Aluminum
3. Paper
4. Plastic & Glass
5. Circle the green triangle made from three arrows.
6. True
7. (a) reuse
8. (b) pollution
9. True
10. (d) It goes to the landfill.

EXTERNAL ANIMAL PARTS (K-2)

1. Claws
2. Beak
3. Opposable Thumb
4. Tail
5. Legs
6. Animal Covering
7. (b) External
8. (d) Survive
9. (a) Opposable thumbs
10. Many answers accepted. For example, legs, thumbs and ears.

LIVING THINGS CHANGE THEIR ENVIRONMENT (K-2)

1. Nest
2. Burrow
3. Dam
4. Pollution
5. Poop
6. Recycle
7. (b) Environment
8. (c) Help
9. (d) Harm
10. True

TIMESCALE OF EARTH'S EVENTS (K-2)

1. Volcano
2. Shake Table
3. Flash Flood
4. Glacier
5. Landslide
6. Earthquake
7. (b) Slow
8. (a) Fast
9. (a) Erosion
10. True

ANIMALS NEED FOOD (K-2)

1. Meat
2. Plants
3. Grow
4. Senses
5. Bugs
6. Eat
7. (d) Water
8. (b) Senses
9. (d) Meat
10. Many answers accepted such as pizza, pasta, salads, chicken and ice cream.

BIODIVERSITY OF LIFE ON EARTH (K-2)

1. Rainforest
2. Desert
3. Pond
4. Biodiversity
5. Canopy
6. Scavenger
7. (b) Biodiversity
8. (a) Habitat
9. (b) Survey
10. Many answers accepted such as snakes, lizards, foxes, rabbits, birds and bears.

MAPS OF LANDFORMS (K-2)

1. Mountain
2. River
3. Lake
4. Ocean
5. Island
6. Coast
7. Boundaries
8. (a) Map legend
9. (a) Landforms
10. True

FOOD WEBS (3-5)

1. The sun
2. True
3. (a) lettuce
4. A consumer
5. Sun, cow, human
6. Drawing: Sun should be on the left, then a plant, then 2 animals.
7. A food web is a model of intersecting food chains. It shows how animals and plants in an ecosystem are connected to each other.
8. False
9. Apex predators keep prey populations under control and keep the ecosystem in balance.
10. They break down dead and decaying organisms.

ECOSYSTEMS (3-5)

1. An ecosystem
2. False (both living and non-living things interact in an ecosystem)
3. (d) all of these.
4. Rain forests produce 40 percent of Earth's oxygen
5. Invasive species
6. Balance (lots of different living things)
7. False, plants provide food, shelter and oxygen in an ecosystem
8. (d) desert
9. Answers vary – e.g. fish might use rocks as hiding places
10. An ecosystem can be small (a puddle or your backyard) or very large (like the ocean)

MOON & ITS PHASES (3-5)

1. The orbit of the moon around the Earth
2. False, the moon is 400x smaller than the sun
3. The moon is lit by reflected light from the sun
4. A system is a set of things that are connected
5. (a) moon
6. Sun, Earth, Moon
- 7.



8. (a) ancient volcanoes
9. Earth, moon and sun
10. The direction and strength of an asteroid impact

SUN AND OTHER STARS (3-5)

1. True
2. A star is an exploding ball of burning gas held together by gravity
3. Our sun is MUCH closer to Earth than any other star
4. Light year
5. Light and heat
6. Sirius is much closer to the earth.
7. (c) it's the right distance from Earth to support life
8. Light
9. Navigation
10. Since Earth takes a year to orbit the sun, the part of the sky visible from Earth changes.

ANIMAL & PLANT LIFE CYCLES (3-5)

1. A life cycle shows how living things grow and change over time
2. Most plants start as seeds
3. Live birth or hatch from an egg
4. True
5. (d) frog
6. (d) adult
7. From an egg.
8. Water
9. Egg, tadpole, tadpole with legs, frog
10. A butterfly hatches from an egg into a small caterpillar. The caterpillar builds a pupa to encase itself as it changes into an adult butterfly that can lay more eggs.

EARTH'S ORBIT & ROTATION (3-5)

1. 24 hours
2. Earth takes 365.25 days to orbit the sun yet our calendar has 365.0 days.
3. False, Earth's rotation on its axis causes night and day.
4. The rotation of the Earth.
5. False, constellations visible from Earth change throughout the year due to Earth's orbit
6. Answers include: apparent motion of sun and stars across the sky, changing length of shadows, Foucault pendulum, visible rotation of Earth from space
7. A Foucault pendulum swings back and forth in the same direction as the Earth's surface below it moves, causing the line of the swing to appear to change direction.
8. Different than
9. No, these cities are in different time zones
10. (b.) shadows

ANIMAL GROUP BEHAVIOR (3-5)

1. Answers may include: to help them survive, grow, reproduce, find food, protection, conserve energy, raise young, etc.
2. (d) 1 million+
3. Ants work together to build tunnels, create bridges and gather food.
4. To find and collect nectar from flowers or build their home.
5. True, a group may be only a few individuals.
6. (a) sentry
7. To reduce wind resistance and save energy
8. Protection from predators and potential mates
9. Swim in schools
10. A pride

STRUCTURE OF LIVING THINGS (3-5)

1. False, structures like buildings are made by humans, but animals have natural structures. A structure is anything made up of a number of parts held together in a particular way.
2. Internal: brain, lungs, heart; External: claws, eyes, skin
3. Digging, climbing, tearing apart prey
4. Vulnerability when growing because you have to molt
5. Small, large
6. Fireflies or jellyfish
7. Provide camouflage – protection from predators
8. Male beetles use their horn structures to battle for mates
9. Large arm-like jaws to capture prey, long front legs covered in hairs to sense its environment, or exoskeleton for protection from predators, falling rocks and for waterproofing
10. Conserve water in dry environments or protection from predators.

VARIATION OF TRAITS (3-5)

1. Their parents
2. True
3. Brown fur, ears, tails
4. Tail length, color of fur (some have more black), snout length
5. Large
6. (a) fertilizer
7. Camouflage from prey
8. True
9. Coloration, camouflage pattern, body size, snout size, distance between eyes.
10. Answers could include height, eye color, nose shape, hair color, etc.

ADAPTATIONS AND THE ENVIRONMENT (3-5)

1. An adaptation
2. (a) beak
3. True
4. It could die, move, or adapt over generations
5. (b) pelican
6. Armored plates and the ability to roll into a ball
7. Black tip of tongue protects against sunburn
8. Slow speed, coloration
9. Opposable thumbs allow humans to grasp objects
10. Long snout, ability to sense electricity with snout, long tongue

EARTH'S LANDSCAPES (3-5)

1. Fossils
2. False
3. Sharktooth
4. A bone bed
5. Oldest = D, youngest = A
6. Radiocarbon dating can tell us the age of a fossil
7. (a) river
8. True
9. Megalodon
10. Layers above it are younger, layers below it are older.

