# 6TH GRADE SCIENCE

Students should be able to use science and engineering practices and understand the following content:

## Science and Engineering Practices

- Development of habits of mind that are necessary for scientific thinking and that allow students to engage in science in ways similar to those used by scientists and engineers
- Asking and answering questions about the natural world
- Developing and using models to (1) build understanding of phenomena, processes and relationships, (2) test devices or solutions, or (3) communicate ideas to others
- With teacher guidance, conduct structured investigations to answer scientific questions, test predictions, and develop explanations
- Collecting and analyzing data from investigations to construct explanations and communicate results
- Using mathematical and computational thinking in collecting and communicating data
- Using technology to collect data and in communication of results

## Earth Science (Atmospheric Composition, Water Cycle, Weather Data, Climate)

- Demonstrate an understanding of the interactions within the Earth's systems (flow of energy) that regulate weather and climate
- Describe and model atmospheric properties such as gases, temperature, pressure, and altitude
- Examine evidence for and against how natural and human factors may contribute to atmospheric composition
- Describe the water cycle in detail
- Analyze and interpret weather data from multiple sources (local conditions, satellite data, weather maps, radar)
- Describe how moving air masses, pressure systems, and frontal boundaries result in weather conditions and storms
- Develop and use models to show how solar energy and convection impact weather patterns and climate (global winds, jet stream, ocean currents)
- Discuss the many factors that can contribute to weather in a given area

## Physical Science (Properties of Energy, Forces)

- Demonstrate an understanding of the properties of energy, the transfer and conservation of energy, and the relationship between energy and forces
- Describe the properties and compare sources of different forms of energy (mechanical, electrical, chemical, radiant, and thermal)
- Develop and use models that illustrate the conservation of energy (kinetic to potential and vice versa)
- Explain how energy is conserved as it is transferred and transformed in electrical circuits
- Discuss magnetic fields that are produced by electric currents in electromagnets, generators, and simple electric motors
- Discuss and describe heat transfer via conduction, convection, and radiation
- Investigate the kinds and uses of simple machines
- Design and test ways that the efficiency of a simple machine can be improved

## Life Science (Animal Classification, Adaptations, Behaviors, Protists, Fungi, Plants)

- Demonstrate an understanding of how scientists classify organisms and the structures, processes, behaviors, and adaptations of animals that allow them to survive
- Describe and provide evidence that organisms need energy, are able to respond, reproduce, and grow
- Practice classifying organisms based the current hierarchical taxonomic scheme
- Describe characteristics of vertebrates and invertebrates and discuss the diversity of life in both groups
- Describe the various adaptations that help the survival of different kinds of organisms
- Describe various ways that animals respond to their environments
- Explain differences between innate and learned behaviors
- Analyze and explain how ectothermic and endothermic animals are adapted and respond to their environments
- Demonstrate an understanding of the structures, processes, and responses that allow protists, fungi, and plants to survive and reproduce
- Compare the ways in which protists (Euglena, paramecia, and amoebae) and fungi carry out life functions
- Describe how fungi respond to external stimuli
- Compare how vascular (conducting tissue) and nonvascular plants move water and food
- Describe how the processes of photosynthesis, respiration, and transpiration are used by plants to meet their survival needs
- Describe the adaptations that aid in the survival of flowering plants
- Plan and conduct investigations to determine the kinds of factors related to plant growth and development

## Activities:

- Check the weather forecast and various weather maps online.
- Weather apps are also sources of not only local but, global weather. The Weather Channel also broadcasts programs.
- Follow the weather forecast for a week or so. How on target were the predictions?
- Go on a hike to a local pond, park, nature center, or wetlands.
- Photograph the animals and plants and discuss how they rely on water.
- Look for human impacts on the environment. What are the pros and cons of things you see?
- Make a list of all the ways in which you use energy.
- Find out how hybrid and electrical cars work.
- How does magnetic resonance imaging work?
- Read about and discuss the Earth's magnetic field.
- Discuss animal and plant adaptations.
- Visit a nature center, a pond, a lake, the shore, etc. Talk about the similarities and differences you see in plants and animals and where each lives.

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- Read about endangered species and the reasons they are endangered.
- Many good sources about plants and animals are online. Sit down with your child and explore. Remember too, that nothing surpasses the outdoors.

## Books:

- Amato, Carol. *Backyard Pets: Activities for Exploring Wildlife Close to Home*
- Beller, Joel and Carl Raab. *Hands-on Science Series: Plants*
- Bundey, Nikki. *Storms and the Earth: The Science of Weather Series*
- Elsom, Derek. *Weather Explained: A Beginners Guide to the Elements*
- Galiano, Dean. *Clouds, Rain and Snow*
- Haber, Louis. *Black Pioneers of Science and Invention*
- Hickman, P. *Starting with Nature: Plant Book*
- Hickman, Pamela. *Animals and Their Mates: How Animals Attract, Fight for, and Protect Each Other*
- Kaner, Etta and Pat Stephens. *Animals at Work: How Animals Build, Dig, Fish, and Trap*
- McKinney, Barbara. *A Drop Around the World*
- Nankivell-Aston, Sally and Dorothy Jackson. *Science Experiments with Simple Machines*
- Parker, Steve. *Kingdom Classification: Protozoans, Algae & Other Protists*
- Snedden, Robert. *Plants and Fungi: Multicelled Life (Cells and Life)*
- Van Cleave, Janice. *Physics for Every Kid*

## Web Sites:

- AAAS Science Netlinks - www.sciencenetlinks.com
- Bill Nye, The Science Guy - www.billnye.com
- Biology4Kids - www.biology4kids.com
- Learning Network Parent Channel - www.familyeducation.com
- Physics for Kids - http://www.physics4kids.com/
- The Franklin Institute - www.fi.edu/learn
- The Weather Channel - www.weather.com/