

8th Grade Science Syllabus

School: Smoky Mountain Elementary School

Teacher: Mrs. Gilland

Room: E131

School Year: 2026-2027

Course Description

Welcome to 8th Grade Science! This course will provide a deeper understanding of the physical world around us, focusing on key concepts in physical science, Earth and space science, and engineering design. We will engage in hands-on investigations, data analysis, and problem-solving to explore topics like forces, waves, plate tectonics, and human impacts on our planet. The curriculum is designed to help students develop critical thinking skills and an evidence-based perspective on scientific phenomena.

Units of Study and Tennessee State Standards

This course is structured around the following core units, each aligned with specific Tennessee State Standards.

1st 9 Weeks

Unit 1: Physical Science - Motion, Waves, and Energy

- **8.PS1.1** Use a model to understand that atoms are a system composed of a positively charged nucleus surrounded by one or more negatively charged particles called electrons.
- **8.PS1.2** Develop a model to explain how the light coming from distant stars and the formation of heavier atoms is the result of changes in the composition of the nucleus of the atom and the energy released during the process of nuclear fusion.
- **8.PS2.1** Conduct an investigation to provide evidence that the size of force fields (electric and magnetic) depends on the magnitudes of the charges, current, or magnetic strengths involved and the distances between interacting objects.
- **8.PS2.2** Ask scientific questions about data to determine how manipulating variables can increase or diminish the electric current and magnetic field strength in electromagnets, generators, and electric motors.
- **8.PS2.3** Construct an argument using evidence to support the claim that gravitational interactions in a large-scale system (e.g. galaxies and solar system)

are attractive and depend on the masses of and distance between interacting objects.

- **8.PS2.4** Construct an explanation to describe why the position and motion of object(s) in a system, and the effects of forces on those objects, vary with respect to the observer.
- **8.PS2.5** Plan and conduct an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
- **8.PS2.6** Evaluate and interpret that for every force exerted on an object there is an equal force exerted in the opposite direction.

Unit 3: Engineering, Technology, and Applications of Science

- **8.ETS1.1** Use a model of a device that incorporates an electromagnet to test solutions to a design problem with specific criteria and constraints.

2nd 9 Weeks

- **8.PS4.1** Develop and use models to represent the basic properties of waves in a system including frequency, amplitude, wavelength, and speed.
- **8.PS4.2** Construct explanations from observed patterns of wave behaviors to compare and contrast mechanical waves and electromagnetic waves based on refraction, reflection, transmission, absorption, and their behavior through a vacuum and/or various media.
- **8.PS4.3** Engage in argument from evidence to support the claim that digitalized signals, sent as wave pulses, are more reliable than analog signals to transmit information in a system.
- **8.LS4.1** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change in life forms throughout Earth's history.
- **8.LS4.2** Construct an explanation addressing similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.
- **8.LS4.3** Construct an explanation based on evidence that explains how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing.
- **8.LS4.4** Develop a scientific explanation of how natural selection plays a role in

determining the survival and reproduction of a species in a changing environment

- **8.LS4.5** Obtain, evaluate, and communicate information about the technologies that have changed the way humans use artificial selection to influence the inheritance of desired traits in other organisms.

3rd 9 Weeks

Unit 2: Earth and Space Science

- **8.ESS1.1** Research, analyze, and communicate that the universe began with a period of rapid expansion using evidence from the motion of galaxies (i.e. redshift and blueshift), elemental concentrations of hydrogen and helium, and cosmic background radiation.
- **8.ESS2.1** Analyze and interpret data to support the assertion that rapid or gradual geographic changes lead to drastic population changes and extinction events.
- **8.ESS2.2** Evaluate data collected from seismographs to create a model of Earth's structure and to understand how energy is derived from Earth's hot interior.
- **8.ESS2.3** Gather and evaluate evidence that energy from the earth's interior drives convection cycles within the asthenosphere which creates changes within the lithosphere including plate movements, plate boundaries, and sea-floor spreading.
- **8.ESS2.4** Construct a scientific explanation using data that explains the gradual process of plate tectonics accounting for (a) the distribution of fossils on different continents, and (b) continental and ocean floor features (i.e. mountains, volcanoes, faults, and trenches).
- **8.ESS3.1** Collect data, map, and describe patterns in the locations of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hotspots in order to forecast the locations and likelihoods of future events.
- **8.ETS2.1** Research and communicate information to describe how data from technologies (e.g. telescopes, satellites, space probes, seismographs) provide information about Earth and objects in space and how those scientific discoveries have in turn led to improved technologies.

4th 9 Weeks

During this time we will be practicing for the TCAP Test which will be given April 12th - 30th. We will have 3 weeks left after TCAP at which time we will be doing STEM Activities.

Case Benchmark Testing:

1st Test - Oct. 1st - Oct.9th

2nd Test - Dec. 9th - Dec. 17th

3rd Test - March 2nd - March 12th

Grading Policy

- **90-100 A**
- **80-89 B**
- **70-79 C**
- **60-69 D**
- **Below 59 F**

Grades will be taken on the following:

- Mastery Connect Test
- Edulastic Spiral Review
- Study Island Practice Sessions

Classroom Expectations

- **Be Respectful:** Treat your classmates, your teacher, and the classroom with respect.
- **Be Responsible:** Come to class prepared with all necessary materials and be on time.
- **Be Engaged:** Participate actively in discussions and activities. Ask questions and share your ideas.

Materials Needed

* Notebook specifically for science

- Pencil
- Loose-leaf paper
- Optional: Colored pencils or markers

This syllabus is subject to change at the teacher's discretion.