WHAT IS SCIENCE? (3-5)

1. More evidence
2. (c) butterflies
3. Evidence
4. Asking questions
5. False, the science of studying space is called Astronomy
6. The paint only glowed under violet light. White light is made up of all colors of light so since it caused the paint to glow too, it must also contain violet light.
7. No
8. As new evidence is collected our scientific understanding can change.
9. Paleontology is a field where the practices of observation and constructing explanations, as well as argument from evidence and obtaining, evaluating and communicating information are used rather than controlled experiments. Astronomy is another good example.
10. (d) chemistry

FOSSILS & EXTINCTION (3-5)

1. Remains or impressions of prehistoric life
2. (b.) Paleontologist
3. If it was a carnivore, herbivore or omnivore
4. What it ate
5. Microfossils are tiny fossils (smaller animals, plants, etc.) and we can learn about the environment that larger animals lived in
6. False
7. False
8. Buried under
9. It is not found alive anywhere on Earth today
10. (b) mountain lion

INTERACTION OF EARTH'S SPHERES (3-5)

1. Geosphere, hydrosphere, biosphere, atmosphere
2. Geosphere
3. Hydrosphere
4. Air and gases surrounding Earth
5. False, ocean currents affect temperatures on land
6. (a) bees
7. Humans impact all of Earth's spheres in a variety of ways (answers vary)
8. True
9. Erosion of rocks is the most common example
10. Atmosphere or hydrosphere acceptable.

WEATHERING & EROSION (3-5)

1. (d) sand
2. Ice (expansion of frozen water)
3. Answers include water, ice, wind, gravity, tree roots, etc.
4. Weathering
5. Erosion
6. (c) sunlight (can cause weathering, not erosion)
7. True
8. The Grand Canyon
9. Running water and gravity
10. Sunlight warms the pavement causing it to expand. It then contracts when it cools. This happens repeatedly eventually leading to cracks forming.

HOW DO WE USE FOOD (3-5)

1. We get hungry
2. Energy, Growth & Repair.
3. True, flamingos eat pink shrimp
4. All burned (with addition of oxidizer)
5. The sun
6. Photosynthesis is the process by which plants make sugar using energy from the sun
7. True
8. Candy doesn't contain many of the nutrients our bodies need
9. (d) soil
10. Sun -> Plankton -> Fish -> Seal -> Shark

WATER QUALITY & DISTRIBUTION (3-5)

1. Lakes, rivers, ground water, glaciers
2. (c) 97 percent
3. To keep people safe & living things healthy
4. Dog poop can wash down storm drains and flow into the ocean
5. Yes, it can be washed into lakes, rivers and oceans causing algae blooms.
6. Recycling, pick up dog poop, beach clean up
7. An area of land that drains into a body of water
8. True
9. No! It may contain bacteria too small to be removed by this type of filter.
10. Algae uses up the oxygen that other organisms need which creates dead zones

NATURAL DISASTERS (3-5)

1. Seismograph
2. (b) stone
3. Plates or tectonic plates
4. Magma (it's called lava after it erupts)
5. False, most tsunamis are caused by earthquakes
6. (d) humans cannot prevent natural disasters
7. Homes built as a single story or skyscrapers engineered to sway on purpose
8. Plate boundaries
9. Earthquakes
10. False, most volcanoes are found along plate boundaries but some are found other places too.

HUMAN BODY SYSTEMS (3-5)

1. Respiratory, circulatory
2. False, there are 11 systems that make up the human body and they all work together
3. Circulatory
4. Respiratory
5. True, it breaks it down into smaller pieces.
6. Respiratory, Muscular, Circulatory
7. Circulatory
8. Increases, increases
9. Contract, relax
10. Red blood cells

BRAIN PROCESSING OF SENSES (3-5)

1. (d.) Nervous system
2. Nerves
3. False, takes milliseconds to reach the brain.
4. Sense of smell
5. Sensing prey and knowing when to change colors
6. (b) tongue
7. a, c, b, e, d
8. Heart beating faster is a natural response to fear. It gets the body ready to run away.
9. Reaction time is the time it takes your senses to gather information, for that information to travel to your brain, your brain to process it and for your body to react.
10. True

EXTREME WEATHER SOLUTIONS (3-5)

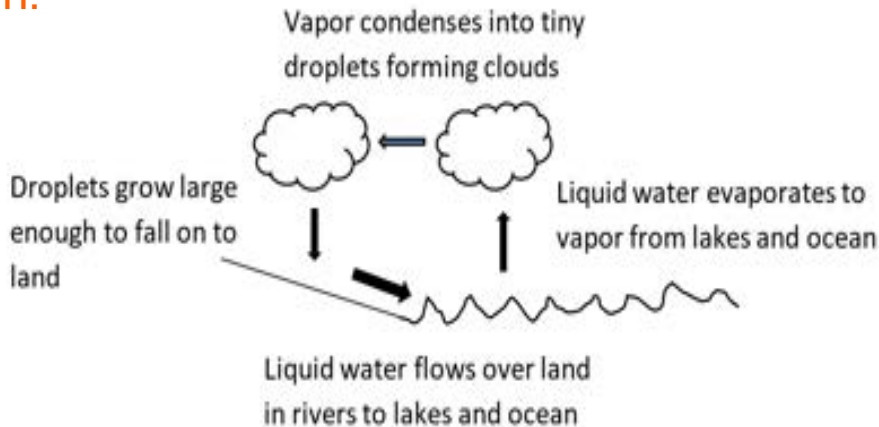
1. (a) a sunny day
2. Past hurricane data helps us predict when and where hurricanes will happen
3. Electricity from lightning passes through the metal lightning rod down to the ground instead of running through the house.
4. (d) recurved wall
5. Slanted ends, flat ends
6. True
7. True
8. Design solutions to reduce its impact
9. It is designed from strong materials where people can go during a tornado.
10. tornadoes

WEATHER VS. CLIMATE (3-5)

1. weather
2. (d) thermometer
3. Rain gauge
4. (b) pressure
5. False, meteorologists use weather data to predict the forecast
6. Usually clear, sunny skies (H = high pressure, "Happy" weather)
7. Rainy or bad weather (L = low pressure)
8. Check the weather – weather can vary day to day even when you live in a hot climate
9. Wind speed
10. Answers will vary.

WATER CYCLE (3-5)

1. (b) gas
2. faster
3. Boiling water filled the barrel with hot steam (water vapor) as it evaporated
4. The ice outside the barrel caused the steam to condense back to liquid—causing the barrel to collapse.
5. Condensation
6. Evaporation
7. False, the water vapor from the surrounding air is condensing on the outside of the glass
8. Condensation of the water vapor inside the bottle due to a drop in pressure
9. Because water cycles continuously through evaporation and condensation
10. Dew is water droplets that form on plants when water vapor from the air condenses.
- 11.



