RETHINK EDUCATION
North Carolina Department of Public Instruction

An At-Home Guide for Families

6th Grade Science in North Carolina Public Schools

Course Outline

At the end of the course, my child will know…

- how to explain and describe forces and motion, wave properties, and sound and light waves
- how to describe atoms and particle behavior in matter
- how to explain energy transfer and the form and function of different types of waves
- how to explain the structure of the solar system and the impact it has on our seasons
- how to identify the different structures of Earth and describe geologic results of shifts in our planet
- how to summarize the structures and functions of plants
- how to explain the interactions of living and nonliving things on our planet

Curious what the specific standards are for 6th 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** aligned to the course standards.

Key Vocabulary

Visual	Term	Definition
	**Wave**	disturbance that transmits energy through matter or empty space.
	**Medium**	a substance through which a wave can travel. It can be solid, liquid, or gas. Plural is media.
	**Crest**	the highest point of a transverse wave.

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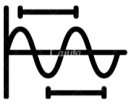
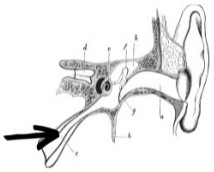
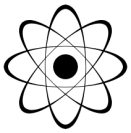
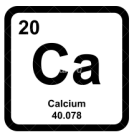
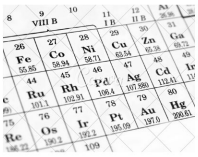
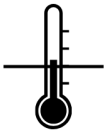
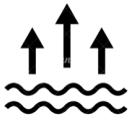
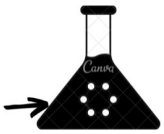
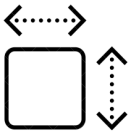
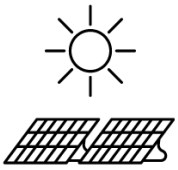
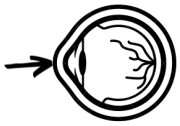
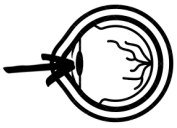
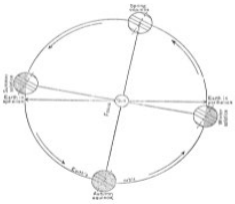
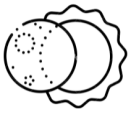
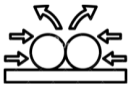
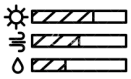
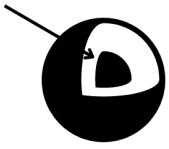
Visual	Term	Definition
	**Trough**	the lowest point of a transverse wave.
	**Reflection**	the change in direction of a wave when it hits a surface and does not go through it
	**Refraction**	the bending of a wave when it passes through a substance and its speed changes
	**Diffraction**	the change in direction of a wave when it finds a barrier or an edge, such as a gap between objects
	**Amplitude**	how far a wave rises higher or dips down from its resting position in a transverse wave
	**Wavelength**	the distance between two successive troughs or crests of a light wave, or two successive compressions or rarefactions of a sound wave
	**Frequency**	the number of waves that pass a point in a specific amount of time
	**Electromagnetic Spectrum**	a diagram that illustrates the types of transverse waves that transmit electromagnetic energy
	**Radiation**	a type of energy transfer that does not require a medium in which to travel
	**Visible Light**	a portion of the electromagnetic spectrum that can be seen by the human eye
	**Pitch**	how high or low a sound is perceived
	**Ear Canal**	passageway through which sound travels to the middle ear

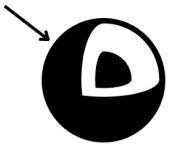
Visual	Term	Definition
	**Eardrum**	a circular piece of skin that vibrates when sound waves come into contact with it
	**Eustachian Tube**	a passageway that connects the ear to the back of the mouth; helps to equalize pressure on both sides of the eardrum
	**Atom**	the smallest particle of an element that has the same properties of the element
	**Atomic Number**	number of protons in an atom
	**Element**	substance composed of only one type of atom
	**Periodic Table of Elements**	a table that shows the elements arranged in order of increasing atomic number
	**Solid**	state of matter in which particles are tightly packed; solids keep their shape and have a definite volume
	**Liquid**	state of matter in which particles are not as tightly packed as solids; liquids have a definite volume and take the shape of the container they are in
	**Gas**	state of matter in which particles are very spread apart; gases have no definite volume and can spread out indefinitely
	**Temperature**	measure of how hot or cold an object is

