



An At-Home Guide for Families

4th Grade Science in North Carolina Public Schools

Course Outline





At the end of the course, my child will know how to:

- Explain how various forces affect the motion of an object
- Describe the composition and properties of matter before and after they undergo a change or interaction
- Recognize that energy takes various forms that may be grouped based on their interaction with matter
- Explain the causes of day and night and phases of the moon
- Understand the use of fossils and changes in the surface of the earth as evidence of the history of Earth and its changing life forms.
- Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.
- Understand food and the benefits of vitamins, minerals, and exercise.

Curious what the specific standards are for 4th Grade Science in North Carolina?

Check out the [North Carolina Standard Course of Study](#) to learn more. Looking for additional explanations about what students should be able to do at the end of this course? Check out [NC DPI's unpacked contents document](#).








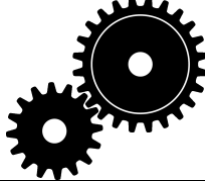

Key Vocabulary

Visual	Term	Definition
	Force	A push or a pull
	Magnets	Objects that are attracted to items that contain iron
	Iron	A metal that has magnetic properties
	Attract	A magnet's pull


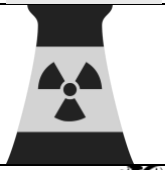

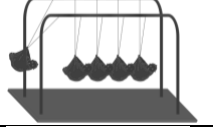

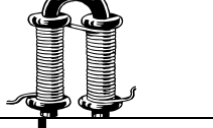
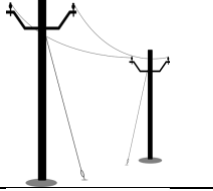
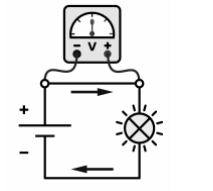
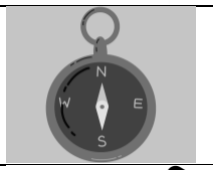



Visual	Term	Definition
	Repel	A magnet's push
	Magnetic Field	The area around the magnet where the force of the magnet attracts objects.
	Magnetic Poles	A point at either end of a magnetic field where the magnetic force is concentrated and strongest
	Compass	A device that shows the cardinal directions used for navigation and geographic orientation
	Magnet Polarity	Magnetic polarity refers to the north and south poles of the magnet. These poles exist in pairs. They cannot be separated.
	Atom	The smallest piece of any kind of matter
	Protons	Particles are located in the nucleus of an atom, has a positive electric charge
	Neutron	Particles located in the nucleus of the atom that have neutral electric charges
	Electron	Particles that float around the nucleus in a path that is similar to an orbit, has a negative electric charge
	Static Electricity	The buildup of charge on an object or the spark that buildup of charge creates



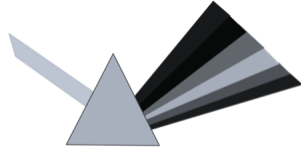
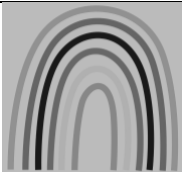









Visual	Term	Definition
	Electric Charge	The amount of electricity based on the number of protons and electrons in an object
	Energy	The ability to do work. How things change or move.
	Kinetic Energy	Energy in motion
	Potential Energy	Stored energy
	Light Energy	Energy that you can see
	Thermal Energy	The amount of heat in an object.
	Sound Energy	Energy that you can hear produced through vibrations
	Mechanical Energy	Energy of motion
	Electrical Energy	Movement of electrical charges