RENEWABLE VS. NONRENEWABLE RESOURCES (3-5)

1. Coal (wood, candle and other solids also acceptable)
2. Oil, coal, natural gas
3. Fossil fuels come from the remains of prehistoric life, which take a long time to make again.
4. Answers could include: water, wind, solar, biodiesel, ethanol, geothermal
5. Ethanol comes from corn and more corn can be grown relatively quickly.
6. True
7. If the electricity used to charge the batteries of an electric car is produced by burning fossil fuels, the electric car still runs on fossil fuels
8. Algae grows fast and produces high energy oils
9. False, any fuel that can burn can power an engine (the engine may need to be modified)
10. (c) natural gas

CONSERVATION OF MATTER (3-5)

1. $25\text{ g} + 150\text{ g} = 175\text{ g}$
2. Some of the matter escaped as gas.
3. False, matter is anything that has weight and takes up space
4. Solid carbon dioxide changes into carbon dioxide gas which goes into the atmosphere
5. The gas released from the solid carbon dioxide is trapped inside the balloon and the weight remains constant
6. The wax melts and then is burned, going into the surrounding air
7. Decrease, matter is transformed to gas and released into the surrounding air
8. False, they grow bigger because gas bubbles inside the dough expand as they bake
9. No, it was not magic – the flash paper transformed into gas
10. (d) stay the same

PATTERNS OF MOTION & FRICTION (3-5)

1. A weight tied on a string that swings back and forth
2. Friction
3. The friction between the two sticks produces heat
4. A layer of air that reduces friction is created by air pumped through tiny holes in the table
5. (a) sand paper
6. False, treads increase friction of tires against the road
7. Answers can include: airplanes, pencils, socks, air hockey, bowling, car tires, etc.
8. Each individual block swings back and forth
9. Each block has a slightly different lengths of string so they swing at different speeds
10. Friction

INFORMATION TRANSFER (3-5)

1. Dots and dashes
2. 1s and 0s
3. Red, blue, green
4. True
5. Instructions from the computer are sent to the printer as patterns of 1s and 0s
6. Patterns of light pulses
7. False, cell phone signals are sent to a cell phone tower first, then to another phone
8. Electricity (could also be Morse code)
9. (d) pixels
10. A microchip
11. Books, carrier pigeons, talking, etc.

PARTICLE NATURE OF MATTER (3-5)

1. Solid, liquid and gas
2. Particles
3. False, $500\text{ ml} + 500\text{ ml} = 970\text{ ml}$ because the particles of alcohol fit in between the water
4. (d) tiny
5. The air particles inside the ball moved closer together in the cold temperatures
6. Particles of air inside the marshmallows move further apart to fill up the empty space when the surrounding air is removed.
7. False, a particle is about 100,000x smaller than the width of a human hair
8. Matter
9. The fizzy tablets and water cause particles of gas to build up and spread apart filling the container so full of matter that the lid pops off.
10. The particles of carbon dioxide gas moved so close together that it formed a solid.

BALANCED & UNBALANCED FORCES (3-5)

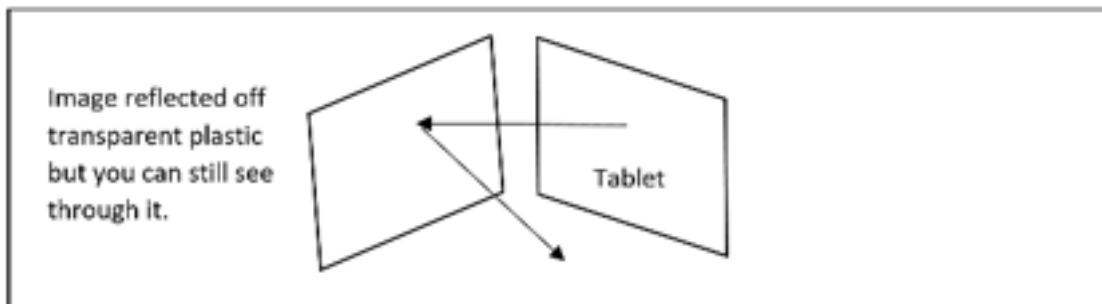
1. Strength and direction
2. (b) balanced
3. Forces are unbalanced
4. Gravity, Moving Air
5. The ball would move up more or fly off because the forces are no longer balanced
6. (c) direction of force
7. True
8. The force of the tube up on the egg, the force of gravity down on the egg
9. True
10. The force Izzy applied was too strong

PROPERTIES OF MATTER (3-5)

1. Air is matter and it has weight
2. (b) air
3. Magnetism
4. Helium
5. Density
6. False, they used solubility
7. (d) solubility
8. The Styrofoam is softened by the acetone, which releases air and leaves only a small amount of soft plastic behind.
9. Iron powder
10. Conductivity
11. So you can design items from materials that will last long and do their job effectively.

LIGHT REFLECTION & VISION (3-5)

1. (d) straight line
2. A mirror
3. False, the light doesn't bend, it changes directions because it is reflected off a mirror
4. False, black reflects less light than white, but still reflects light
5. Light travels in a straight line, passes through the lens and is reflected onto the white paper in the back of the box.
6. Our brain automatically flips the upside down images reflected into our eyes.
7. (d) car
8. Light reflects off the inside of a plastic cable
9. A lens can bring the image into focus (like glasses for our eyes)
- 10.



ENERGY TRANSFER (3-5)

1. Energy
2. Motion, electrical
3. False, a generator converts energy from one form to another
4. Answers can include: Wind, water, steam, burning coal or wood
5. Wires connected to a power plant
6. True
7. The fish is connected to a solar cell, that is powered by light.
8. Heat lamp warming food (fries), s'mores in solar oven, etc.
9. (a) Light
10. A device that converts light into electrical energy.

COLLISIONS (3-5)

1. Energy
2. The instant of contact
3. False
4. (d) collision
5. False, Dr. Jeff's mom stops and Izzy flies backward
6. One
7. Increases, Increases
8. Crumple zones are located in the front of the car and absorb energy in a car crash
9. Plexiglass barriers absorb the motion energy from the flying puck.
10. A. Sound and C. Heat

WAVE PROPERTIES (3-5)

1. Energy
2. False, the ball moves up and down, not sideways
3. Wavelength
4. Amplitude
5. False, longitudinal waves move back and forth.
6. (b) Move in all directions.
7. Echolocation
8. Increases
9. Transverse
10. Sound waves, vibrations or energy are all acceptable answers.