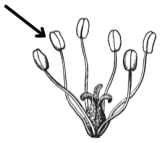
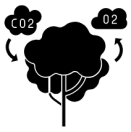
Visual	Term	Definition
	**Melting**	change in phase from solid to liquid
	**Freezing**	change in phase from liquid to solid
	**Condensation**	change in phase from gas to liquid
	**Vaporization**	change in phase from liquid to gas
	**Mass**	the amount of matter in a substance; does not change no matter where this substance is located in the universe
	**Weight**	a measure of the pull of gravity on the mass of a substance; can change depending on where an object is in the universe
	**Melting Point**	temperature at which a substance changes from its solid state to its liquid state
	**Freezing Point**	temperature at which a substance changes from its liquid state to its solid state
	**Boiling Point**	temperature at which a substance changes from its liquid state to a gas
	**Volume**	amount of space occupied by an object
	**Density**	how tightly packed the particles of a substance are

Visual	Term	Definition
	**Solute**	the substance that dissolves into a solvent
	**Solvent**	the substance the solute dissolves into; usually a liquid such as water
	**Surface Area**	measure of the total area that the surface of the object takes up
	**Law of Conservation of Energy**	energy cannot be created or destroyed; it can only be transformed from one form to another
	**Mechanical Energy**	energy due to an object's motion or position
	**Thermal Energy**	energy felt as heat
	**lens**	sits behind the iris; changes its shape to focus light onto the retina
	**cornea**	clear and curved, and sits at the front of the eye; protects the eye and helps the lens focus light
	**pupil**	black circle in the middle of the eye; allows light to enter the eye
	**retina**	layer of tissue in the back of the eye that contains photoreceptors (which sense light) and sends images to the brain
	**conductor**	material that transfers energy efficiently

Visual	Term	Definition
	**insulator**	material that blocks the transfer of energy
	**solstice**	the day when the poles are tilted as far toward or away from the Sun as possible
	**equinox**	the Earth experiences nearly equal amounts of daylight, and the Earth's axis points neither toward nor away from the Sun
	**satellite**	any object that revolves around, or orbits, another object
	**lunar cycle**	the amount of time it takes for the moon to complete one revolution around Earth
	**new moon**	the moon is between Earth and the Sun, and people on Earth see the half of the moon that is in shadow; scientists consider this the beginning and end of each lunar cycle
	**tide**	cyclical rise and fall of ocean levels caused by the gravitational pull exerted by the moon and the Sun, as well as the rotation of the Earth
	**lunar eclipse**	occurs when the moon moves into the path of Earth's shadow

Visual	Term	Definition
	**solar eclipse**	occurs when the Earth moves into the path of the moon's shadow
	**solar system**	consists of the star that is closest to us (the Sun), eight planets, many moons, asteroids, meteors, comets, dust and gases, and plenty of empty space
	**inertia**	the tendency of an object at rest to stay at rest unless acted upon by an external force, and an object in motion to stay in motion unless acted upon by an external force
	**asteroid**	small rocky body that orbits the Sun
	**atmosphere**	layer of gases that surrounds a planet
	**climate**	average weather patterns over a long period of time
	**core**	the central part of the Earth

Visual	Term	Definition
	**crust**	the outer most layer of the Earth
	**Pangea**	a hypothetical supercontinent that included all current land masses, believed to have been in existence before the continents broke apart during the Triassic and Jurassic Periods.
	**deposition**	when rocks are moved to a new place due to erosion
	**erosion**	process by which sediments are removed by water, wind, ice, and gravity
	**permeability**	ability to transmit air and water through POROUS rock or sediments, soil that is permeable will allow water to move through the soil
	**organic material**	comes from plants, insects, birds, animals, or any other thing that was once alive. As the decomposers, such as any organism, especially a soil bacterium, fungus, or invertebrate, that decomposes organic material, eat the dead organisms, and then excrete their waste, the soil becomes richer and darker
	**hydrosphere**	all the water on the earth's surface

Visual	Term	Definition
	**stamen**	male part of the flower
	**pistil**	female part of the flower
	**photosynthesis**	the process in which plants convert sunlight, water, and carbon dioxide into food (sugars and starches), oxygen and water
	**germination**	the beginning of growth of a plant from its seed.
	**biosphere**	parts of the Earth where life exists
	**nitrogen cycle**	movement of nitrogen between the environment and living things
	**hydrotropism**	response to water
	**phototropism**	response to light

Visual	Term	Definition
	**thermotropism**	response to changes in temperature
	**thigmotropism**	response to touch
	**adaptations**	the process of change by which an organism or species becomes better suited to its environment
	**biome**	region of Earth where climate determines the types of plants and animals that live there
	**carrying capacity**	maximum number of individuals of a species that the environment can carry and sustain

Learning in Action: Grade Level Skills

Examples of Grade Level Skills

Examples of grade level skills by content area as follows:

1. Explain the different types of waves, the parts of each wave, and examples of waves in real life.

2. Pick one of the following bridges: The Brooklyn Bridge, Golden Gate Bridge, or Tower Bridge in London. Research how it was designed to sustain temperature changes and general use. Be sure to research the materials used to build it as well.