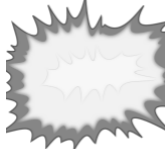



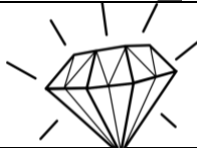

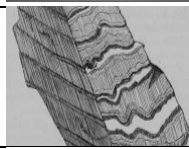



Visual	Term	Definition
	Chemical Energy	Energy stored in the bonds of atoms and molecules
	Nuclear Energy	Energy stored in the nucleus of an atom.
	Gravitational Energy	Energy stored in an object's height. The higher and heavier the object, the more gravitational energy is stored.
	Law of Conservation of Energy	Energy cannot be created or destroyed, but it can be transferred or changed into another form of energy
	Magnetism	A force exerted by magnets
	Electromagnet	A magnet that gets its power from an electric current
	Electric Current	Flow of electricity produced by a stream of charged particles
	Electric Circuit	A complete path for electricity to flow
	Magnetic Energy	Energy that uses magnets
	Refraction	When light travel from one medium to another and changes direction

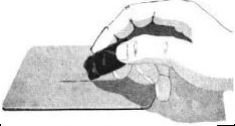









Visual	Term	Definition
	Reflection	When light bounces off a surface
	Absorption	When light is soaked up by a surface
	Prism	A clear object that breaks up light into the color spectrum
	Color Spectrum	Rainbow colors that show when light travels through a prism or water
	Travel	To get from one place to another
	Solid	Particles are tightly packed, has its own shape
	Liquid	Particles are close together, takes on the shape of the container
	Gas	Particles are well separated, takes on the shape of the container and fills it
	Particle	The smallest part of matter
	Matter	Anything that has weight and takes up space
	Strength	How strong is the material



Visual	Term	Definition
	Hardness	How hard the material is. The ability of an object to resist being scratched. The Mohs Hardness Scale is used to assess the hardness of a rock.
	Flexibility	The ability to move freely
	Conduction	The ability to run electricity
	Reaction	What happens when two chemicals come together
	Minerals	Solid substances that occur naturally that can be made from a single element (like gold or copper) or from a combination of elements.
	Rock	A naturally occurring solid made up of a bunch of different minerals
	Physical Properties	Characteristics that can be observed and measured
	Luster	How light is reflected off the surface of the mineral.
	Color	The appearance of the object caused by light either being reflected or emitted.
	Cleavage	If a mineral breaks and forms a smooth surface
	Fracture	If a mineral breaks unevenly



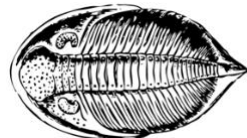







Visual	Term	Definition
	Streak	The color of the powder left behind when a mineral is scraped on a streak plate.
	Geologists	Scientists who study the earth, its composition, and the changes that occur over time.
	Rock Cycle	The processes through which rocks change from one type to another
	Sedimentary Rocks	A type of rock that is formed by the consolidation of sediment particles or of the remains of plants and animals.
	Metamorphic Rocks	Types of rocks that are formed by great heat and pressure
	Igneous Rocks	A type of rock formed when magma inside the Earth or lava on the Earth's surface cools.
	Clastic Sedimentary Rocks	Rocks that contain very old sediments
	Organic Sedimentary Rocks	Rocks that contain large amounts of organic material











Visual	Term	Definition
	Crystalline Sedimentary Rocks	Rocks that are composed of crystals that were formed from a chemical reaction
	Contact Metamorphism	When rocks come in contact with heat
	Regional Metamorphism	When rocks come in contact with intense pressure
	Intrusive Igneous Rocks	Formed inside the Earth from magma and is cooled very slowly because of the intense heat inside the Earth. It allowed minerals to form into very large crystals.
	Extrusive Igneous Rocks	Formed on the surface of the Earth from lava and cools very quickly. Small or no crystals form. They may even have air bubbles inside.
	Weathering	The breaking up of rocks into smaller pieces
	Erosion	The movement or transportation of pieces of rocks
	Deposition	When the pieces of rocks come to rest on a surface



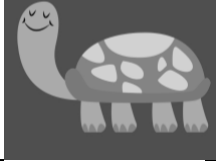
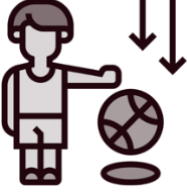






