

West Virginia Board of Education Content Standards Policies

The authoritative document is [WVBE Policy 2520.1A](#). The document you are reading attempts to present this in a more easily digestible fashion while making some suggestions about implementation in a small group setting. It is adapted from the material starting on page 40 (the 41st page of the PDF), and was initially copied from <https://wvde.us/tree/early-learning-p-5/grade-5/science-grade-5/>.

Science

Fifth Grade Science expands understanding of earth and sky, life cycles and habitats of organisms, properties, positions and motions of objects and energy. Major content concepts at the fifth grade level include changes in properties of matter, structures, functions and adaptations of organisms, and the structure of the earth's system.

Standard	Implementation
<p>S.5.GS.1 Students will develop a model to describe that matter is made of particles too small to be seen.</p>	<p>1. Describe basic atomic theory, utilizing images from electron microscopes and 3D imagery. To illustrate the heat-dependent motion of molecules, perform an experiment showing the thermal expansion of a liquid or gas. To satisfy the graphing requirement of Standard S.5.GS.2, graph volume increase as a function of temperature change¹. (See, for example, Resource 3.)</p>
<p>S.5.GS.2 Students will measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.</p>	<p>2. This will require an accurate scale or balance. Just as not every student is assigned one at school, we may use one in one household and others view via webcam share. It should be explained that when substances are combined, they may react chemically and form a new compound or not react and form a new mixture. This can be explained in terms of item 1. The most significant result is conservation of mass in a chemical reaction. This should be the concluding experiment. (See, for example, Resource 2.)</p>
<p>S.5.GS.3 Students will make observations and measurements to identify materials based on their</p>	<p>2nd semester</p>

¹ It is somewhat puzzling that this standard should mention graphing, when the total mass, being equal, would simply form a horizontal line for all temperatures, mixtures, and products of reactions.

properties.	
S.5.GS.4 Students will conduct an investigation to determine whether the mixing of two or more substances results in new substances.	2 nd semester
Topic: Matter and Energy in Organisms and Ecosystems.	
S.5.GS.5 Students will use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.	(Google "energy cycle in ecosystem" images for ideas. There are many.)
S.5.GS.6 Students will support an argument that plants get the materials they need for growth chiefly from air and water.	2 nd semester
S.5.GS.7 Students will develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	2 nd semester
Topic: Earth's Systems	
S.5.GS.8 Students will develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	Tie in with <i>When Stars Are Scattered</i> from our literature component by getting information on Kenya and/or Somalia.
S.5.GS.9 Students will describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	We will substitute some analysis of rainfall data from climate.gov. Is rainfall changing where we live over time? Students will be guided to write portions of a computer program to analyze and graph pre-downloaded data (or the data access portion will already be written for them).
S.5.GS.10 Students will obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	2 nd semester
Topic: Space Systems-Stars and the Solar System	
S.5.GS.11 Students will support an argument that the gravitational force exerted by Earth on objects is directed down.	In keeping with our explanation of basic principles of physics, give a limited presentation of Fundamental Interaction. Conclude with gravity. Ask for examples from students that gravity is directed toward the center of the earth. Make sure a pendulum is mentioned, as well as the importance of gravity in the water cycle.

S.5.GS.12 Students will support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	2 nd semester (along with S.5.GS.13 – astronomy)
S.5.GS.13 Students will represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	2 nd semester
Grade 3-5: Science (Engineering, Technology, and Applications of Science)	
Topic: Engineering Design	
S.3-5.ETS.1 Students will define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	Provide research into low-tech ways people are addressing water supply in dry areas in Africa and challenge students to think of meaningful improvements.
S.3-5.ETS.2 Students will generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Follow-up on S.3-5.ETS.1.
S.3-5.ETS.3 Students will plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	2 nd semester

Resources

1. Beginning Chemistry by David W. Ball, <https://2012books.lardbucket.org/pdfs/beginning-chemistry.pdf>
2. Law of Conservation of Mass experiment <https://www.youtube.com/watch?v=FZwHH7Sm4hl>
3. Thermal Expansion of Water: Demonstration <https://www.youtube.com/watch?v=IHhvaUdWfDI>
4. Fundamental Interaction https://en.wikipedia.org/wiki/Fundamental_interaction

Syllabus in brief

Focus will be on basic understanding of scientific principles and techniques.

- Structure of atoms and molecules and their interactions, the basis of all matter.
- Obtaining empirical data gathered by others to find out about the geosphere, biosphere, hydrosphere, and/or atmosphere of eastern Africa.
- Researching what applied methods have been used to try to improve conditions in this area.
- Thinking scientifically about what might be done.