CHEMICAL VS. PHYSICAL CHANGES (3-5)

1. Chemical
2. (a) gallium
3. Physical
4. Chemical change
5. False, it's a physical change: the gas was already in the soda. No new substance.
6. The gas caused the candles to go out.
7. (b) flame test
8. It pops (burns)
9. Chemical
10. It is a physical change

MAGNETS & STATIC ELECTRICITY (3-5)

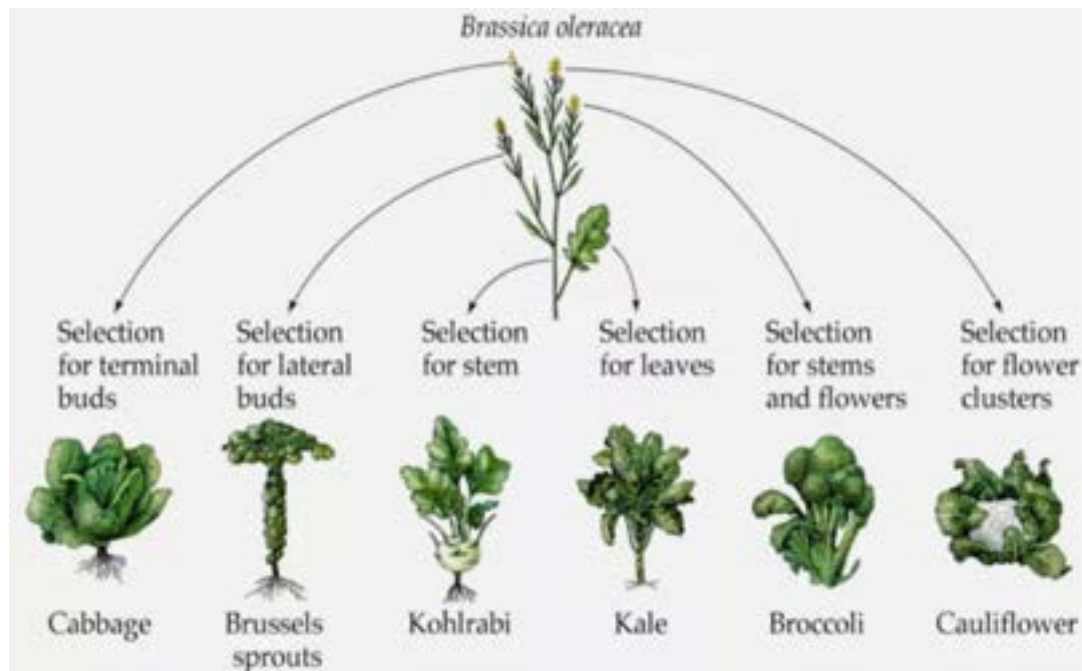
1. Magnetic field
2. False
3. (b) Iron
4. Aluminum
5. N and S poles attract
6. Neodymium magnets are very strong and can smash things, including fingers.
7. (a) magnet
8. False
9. Static electricity (repelling like static electric charges)
10. a. Same b. Opposite

PHOTOSYNTHESIS & RESPIRATION (6-8)

1. Chloroplast
2. cellular respiration
3. photosynthesis
4. Microorganisms
5. oxygen
6. Reactants; products
7. Molecular biologists
8. mitochondria
9. Plants are important for many reasons. For example, they provide many animals with food and produce oxygen that animals need to survive.
10. Plants make matter out of air and water through photosynthesis; an animal eats that plant, then another animal eats that animal. Animals breathe out the carbon dioxide that a plant needs to make its matter.

BIOTECHNOLOGY (6-8)

1. Molecular biologists
2. genes
3. artificial selection
4. insulin
5. DNA
6. Gene therapy
7. vitamin A
8. One example would be the sheep with the fluffy white wool. If you keep breeding sheep with these traits, eventually you only get sheep that have fluffy white wool.
9. Scientists are able to cut some genes out of one organism and paste them into another. As examples, this has been done with both rice and bacteria.
- 10.



NATURAL RESOURCE DISTRIBUTION (6-8)

1. Natural resources
2. metal
3. geosphere
4. fossil fuels
5. hydrosphere
6. unevenly
7. soil
8. atmosphere
9. Weathering and erosion are natural processes that help create soil.
10. Not every place on Earth has the right conditions for every natural resource. Seafood, for example, can only live in the water, so that is where we find that natural resource.

ELECTROMAGNETIC SPECTRUM (6-8)

1. energy
2. Frequency
3. Wavelength
4. Gamma, Ultraviolet, Infrared, Microwave
5. infrared
6. wavelength
7. ultraviolet
8. Radio
9. They pass through skin but are absorbed by bone.
10. Each color of light bends at a slightly different angle as it passes through the prism.

GENES & MUTATIONS (6-8)

1. Variation
2. DNA
3. parent
4. forensic scientist
5. Mutations
6. Genetic; environmental
7. Chromosomes
8. proteins
9. Some examples of a trait would be your natural hair color, eye color, and height. Genes are responsible for determining what traits you have, and those traits are passed down from parents to their offspring. Animals get half their DNA from their mom and the other half from their dad.
10. One example might be that a change in the gene that grows hair on mice would affect the mouse's ability to grow hair, resulting in mice without hair.

INTRO TO CLIMATE CHANGE (6-8)

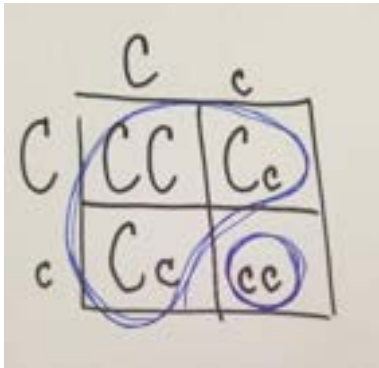
1. Weather; Climate
2. Evidence of Earth's temperature change has been collected for over 100 years globally and can be seen in tree rings, and ice cores.
3. the increase in carbon dioxide in the atmosphere
4. Carbon dioxide, methane, water vapor
5. Greenhouse gases absorb some of the infrared light being redirected from Earth, which causes Earth to warm, because the infrared light is not being emitted back into space.
6. Coal, oil, and natural gas
7. Increased glacier melt causing the sea level to rise, stronger hurricanes, forest fires, severe drought, farmlands drying up
8. Renewable energy resources
9. Material scientists
10. We need to drastically reduce our use of fossil fuels for transportation and energy generation, so that we decrease the amount of carbon dioxide in the atmosphere.

HEAT: TRANSFER OF THERMAL ENERGY (6-8)

1. Temperature
2. higher temperature; lower temperature
3. conduction
4. convection
5. Heat is the transfer of energy, not a substance. Thermal energy is transferred to the particles that make up a gas or liquid, causing them to move faster and, as a result of high-speed collisions, farther apart. As the particles get farther apart, the substance becomes less dense. When the gas or liquid is less dense, it rises compared to when the substance is denser. Therefore, the heated substance rises, not heat.
6. The metal is heated by radiation from the sun. The energy transferred from the sun to the metal increases the thermal energy in the chair, so the metal particles vibrate more rapidly. The greater the vibration of the metal particles, the greater the temperature.
7. The amount of a substance, the composition of a substance, and the temperature difference between the substance/object all affect the rate of thermal energy transfer.
8. Temperature measures the average kinetic energy of the particles in a container. The fewer the particles in the container, the less energy is needed to get the particles to move more. The more particles, the more energy is needed to get them all moving faster, which in turn raises the temperature.
9. A good thermal insulator slows the rate of thermal energy transfer between substances. It takes a larger amount of thermal energy to raise the temperature of the same mass of water than it does to raise the temperature of the same mass of many other materials. Therefore, the rate of thermal energy transfer would be less.
10. A jacket does not produce heat. It slows the rate of thermal energy transfer through conduction, convection, and radiation from your body to the cooler air.