Visual	Term	Definition
	Compaction	When the rocks are compressing together
	Lithification	Where minerals are dissolved in water and crystallized and then cement rocks together.
	Fossil	A preserved remain or impression of a plant, animal, or insect
	Mold	An impression of a living organism filled by minerals
	Cast	A hollow impression of a living organism
	Amber	Hardened tree sap that can preserve fossils for millions of years
	Trace Fossil	A fossil that leaves a trail behind such as molds, animal tracks, casts, and impressions
	Body Fossil	A fossil that represents body parts of a once living thing

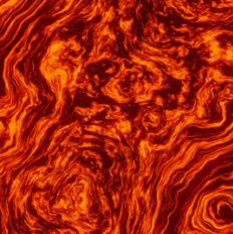




Visual	Term	Definition
	Paleontologist	A person who studies fossils to learn about Earth's history
	Fossil Record	A document that helps scientists know how long ago an organism lived
	Climate	The weather in a particular region over time.
	Inference	A conclusion based on evidence
	Environment	The natural surroundings in which a person, plant, or animal lives
	Examine	Inspect or investigate
	Landslide	The sliding down of large pieces of Earth or rock from the side of a mountain. When rocks and soil suddenly slide down the side of a mountain or hill.
	Volcanic Eruption	When lava and gas come out of a volcano, sometimes explodes out












Visual	Term	Definition
	Earthquake	When tectonic plates move under the Earth's surface. A shaking of the ground caused by two tectonic plates running into each other or sliding past each other.
	Drastic	Change that is seen immediately
	Subtle	Change that is noticed over time
	Gravity	A force that pulls objects down
	Mass Movement	Whenever gravity moves rocks or sediments downhill
	Soil Creep	Gradual downhill movement of soil
	Debris Flow	Rapid downslope flow of debris.
	Mud Flow	Downward flow of fine particles such as mud and large amounts of water.




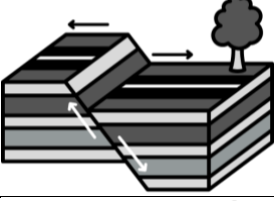
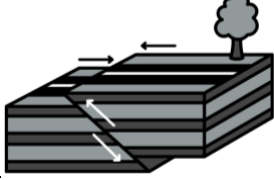
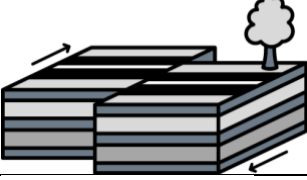
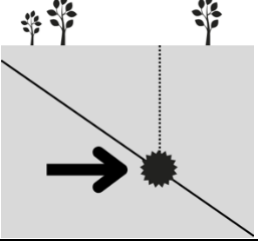


Visual	Term	Definition
	Rock Fall	Rapid falling of pieces of rock from a cliff or steep slope.
	Volcano	An opening in the Earth's crust where magma escapes
	Acidic Lava	Has a high silica content and this makes it thicker and it will not travel far, but due to the high level of dissolved gas it has it will have violent eruptions.
	Basic Lava	Contains less silica which allows the gasses to escape and gives a runny lava. Eruptions of this type of lava are gentler and this along with it being runny allows the lava to flow further.
	Cinder Cones Volcanoes	Have small, steep sides and are made of ash and cinders. Despite being benign, fiery and explosive it has only a little lava. They are the smallest and the most common volcanoes.
	Shield Volcanoes	Long broad sloping volcanoes made up of thin runny lava called basalt. These types of volcanoes are the largest and do not erupt often.
	Composite Volcanoes	Also called stratovolcanoes. They have steep sides with layers of half cinders and half lava. They have violent and explosive eruptions of gas, steam, ash, and thick lava.
	Stress	The amount of force on a rock and this stress causes rocks to deform.

