

GRADE 7 SCIENCE

Key Features

Focus Areas

- structures and properties of matter,
- chemical processes,
- energy,
- ecosystem dynamics, and
- global climate change.

By the end of Grade 7, students can

- Describe the atomic composition of simple molecules and extended structures.
- Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred, including evidence for the conservation of mass.
- Describe the proportional relationships of kinetic energy to the mass of an object and to the speed of an object, including the transfer of kinetic energy to and from objects.
- Describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
- Describe how food molecules in plants and animals are rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem, including changes to physical and biological components, such as biodiversity.
- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- Explain how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- Ask questions to clarify evidence of the factors that have impacted global temperatures over the past century.

Home to School Connections

Questions you can ask your learner could include:

- How does our body break down and use energy from food?
- How has the global temperature changed over the last century?
- What are the components of an ecosystem?

Questions you can ask your learner's teacher could include:

- What resources are available in the community to support the concepts learned in class?
- How is the learning in this course connected to learning opportunities available in high school and beyond?

Activities and learning you can do outside of the classroom to support your learner could include:

- Draw a comparison of the structures of diamond and graphite, both made from carbon. A diamond is a hard, crystalline structure created by high pressure within Earth or created synthetically in a lab. Graphite is soft and used in pencils. It is arranged in layers.
- Common reactions to observe include milk curdling, baking soda reacting with vinegar, and bicarbonate tablets (an antacid) dissolving in water. Conduct one of these reactions and make observations about the rate of the reaction, changes made to the reactants, and the result.
- Natural resources undergo a chemical process to form a synthetic material. For example, plastic is made from petroleum (the resource also used to fuel cars). Travel to a local store and observe the amount and variety of plastic used in packaging and materials for everyday items. Talk about how the discovery of plastic has changed our society.
- Kinetic energy is energy used for motion. Riding a bicycle at different speeds, rolling different sizes of rocks downhill or being hit by a wiffle ball versus a tennis ball are all great examples of kinetic energy.

- Potential energy is stored energy. View or ride a roller coaster. When the cart is at the top of a hill, it has stored energy that will be used for motion once it rolls down the hill.
- Identify a scenario where there was a scarcity or abundance of a resource. Discuss how competition with others and access to the resource played a role.
- Choose an ecosystem you are familiar with and identify organisms that show the following types of interaction: competitive, predatory, mutually beneficial, and/or parasitic.
- Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Draw an example food web from a local ecosystem. Identify what would happen if there was a disruption to a physical or biological component of the ecosystem.
- Humans can benefit from healthy ecosystems. Water purification, nutrient recycling, pollination, and prevention of soil erosion are some examples.
- Human populations have a direct impact on Earth systems. Examine the following human environmental impacts: water usage, land usage and pollution. Discuss solutions your community could use to reduce the impact.

Resources

- Biology4Kids (<http://biology4kids.com/>)
- Chem4Kids (<http://www.chem4kids.com>)
- CK-12 Foundation (<https://www.ck12.org/student/>)
- Discus (<https://www.scdiscus.org/>)
- Geography4Kids (<http://www.geography4kids.com/>)
- Khan Academy (<https://www.khanacademy.org/>)
- PBS LearningMedia (<https://scetv.pbslearningmedia.org/>)
- Physics4Kids (<http://physics4kids.com/>)
- SC Department of Natural Resources (<https://www.dnr.sc.gov/>)
- The Weather Channel (<https://weather.com/>)