REPRODUCTION OF LIVING THINGS (6-8)

1. Asexual (cloning)
2. recessive
3. Chromosome
4. Punnett square
5. sexual
6. True
7. The ultimate goal is to increase the chances of reproducing and to ensure their offspring's survival.
8. The two versions are dominant alleles and recessive alleles. For the dominant trait to be expressed, only one of the alleles must be the dominant version. Recessive traits are expressed when the two alleles are the same.
9. Sample answers include nest building, frogs croaking, pufferfish making patterns in the sand, protecting eggs, and searching for food for days.
10. 25%; 1:4 chance



WHAT IS SCIENCE? (6-8)

1. observation; experimentation
2. how; why
3. The law describes WHAT happens; the theory explains WHY it happens.
4. Scientists would be more confident in the explanation that is supported by more evidence.
5. evidence
6. Models
7. b. debate
8. planned
9. To show how variables are related to each other.
10. Computers can run calculations much faster than humans.

PREDICTING NATURAL DISASTERS (6-8)

1. earthquake
2. Drop, cover, and hold.
3. A natural disaster is a natural event that can cause great damage.
4. preventable
5. tectonic plates
6. Los Angeles, California is a location where two tectonic plates meet.
7. satellites
8. Tsunamis
9. A tornado needs rapidly rising, rotating air that occurs when a cold air mass and warm air mass collide.
10. seismograph

CLASSIFICATION OF LIVING THINGS (6-8)

1. Taxonomy
2. dichotomous
3. Domain; species
4. When taxonomy was originally set up, Latin was considered the language of science.
5. Mammalia
6. An organism's scientific name consists of its genus and species. The scientific name is helpful because no matter what language you speak, the scientific name will be the same.
7. Phylum, because at each level of taxonomy the characteristics get more and more similar, which suggests the organisms are more closely related.
8. DNA
9. As we discover new organisms that don't fit into any existing group, new groups can be created, and the system can be updated.
10. entomologist

ELECTRIC & MAGNETIC FIELDS (6-8)

1. touching
2. magnetic; electric
3. south
4. negative
5. Examples would include iron, cobalt, nickel, and steel
6. It gets stronger.
7. An electric field is generated when charged particles move.
8. You can increase the strength of an electromagnet by increasing the number of wire coils.
9. The iron would move to the coil and then stop because it is attracted to the coil when the current is on.
10. Because electric current flowing through a coil of wire creates an electromagnet.

ENGINEERING DESIGN PROCESS (6-8)

1. Criteria are used to determine what the design solution needs to be able to do or demonstrate in order to be considered a success.
2. Constraints are used to determine the limitations that the design solution needs to stay within, such as the length of time provided to complete the project.
3. An engineer might brainstorm, research, sketch, model, or test materials to help develop possible ideas for a design solution.
4. A model or prototype can be used to test the functionality or concepts of the design solution.
5. An engineer might test a model or prototype and use the data to help figure out new ideas that can improve the design. An engineer uses the criteria and constraints to guide this process of improvement.
6. Criteria and constraints can be used to determine which design idea best meets the design requirements. The design that more fully meets the criteria and constraints would be considered the best solution to solve the problem.
7. Chemical engineers use their knowledge of chemistry to solve problems such as cleaning up oil after an oil spill, making new fuels, making new medicines, or creating new materials.
8. Mechanical engineers use their knowledge of machines to solve problems such as sorting recyclables or building machines that help make the food we eat.
9. Civil engineers use their knowledge of design and construction to solve problems such as designing, building, and maintaining roads, bridges, and dams.
10. Aerospace engineers use their knowledge of flight to solve problems such as designing airplanes, satellites, and rockets.

DIGITAL VS. ANALOG SIGNALS (6-8)

1. Digital
2. Analog
3. Digital
4. binary
5. analog; digital
6. noise
7. False
8. The metal surrounding the elevator can block the radio waves that cell phones use to communicate.
9. Samples are taken of the values along the analog signal, and each value is translated to binary code, which is a series of 1s and 0s.
10. Because the values in a digital signal can represent only certain values of 0 or 1.

INTRO TO THERMAL ENERGY (6-8)

1. vibrating
2. A cup of room temperature water
3. Solid, Ice
4. Heating food, Heating your home, Hand warmer, Melting something, Boiling water
5. Cooling food, Cooling your home, Instant cold pack, Freezing water, Condensation
6. c. Water vapor (gas)
7. chemical reactions
8. From your ankle to the cold pack
9. They slow down
10. smaller; slow down

POTENTIAL vs. KINETIC ENERGY (6-8)

1. We might see it move, give off light, heat, or sound.
2. When an object moves, potential energy, energy due to an object's position, is converted to kinetic energy.
3. Kinetic energy used to compress the spring is converted to potential energy. When whatever is compressing the spring (finger pushing, jumping on) is removed, the potential energy is converted to kinetic, and the pen's tip emerges or the pogo stick bounces up.
4. The ball on the left gained potential energy when it was lifted. PE was converted to KE when it was released, and the ball dropped. Its KE was transferred to the next ball, then the next, etc. until it reached the end ball on the right. The end ball on the right gained enough energy to move.
5. Eventually there is not enough energy from the initial drop to move the end ball on the right because some of the energy is converted to heat and sound energy each time the balls strike one another.
6. To decrease potential energy (the amount of energy an object has), you could change the position of the object and/or decrease its mass. To decrease the kinetic energy of an object, you could slow it down and/or decrease its mass.
7. directly
8. linear
9. The cart needs enough PE to convert to KE to make it around the loop. If the hill is lower than the top of the loop, then there will not be enough PE to convert. In addition, some of the KE is lost as heat and sound as the cart moves down the track and around the loop.
10. Examples from the video: building and testing prosthetic legs, designing rides for amusement parks, designing water slides, designing helmets for football players, designing airbags in cars.

ROCK LAYERS (GEOLOGIC TIME) (6-8)

1. erosion
2. Fossils
3. weathering
4. Geologists
5. sedimentary
6. 4.6 billion
7. fossils
8. younger
9. Sedimentary rock is formed when sediment is deposited and then more sediment is deposited on top of it, pressing it together so much that it forms a rock.
10. Sediment is deposited at the bottom and then more sediment is deposited on top of it, and it just keeps going. The layers can be made of the same kind of sediment or it can be different and that is why it is sometimes different colors. The oldest layers of sediment are on the bottom and the younger ones are on the top.