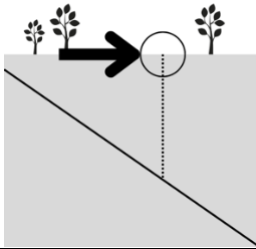

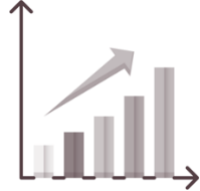







Visual	Term	Definition
	Deform	To change size or shape
	Confining Stress	When rocks are pushed down from the weight or other rocks.
	Tensional Stress	When rocks are stretch apart
	Compressional Stress	When the rocks are pressed or squeezed together
	Shear Stress	When rocks slip in a horizontal direction
	Elastic Deformation	When the changes of the rock are reversible.
	Plastic Deformation	When the changes of the rock are not reversible.
	Ductile Deformation	When the changes of the rocks are created through bending or folding without breaking
	Brittle Deformation	When the changes of the rock are created through bedding or folding with breaking.




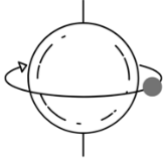

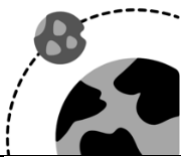
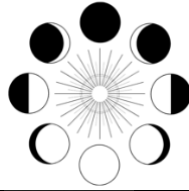

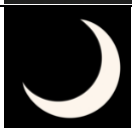


Visual	Term	Definition
	Faults	Fractures between blocks of rock that allow the blocks to move relative to one another.
	Tectonic Plates	Pieces of the Earth's crust
	Oceanic Plates	Plates under the ocean
	Normal Faults	Cracks where one block of rock is sliding down and away from another block of rock.
	Reverse Faults	Formed where the Earth's crust is under compression
	Strike-Slip Faults	Lie between two sides of the crust that slide past each other.
	Hypocenter	A place located way underground and where the earth begins














Visual	Term	Definition
	Epicenter	When the earthquake gets to its strongest point
	Seismograph	A tool used to measure and score the strength of an earthquake
	Richter Scale	A tool used to score the magnitude of the seismic waves.
	Instability	Not stable
	Evacuate	Leave
	Fatalities	Deaths
	Infrastructures	The basic physical structures and facilities such as buildings, roads, or power supplies needed for the operation of a society.
	Titanium	A durable and robust material element.







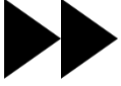





Visual	Term	Definition
	Rotation	How something turns or springs around a point located at its center
	Axis	Imaginary line that starts at the top of the Earth at the North Pole and then goes completely through the Earth's center or ends up at the South Pole
	Orbit	A path
	Revolution	When a planet or moon travels around the body it is orbiting at one time
	Craters	Big holes on the surface of the moon formed when big meteorites crashed millions of years ago.
	Satellites	Things that orbit our planet and go around and around the Earth
	Lunar Cycle	The amount of time it takes the moon (about a month) to orbit the Earth and rotate on its axis
	New Moon	Moon that cannot be seen because it is located between the sun and the Earth
	First Quarter	Half lit on the right side














Visual	Term	Definition
	Full Moon	Completely lit
	Last Quarter Moon	Half lit on the left side
	Waxing	Growing
	Waxing Crescent	Glowing with less than of the moon looks lit on the right side
	Waxing Gibbous	Growing with more than half lit on the right side
	Waning	To decrease
	Waning Gibbous	Decreasing and more than half lit on the left side
	Waning Crescent	Decreasing and less than half lit and on the left side
	Navigation	A method of figuring out position, course, and distance traveled
	Ecosystem	An outdoor environment where living and nonliving things interact with each other
 Biotic	Biotic	Living characteristics of an ecosystem
 Abiotic	Abiotic	Nonliving characteristics of an ecosystem


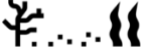












Visual	Term	Definition
Environment 	Environment	Everything that surround and effect living and nonliving things
	Producers	Make food and oxygen for the animals
	Consumers	Eat other living things to survive
	Decomposers	Breaks down dead or decaying organisms.
	Drought	A lack of precipitation over an extended period of time
	Heat Wave	Extremely high temperatures
	Migrate	Move
	Pollution	To cause harm to the Earth
	Succession	When an ecosystem is changed by a new organism that starts to grow and live in that ecosystem
	Secondary Succession	Occurs in areas that have little or no soil and creates a new ecosystem where one did not exist before