3. Could the melting point and boiling point of a substance be the same temperature? Why or why not?

4. If you go to the moon, is your weight the same? Is your mass the same? Why or why not?

5. You have impressed your teacher with your knowledge of tides and would like you to create a review about tides. Your review needs to include the following items.
   - Definition of tides
   - Reason for tides
   - Explain why high tide occurs on opposites sides of Earth at the same time with at least one diagram
   - Explain spring tides and include at least one diagram
   - Explain neap tides and include at least one diagram

6. What are some ways to prevent erosion and why is soil conservation important?

7. Explain how plants defend themselves against predators.

8. Explain the steps in the carbon cycle and why it is important for life on Earth.

Resources

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

- Bill Nye the Science Guy Website
- IXL 6th Grade Science
- Common Sense Educaiton - Terrific Websites for Science
- National Geographic - LEARN AT HOME: GRADES 6-12
- Khan Academy Science
- Crash Course Kids Science

At-Home Connections

- When we look through a telescope at stars and other things in space, we are seeing light from many years ago. Is it worth observing space if we are actually observing what it was like many years ago?
- What knowledge might we gain from observing and investigating other galaxies even though we can't visit them?
- Should research tackle issues on Earth, such as climate change, be prioritized over space research? Why or why not?
- If we found a planet that humans could live on, would we have a right to move there?
- What is the difference between forms and sources of energy? For example, potential and kinetic energy or tidal and solar sources of energy.
- When a fast-moving car brakes, where does the energy go?
- Some of the energy we produce is wasted. For example, heat from a light bulb. Could we ever make use of all wasted energy?
- Think of examples of forces that you know about. What are the similarities and differences between them?
- Do forces explain why things happen?
- How can we know that atoms exist and understand them if they are invisible?
- Atoms were thought to be indivisible (not able to be broken down). Now we know that they are made of smaller particles. Should we still think of them as the building blocks of matter?
- If scientists found a new particle that they thought was the smallest part of an atom, how could they be sure that there wasn't anything smaller?
- Can you think of anything that is not made of atoms?
- What is a chemical?
- In the past we have used chemicals that we thought were safe that have turned out to cause harm. Such as lead. How can we be sure that we are not repeating our mistakes?

- Should dangerous chemicals be banned or destroyed completely?
- Are all chemicals that occur naturally safe?
- If ecosystems are damaged by human activity should we try to reverse this?
- How reliant are you on relationships with other organisms?
- Could a human survive without any relationships with other humans after it is born? If not, what does this mean for us?
- How is a human being similar to an ecosystem?
- Are your organs alive?
- Scientists are developing new methods to grow organs from cells in a lab. Is an organ grown in a lab as alive as one in the body?
- You can't live without the bacteria inside you, so are they part of you as a living organism?
- Cells in the human body are regularly replaced. For example, skin cells only exist for about two weeks. Does this mean you don't have the same body throughout your life?
- Why is it so difficult to tell what makes us healthy or unhealthy?
- What aspects of your health are you responsible for and what aspects are you not responsible for?
- Why are there often misleading claims about health in the media and online?
- Why is it important that scientists think about possible errors in their method or results?
- Why is it important for scientists to repeat each other's experiments?
- If scientists kept the results of experiments secret from other scientists, would that be bad for science?
- Are there any results of investigations that scientists shouldn't share? For example, if an astronomer spotted a comet unavoidably heading to Earth, should they tell people?
- Do we only make scientific progress when the results support the hypothesis?
- If a new theory is not exactly right, can it still be useful?
- What is the difference between a guess and a hypothesis?
- Is a hypothesis always just true or false or are there other possible outcomes?
- Do scientists always need a hypothesis?
- What might be the problem with expecting your hypothesis to be true?
- Why is it important that scientists use all of their results and not just some of them?
- If results show that a hypothesis isn't exactly right, does that mean it's false?
- What should we do if the evidence neither supports nor contradicts the hypothesis?
- How is scientific knowledge used in society?
- How does society affect science?
- Who should get to decide what scientific research is carried out?
- Are there any ways that scientific knowledge could harm society?

Challenges to Anticipate

It is common for many students (even those who are computer savvy) to struggle in an online course. For example, students may need extra support with:

- Time management
- Organization
- Focus Strategies
- Technical skills like creating videos or uploading assignments
- Course Navigation

These struggles are normal, acceptable, and developmentally appropriate. You can utilize the support and resources around the platform and technical issues that are provided. You can also find more about supporting your online learner at Edmentum and Common Sense education.

In terms of the science content, some students may struggle with things like:

- New Vocabulary Words
- Critical Thinking
- Making Connections

You can support your students by keeping this document handy to help you with the vocabulary words in each section. You can also learn more about critical thinking and making connections in science using the links below.

Critical Thinking

Making Connections

Communicating with Your Child's Teacher

Still feeling stuck? Reach out to your child's teacher to discuss what you can do to 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:

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