THE SOLAR SYSTEM (6-8)

1. 99.8
2. habitable
3. Gas giants
4. Asteroids or rocks, ice, and dust
5. Dwarf planets, rocks, and ice
6. Pluto did not clear the neighborhood around its orbit of other objects.
7. Because the comparison between the size of the planets and the Sun do not represent the actual mathematical relationships found between these things in our solar system.
8. The gravitational pull of the Sun holds them in orbit.
9. A sun or star and all the objects that orbit it.
10. Scientists believe that humans will land on Mars in our lifetime, so they are learning about the atmosphere, its seasons, the terrain, and other information to help us prepare.

HUMAN IMPACTS ON THE ENVIRONMENT (6-8)

1. Aluminum cans, plastics, paper
2. Plastic grocery bags can get caught in machinery that sorts the recyclables. Plastic bags should be reused instead of recycled.
3. Advancements were made in both medicine and technology. Also, with better nutrition people began to live longer.
4. There is an increased demand on our natural resources, which may not be enough for everybody.
5. The Caribbean monk seal was killed to extinction by humans to use their blubber to make lamp oil.
6. New laws were passed, and wildlife preserves were created.
7. The lake nearly dried up killing most of the aquatic life. This also affected the birds, plants, and other animals that lived there.
8. Oil usage is thirty times higher than 100 years ago and since it is a nonrenewable resource, it is limited and can be used up. Using oil as an energy source is also a major source of pollution.
9. Using alternative energy sources such as solar energy and biodiesel made from plants instead of oil. Also, humans can reduce the amount of oil they use each day by carpooling, turning off cars when waiting, and using public transportation.
10. New innovations are being made to the types of fuels we use such as alternative energies, conservation biologists are helping to pass new laws and create wildlife refuges, advancements are being made to turn saltwater into freshwater, and new technologies such as biodegradable bioplastics are being created.

THE FOSSIL RECORD (6-8)

1. fossil
2. A trace fossil is any evidence of animal activity such as footprints, burrows, and coprolites.
3. A mold fossil
4. A cast fossil is formed by minerals or hardened sediments that fill in a mold.
5. Sedimentary rock is formed when sediment is deposited and then more sediment is deposited on top of it, pressing it together so much that it forms a rock. This can type of rock can help to estimate how old fossils are.
6. older
7. Examples are weathering and erosion; mountain-building; earthquakes
8. Transitional
9. paleontologist

ELECTRICITY & CIRCUITS (6-8)

1. electricity
2. circuit
3. conductors
4. True
5. insulators
6. The battery converts chemical energy to electrical energy, which flows through the wire into the light bulb, where some of the electrical energy is transformed to light and heat. The rest of the electricity flows back to the battery.
7. In a series circuit, all of the components are connected in a series or chain, with one path for the current. Also, all the components in a series will turn on and off at the same time. In a parallel circuit, the components are connected parallel to each other, and each component has its own branch of the circuit. Each component can be turned on and off separately in a parallel circuit.
8. Students could provide a range of answers such as lower the voltage of the energy source, increase the thickness or type of wire, add a resistor(s), or include a potentiometer.
9. circuit board or integrated circuit
10. Electrical engineers

PROPERTIES OF ELEMENTS (6-8)

1. element
2. The nucleus
3. Electrons
4. Magnetism, Melting point, Density
5. protons
6. atomic symbol
7. The atomic number tells you how many protons that element has.
8. Many answers acceptable, most common would be carbon, hydrogen and oxygen.
9. You round the atomic mass up to the nearest whole number and subtract the atomic number.
10. Bismuth is used to treat upset stomach and diarrhea. Fluorine is found in drinking water and toothpaste. Lithium is found in rechargeable batteries in phones and computers.

ROCKS & MINERALS (INCLUDING ROCK CYCLE) (6-8)

1. mineral
2. Gabbro is a type of rock used to make roads. Granite is used in building materials. Coal is used to make electricity. Shale is used to make bricks.
3. dissolve
4. Small crystals form when liquid cools down fast. But in nature, it could take years for water to cool and form crystals. Slower cooling allows crystals to grow much larger.
5. Rocks are made out of minerals. Minerals are the “building blocks” of rocks.
6. Sedimentary rock is igneous rock that has been broken apart, moved by erosion, and then compressed into layers. Sedimentary rock can be used to estimate the age of fossils based on how deep the fossil is found.
7. Metamorphic
8. A subduction zone is when two tectonic plates meet, and one plate gets pushed underneath the other.
9. The crust on one plate is slowly pushed down into Earth, so the rocks in that area get buried deeper and deeper. That makes the rocks heat up, and the added weight creates pressure which forms metamorphic rock.
10. Rocks under intense heat and pressure can melt. These conditions are common along subduction zones.

WAVE REFLECTION, ABSORPTION, TRANSMITTANCE (6-8)

1. All waves have amplitude, wavelength, and frequency.
2. Sound waves need matter to travel through, but light waves do not need matter to travel through.
3. Waves are reflected when the density of matter is too high for the wave to pass through or be absorbed.
4. When a wave is absorbed, the matter takes in energy from the sound wave and in doing so lowers the amplitude.
5. When someone is playing loud music and that music is heard in a different location, the sound waves are being transmitted through the wall, floor, ceiling, or all three.
6. High amplitude sound waves have higher volume, and low amplitude sound waves have lower volume.
7. When white light hits a leaf, all visible colors are absorbed except green, which is reflected onto your eyes. Thus, you see green.
8. The frequency of waves are measured in hertz.
9. Wavelength and frequency combine to form different colors in the visible spectrum.
10. Higher pitch sounds have higher frequency, and lower pitch sounds have lower frequency.

CHEMICAL REACTIONS (6-8)

1. Reactants are substances that are combined to form products in a chemical reaction. Products are the result of substances being combined in a chemical reaction.
2. Odor, Color, Magnetism
3. The Law of Conservation of Matter states that the total amount of matter in a system is conserved because matter cannot be created or destroyed. For this reason, the final mass after a chemical reaction has taken place will be identical to the initial mass before the reaction took place.
4. False
5. 12
6. Because of the Law of Conservation of Matter.
7. A catalyst makes a chemical reaction happen faster.
8. The decomposition of hydrogen peroxide to oxygen and water ($2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2\text{O} + \text{O}_2$)
9. Scientists can use chemical reactions to create new materials.
10. $\text{Fe} + \text{O}_2 = \text{FeO}_2$

COMPETITION IN ECOSYSTEMS (6-8)