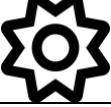





Visual	Term	Definition
	Primary Succession	Occurs when an existing ecosystem has been destroyed or disturbed
	Detrimental	A negative effect that achieves loss, injury, or damage, or is harmful
	Beneficial	A positive effect or achieves a good result
	Invasive Species	Living things not naturally found in that ecosystem,
	Adaptation	A characteristic of a living thing that helps it survive in its environment
	Structural Adaptation	A physical feature that an organism has evolved in order to survive
	Behavioral Adaptations	Something an organism does to improve its survival
	Physiological Adaptations	Something that happens within an organism to change the chemical processes going on inside its cells
	Environmental Adaptations	When the environment in which the animal or plant lives changes
	Predator	An animal to obtain food by killing and eating another animal
	Carnivorous	Meat eater












Visual	Term	Definition
	Prey	An animal that is eaten by another animal
	Sensory Information Processing	When the brain sorts out all of the important messages from the senses and tells the body what to do in response
	Innate Behavior	Instincts
	Imprinting	To come to recognition
	Learned Behavior	Modifying behavior based on experience
	Observational Learning	When an animal watches another animal do something
	Habituation	When an animal becomes desensitized to something that happens repeatedly without providing any new information
	Associative Learning	When an animal makes a connection between two or more experiences
	Species	A group of similar organisms that are able to reproduce
	Diversity	Difference
	Organism	Any life form
		


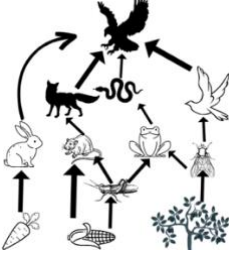
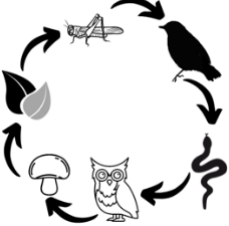





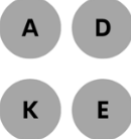


Visual	Term	Definition
	Natural Selection	Organisms have adaptations that make them better able to live in the environment
	Inheritance	A passing on of favorable traits or characteristics to offspring
	Reproduction	A process by which organisms make more of themselves
	Extinct	All of the members of the species die before they can reproduce again
	Endangered Species	A species of which there are very few organisms still alive
	Land Conservation	The process of protecting natural land and returning developed land to its natural state
	Preservation	Lands and their natural resources should not be consumed by humans and should instead be maintained in their pristine form
	Intrinsic Value	Is valuable in itself simply existing
	Renewable Resources	Resources that are replenished by the environment over relatively short periods of time
	Conservation	The proper management of a resource to prevent its destruction or exploitation
	Ecological Balance	An ecosystem where species coexist with other species to create a sustainable environment
	Non-renewable	A resource is a natural resource that cannot be readily replaced by natural means at a pace quick enough to keep up with consumption












Visual	Term	Definition
	Reduce	Limiting the amount of waste which we produce in our everyday life
	Reuse	Taking an item and using it again
	Recycle	Break down an item and to make something new from the materials
	Rain Garden	A shallow area that is designed to capture and filter rainwater that runs off from roofs, driveways, and lawns
	Herbivore	Animals that eat mostly plant or parts of plants like fruits or seeds
	Carnivores	Animals that eat only meat
	Omnivores	Animals whose diet include both plants and animals
	Nutrients	Substances that allow your body to make energy, build and maintain body tissues, and regulate bodily processes
	Photosynthesis	Plants making their own food



Visual	Term	Definition
	Glucose	A type of sugar that is our cell's main source of energy produced by the leaves of plants
	Food Web	Several food chains pieced together that follow the flow of energy in an ecosystem
	Food chain	The transfer of food energy from plants to an animal and then to another animal
	Apex Predator	Top of the food web
	Primary Producers	Organisms that make their own food from sunlight
	Primary Consumer	Eats primary producers
	Secondary Consumer	Eats primary consumers
	Vitamins	Nutrients your body needs to function and fight off diseases
	Fat Soluble Vitamins	Stored in your fat cells which requires fat to be absorbed