1. Answers will vary. A lizard eating a cricket is an example of an interaction between two living things in an ecosystem.
2. Living and nonliving components including plants, animals, air, water & sunlight.
3. Answers will vary. If one animal has better camouflage than another animal of its same kind, it can hide better and not get eaten. Faster animals have a better chance of catching food.
4. Space, water & light
5. Answers will vary. Plants or animals seeking water, sunlight or space are examples of a living/nonliving interactions.
6. An invasive species is a plant or animal that is not native to an ecosystem. Invasive species can affect ecosystems in many ways. If an invasive animal came into an ecosystem and did not have any predators, its population would keep growing. The invasive species may eventually eat up all the food that the native animals need.
7. Answers will vary. Fire (or flooding) in an ecosystem affects it's resources. Animals may not get enough to eat because plants have been burned (or washed) away or some animals may lose their shelters and become prey.
8. Answers will vary. Grey foxes and coyotes have similar diets and compete for the same food resources. Limited food resources due to competition would affect their ability to survive, grow & reproduce.
9. Wildlife biologists help track populations that may be endangered, and they move animals within ecosystems when an area is becoming overpopulated.
10. Students' models will vary but should include at least the sun (nonliving component) and at least one producer and one consumer (living components). Look for students to at least represent the transfer of energy from the sun, to the producer, to the consumer.

SOLAR AND LUNAR ECLIPSES (6-8)

1. 365 days
2. 24 hours
3. 27 days
4. away from
5. The Moon is about 400 times smaller than the Sun and about 400 times closer to Earth. Those proportions cause the Sun and the Moon to look about the same size from Earth.
6. When the Sun and Moon are not exactly in line with the Earth and the Moon only partially obscures the Sun.
7. atmosphere
8. When the Sun, Moon and Earth aren't perfectly lined up, the Moon blocks only part of the Sun.
9. The Moon's path around the Earth is tilted 5 degrees compared with the Earth's orbit around the Sun. The Moon can be behind the Earth but still be hit by light from the Sun due to this tilt.
10. Students' models should include the Sun, the Moon, the Earth, and light. They should show the Earth between the Sun and the Moon, blocking light from reaching the Moon.

SYNTHETIC MATERIALS (6-8)

1. Substances that are not produced by nature but rather are made by humans using natural materials
2. Resources from nature that exist without humans having any role in their formation.
3. Biodiesel
4. Nylon
5. chemical reactions
6. Wintergreen oil
7. Aspirin, metformin, & numbing gel
8. They take a very long time to decompose and cause pollution.
9. When humans deliberately mix substances together for the express purpose of creating new materials with desirable properties.
10. The atomic structures of the original substances are rearranged to form new material. Look for students to represent reactants using shapes (such as a reactant consisting of triangle and squares and another reactant consisting of circles and diamonds) and the products a new combination of these shapes (for example, a product consisting of all the shapes or two products consisting of triangles and circles and another product consisting of squares and diamonds).

HOW TO BE A SCIENTIST (6-8)

1. applications for enrollment
2. Biochemistry is the study of the structure, composition, and chemical reactions of living things.
3. All scientists use the practices of science to generate data, which they use to support their ideas.
4. Marine biology is the study of marine organisms, their interactions with the environment, and their behaviors.
5. Physics is a branch of science related to the properties of matter and energy.
6. One of four states of matter made of positively charged ions that cause them to have very strong electrostatic properties. Lightning is an example.
7. Answers will vary and may include chemical engineer, geochemist, pharmacologist, forensic scientist, chemistry teacher
8. Water
9. Answers will vary and may include physicist, mechanical engineer, software engineer
10. The application of science and math to solve problems.

BACTERIA & VIRUSES (6-8)

1. Bacterial cells are much smaller than animal cells. They can be 10 times smaller than animal cells.
2. By copying their DNA and splitting it in half.
3. Washing your hands, covering your nose and mouth when you sneeze or cough, and staying home when you are sick.
4. Antibiotics only kill bacteria and do not work against viruses like the cold and flu.
5. Viruses hijack cells to make copies of themselves and then burst out of the cell. The copies infect other cells.
6. The respiratory system.
7. Sick people should stay home, so they don't spread bacteria or viruses to others.
8. It injects its DNA (or RNA) into the host's cells.
9. A medicine that helps prepare the immune system to fight infection.
10. Bacteria can be used to make food like yogurt or produce fuel for cars. Good bacteria live on your skin to prevent you from getting sick and in your in your stomach to help digest food.

THE WATER CYCLE (6-8)

1. crystallization
2. condensation
3. evaporation
4. melting
5. Oceans, lakes, rivers, and plants
6. Molecules move more slowly and move closer together when they lose energy.
7. Molecules begin to move faster when they gain energy, and they spread further apart as they bounce off one another.
8. Gravity pulls rain and snow down to Earth from the atmosphere through a process called precipitation. Gravity also pulls water from elevated areas such as mountains and hills down into lakes, oceans, and water reservoir, and also causes water to infiltrate into the ground.
9. The Sun's energy heats water, causing the water to evaporate into a gas called water vapor.
10. Clouds form when environmental conditions cause water vapor to condense on tiny particles floating in the air.

CAUSES OF SEASONS (6-8)

1. 23.5
2. perpendicular (at a 90-degree angle)
3. The light is more direct at the equator than at the poles. This results in the light being more intense (more concentrated) at the equator and more spread out (more diffused) at the poles.
4. summer
5. winter
6. The Northern Hemisphere is tilted towards the Sun and experiences more daylight hours in the summer.
7. When the Northern Hemisphere is tilted toward the Sun, the Sun's rays do not reach further than 66.5 degrees south. The opposite is true when the Southern Hemisphere is tilted toward the Sun.
8. The equator receives direct or nearly direct rays of light throughout the year so there are very little seasonal differences.
9. The angle of sunlight is very low which makes the light less intense.
10. Students' models should show sunlight striking near the equator at 90 degrees (or near 90 degrees) and regions north and south of the equator at lower angles.

COMPARATIVE ANATOMY (6-8)

1. All bones in males and females are arranged in the same ways, but on average, males have slightly wider shoulders and females have slightly wider pelvises.
2. Both have the same pattern of bone structure in the upper extremity—one bone connected to two bones, connected to many bones, connected to finger-like bones.
3. They have similar structures that show a similar pattern and are used for the same function.
4. That organisms are related and have descended from one another over time.
5. They both start out as a single cell and develop the same pattern of structures, such as tails and pharyngeal slits. Some of those structures remain as the embryo gets older, but others go away.
6. Scientists use fossils to show patterns of development of many organisms over time.
7. It has migrated upwards to the top of the head from the front of the nose.
8. Horses, whales, snakes, and birds are a few examples.
9. They study how living things grow from a single cell to highly complex organisms.
10. Understanding shared anatomy can help veterinarians take care of any animal that needs help.

CLIMATE ZONES & OCEAN CURRENTS (6-8)

1. Light intensity is a measure of energy; the higher the intensity the higher the amount of energy.
2. The tropical zone is found between the latitude lines of the Tropic of Cancer (23.5 degrees N) and the Tropic of Capricorn (23.5 degrees S).
3. The temperate zone is found between the tropical zone and the polar zone. This zone is sometimes called the mid-latitude because it exists roughly between 30 degrees and 60 degrees in both the north and south latitudes.
4. Antarctica
5. rises; sinks
6. Coriolis effect
7. ocean
8. salt
9. It is a constantly moving system of deep-ocean circulation driven by temperature and salinity. The great ocean conveyor moves water around the globe.
10. Water that is more dense will sink under less dense water. Water that is colder or has more salt is more dense.

GRAVITATIONAL FORCES BETWEEN OBJECTS (6-8)

1. force
2. Mass
3. The moon's gravitational force.
4. Isaac Newton
5. Weight
6. Gravity
7. Astronomers
8. They would hit the ground at the same time. Gravity pulls all objects down at the same acceleration (speed or rate also acceptable at this grade level).
9. Weight of an object can change based on location. The pull of the Earth's gravitational force is greater at ocean level than it would be on a mountain.
10. Students should clearly indicate the force of air pushing up against the umbrellas is greater on the open umbrella than the closed one.

MULTICELLULAR ORGANISMS (6-8)

1. tissue
2. systems
3. Cells
4. Muscular, nervous, & circulatory
5. The respiratory system brings oxygen into the body, and the circulatory system moves oxygen throughout the body.
6. Once we have absorbed nutrients through our digestive system the circulatory system transports those nutrients around the body.
7. The nervous system
8. Our sense receptors are found in our eyes, ears, tongue, skin, and nose. We need sense receptors for our various senses to work.
9. The respiratory system
10. Students' models will vary but should include a muscle (muscular system), bone (skeletal system), blood vessels (circulatory system), & nerves (nervous system). The accuracy doesn't matter, just that they show different parts with an understanding that they all work together.

NATURAL SELECTION (6-8)

1. A variation
2. reproduce
3. Artificial selection
4. Charles Darwin
5. Mutations
6. Genetic; environmental
7. Biologists
8. One sample answer for this question could be that animals that can run faster will not get caught by a predator.
9. If all the slow animals in a population get caught and eaten, then only the fast ones survive to pass on their genes. Eventually, only the fast animals live, so the population as a whole becomes faster.
10. Student models will vary but should show light-colored mice and dark-colored mice on a dark-colored surface using symbols and/or words to indicate that predators are able to easily spot the light-colored mice. Because of this, it's easier for prey to hunt the light-colored mice which results in greater survival of the dark-colored mice.

MAINTAINING BIODIVERSITY (6-8)

1. biodiversity
2. keystone
3. Food webs
4. Bioindicators
5. extinct
6. medicines
7. decomposing
8. national parks (wildlife reserves, wildlife sanctuaries, etc also acceptable)
9. It is important to protect some land because if we don't, people might hunt on it, which may cause the ecosystem to shift (especially if they kill a keystone species).
10. Student models will vary but should include multiple organisms with producers on the bottom, then animals that eat plants, then animals that eat those animals. Arrows should indicate energy is transferred from one organism to another. Student models may or may not include the sun.

SYMBIOSIS (INTERACTIONS BETWEEN ORGANISMS) (6-8)

1. Symbiosis
2. predation
3. Plants and animals that have a particular variation of a feature (or features) that allow them to out-compete other members of their populations or other populations for resources, continue to reproduce. Over time, these features may become dominant in the species.
4. parasites
5. mutualism
6. Commensalism is a type of relationship between two organisms in which one organism benefits and the other neither benefits nor is harmed. A good example is the remora. This is a type of suckerfish that will attach itself to sharks and other big fish to catch an underwater ride. Accept any answers that represent this type of relationship.
7. Food webs
8. An ecologist studies nature, including plants and animals, with a focus on how these organisms interact with one another and the environment in an attempt to preserve and protect species and ecosystems and solve environmental issues.

PLANT & ANIMAL CELLS (6-8)

1. cell
2. organelles
3. Can list any such as nucleus, mitochondria, lysosome, cell membrane, cell wall
4. Chloroplast; Cell wall
5. vacuole
6. lysosome
7. Mitochondria
8. chloroplasts
9. Unicellular
10. A cell wall is porous giving the cell structure, but most things can pass through it. A cell membrane allows some molecules to pass through, but others can't. Also, cell walls are found in plant cells but not found in animal cells.

TECTONIC PLATES (6-8)

1. Core; Mantle; Crust
2. transform
3. convergent
4. divergent
5. convection
6. Similar fossils on different continents.; How continents can "fit together."
7. When one tectonic plate is pushed under another.
8. When two tectonic plates come together and they are pushed up.
9. Yes
10. Volcanoes; Earthquakes

ATOMS & MOLECULES (6-8)

1. Protons; Neutrons; Electrons
2. (+) Proton; (-) Electron; (0) Neutron
3. Periodic Table of Elements
4. two (2)
5. chemistry
6. Six (6)
7. Various answers accepted, such as carbon, nitrogen, oxygen, hydrogen.
8. Various answers accepted, such as water, carbon dioxide, oxygen gas.
9. Protons; Neutrons
10. Drawing should have protons and neutrons clumped together at the center and electrons orbiting around the nucleus.

FOOD WEBS: CYCLING OF MATTER & FLOW OF ENERGY (6-8)

1. Photosynthesis
2. producers
3. Grass
4. Decomposers.
5. cellular respiration (respiration)
6. apex
7. Each time matter is transferred from one organism to another, some of the energy is lost as heat. Since plants are at the bottom of the food web, there needs to be a lot of plants to support all the organisms near the top of the food web.
8. photosynthesis
9. cellular respiration
10. Drawing should include a linear respiration of 4 organisms, one of which should be a producer like grass or trees. Arrows should all be pointing in the same direction between the organisms (arrows point in the direction of energy transfer).

NEWTON'S LAWS OF MOTION (6-8)

1. Many examples accepted such as a spinning top or tablecloth pulled off a table.
2. Any example in which it is harder to change the motion of something heavy, such as riding your bicycle. Your bicycle is the mass, your leg muscles pushing on the pedals of your bicycle is the force.
3. Engineers apply Newton's third law when designing rockets and other projectile devices.
4. Gravity
5. Friction
6. Drag
7. balanced
8. unbalanced
9. True
10. True

AIR MASSES & WEATHER FRONTS (6-8)

1. Air masses
2. prevailing winds ('wind(s)' also an acceptable answer)
3. Weather fronts
4. The one that formed over the north pole would be cold and dry while the one near the warm ocean would be warm and wet.
5. meteorologist
6. Humidity
7. Warm front (when warm air pushes cold air out of the way). Cold front (when cold air pushes warmer air out of the way).
8. They use lines to show the weather fronts on a map. A blue line is used for a cold front and a red line is used for a warm front.
9. Heavy rain forms because a warm air mass is lifted by two cold air masses working together.
10. False