Visual	Term	Definition
	Water Soluble Vitamins	Not stored in your body
	Minerals	Help your body grow and stay healthy
	Nutrition	The process of taking in nutrients from foods
	Macronutrients	Nutrients that are required in large quantities
	Micronutrients	Nutrients that are required in small quantities
	Endurance	The ability to be physically active for long period of time
	Diet	Everything a person or animal eats
	Food Pyramid	A visual guide created to show a person what to eat each day to be healthy
	Servings	A set amount of food a person should eat

Learning in Action: Grade Level Skills



Examples of Grade Level Skills

As fourth grade students learn about life, physical, and earth sciences, they will develop skills of observation, actively conduct investigations, have opportunities to use the properties of the scientific method to use their senses and other tools to gather data, and time to talk about their observations with peers. Important goals for the year include:

- Explain how forces affect the motion of an object and how magnets, iron, and electrically charged objects may interact.
- Classify, describe, and compare the physical properties of rocks and minerals.
- Recognize basic forms of energy (light, sound, heat, electrical, and magnetic).
- Explain how light travels.
- Explain the causes of day and night and phases of the moon.
- Compare fossils and explain the processes that change the surface of the Earth.
- Explain the effects of environmental changes, adaptations and behaviors that enable animals to survive in changing habitats.
- Classify substances as food or non-food and explain the benefits of vitamins, minerals, and exercise to the human body.

Resources

Links and online resources to allow you to support your child's learning.

- [Magnets on Science Trek](#)
- [Learn About Static Electricity](#)
- [Learn How to Garden](#)
- [Science Buddies](#)
- [Electromagnetism with NeoK12](#)
- [Sciencewiz](#)
- [PBS Learning Media](#)
- [Matter and Energy Games](#)
- [Rocks and Minerals](#)
- [Minerals in Your House](#)
- [Rock Cycle](#)
- [Landslides](#)
- [Volcano Activities](#)
- [Earthquakes](#)
- [Weathering and Erosion](#)
- [Moon Games](#)
- [Moon Phase Practice](#)
- [All About the Moon](#)
- [National Geographic](#)
- [What Are Invasive Species?](#)
- [What Is Natural Selection?](#)



- [Recycle Roundup](#)
- [Recycling Game](#)
- [Recycle with Mr. Nussbaum](#)
- [Photosynthesis Activities](#)
- [Forest Food Web Game](#)
- [Kids Corner at Nutrition.Gov](#)
- [Vitamins and Minerals](#)
- [Fitness Games for Kids](#)

At-Home Connections

- Use of the scientific method to make observation, hypothesis, and conclusions
- Use of journals or science notebooks to document the exploration of science topics
- Encourage students to utilize developing math skills
- Provide real-life connections to content

Challenges to Anticipate

One challenge students may have is the appropriate use of the scientific method in exploring the world around them. To obtain the most accurate information students should follow the following steps:

1. Make an observation using the 5 senses
2. Ask a question.
3. Form a hypothesis or testable explanation.
4. Make a prediction based on the hypothesis
5. Test the prediction
6. Form an analysis and conclusion based on the measurable results.
7. Use the results to make new hypotheses or predictions.

The scientific method and scientific inquiry do not stop at the end of the experiment, but is rather a continuation using the information gathered from the original investigation. It is also important to remember that observations and hypothesis must be measurable and include a time frame for a result to occur. This aids in the development of sound experimentation and accurate results.

Communicating with Your Child's Teacher

Still feeling stuck? Reach out to your child's teacher to discuss what you can do further your child's learning. Some questions that might guide your discussion:

- What resources would you suggest I use to support my child?
- Where do you see my child struggling? What can we do together to help?
- What should my child practice at home?
- What collective message can we send together to help my child learn?



Need Technical Help?

Reach out to your student's home school for technical assistance. Include the type of device (PC, Mac, Chromebook, etc.) and browser (Chrome, Firefox, Safari, etc.).

Citations

All images created using Canva for Education or Google Drawings