Alabama Course of Study
Science

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In Grades 3-5, students are introduced to the full range of scientific knowledge in the domains of Physical Science, Life Science, and Earth and Space Science through content, processes, and application skills. Many content standards build upon prior knowledge while others introduce new concepts and skills. Concrete experiences remain important as students develop abstract-thinking abilities and extend their scientific knowledge. Manipulative skills become more refined, making possible more sophisticated measurement techniques and an expanded use of scientific equipment and technology. Teachers guide students to recognize the important role science plays in society and in the development of technology.

Students in Grades 3-5 are engaged in a learning environment that encourages exploration, inquiry, formulation of models, and application of results based on experiences. As in Grades K-2, such an environment increases opportunities to provide a solid foundation of scientific knowledge and experiences upon which understanding is built. Maintaining a scientific journal of investigations helps students organize experimental information, enhances their reading and writing skills, and allows time for reflection on scientific information and processes.

Students in these grades begin simple independent studies involving variables and increase their abilities to conduct group investigations and work as a team. Effective science instruction inspires their curiosity and encourages independent investigations and discoveries through student-generated questions. As the teacher plans for instruction, attention is given to identifying clear learning goals and providing developmentally appropriate activities that assist students in achieving these goals.
In Grade 5, concrete experiences remain important to students as they conduct scientific inquiries and include evidence of abstract ideas in their explorations. Students refine their abilities to identify variables and increase the accuracy of their predictions based on prior experiences and explanations based on information gathered.

Fifth-grade students need a positive learning environment that encourages and challenges their efforts and progress toward learning science. This environment is supported through active learning opportunities and content-related questions that foster science communication.

As fifth-grade students continue to explore the physical world, they develop detailed comparisons through investigations and hands-on experiences. Students form an understanding of the relationship between food chains and food webs, compare plant and animal cells, and become more knowledgeable about the forms and transfer of energy. They also begin to compare Earth to other planets in our solar system.

**Physical Science**

Students will:

1. Identify evidence of chemical changes through color, gas formation, solid formation, and temperature change.
   
   Example: combining vinegar and baking soda to produce a gas

2. Define mass, volume, and density.
   
   - Identifying the atom as the basic building block of matter
   - Relating temperature changes to particle motion
     
     Example: movement of colored dye in hot and cold water
   - Relating density to the sinking or floating of an object in a liquid

3. Use everyday indicators to identify common acids and bases.
   
   Examples: using grape juice to determine that vinegar is an acid, using juice from boiled red cabbage to determine that baking soda is a base

4. Describe forms of energy, including chemical, heat, light, and mechanical.
   
   - Identifying types of potential and kinetic energy
     
     Examples: potential—water behind a dam, battery; kinetic—water moving across turbine blades
   - Describing alternatives to the use of fossil fuels
     
     Examples: solar energy, geothermal energy, windmill, hydroelectric power, biomass
   - Identifying the transfer of energy by conduction, convection, and radiation
     
     Examples: conduction—hot plate heating a pan, convection—space heater heating air, radiation—sun heating Earth’s surface
5. Contrast ways in which light rays are bent by concave and convex lenses.
   - Describing how a prism forms a visible spectrum
   - Explaining why different objects have different colors
   - Describing how mirrors reflect light
     Example: discussing differences in the reflection of light by convex and concave mirrors
   - Describing the relationship between the structure of the eye and sight
   - Identifying types of corrective lenses used to correct different sight problems
     Examples: convex—farsightedness, concave—nearsightedness
   - Identifying the contribution of van Leeuwenhoek to the development of the microscope

6. Compare effects of gravitational force on Earth, on the moon, and within space.
   - Identifying contributions of Newton to the study of gravity
   - Describing how a spring scale is used to measure weight
   - Explaining how air resistance affects falling objects

**Life Science**

7. Identify common parts of plant and animal cells, including the nucleus, cytoplasm, and cell membrane.
   - Comparing unicellular and multicellular organisms
   - Comparing plant and animal cells

8. Identify major body systems and their functions, including the circulatory system, respiratory system, excretory system, and reproductive system.

9. Describe the relationship of populations within a habitat to various communities and ecosystems.
   - Describing the relationship between food chains and food webs
   - Describing symbiotic relationships

**Earth and Space Science**

10. Identify spheres of Earth, including the geosphere, atmosphere, and hydrosphere.
    - Describing technology used to investigate Earth
      Examples: sonar, radar, seismograph, weather balloons, satellites
    - Describing the rock cycle

11. Compare distances from the sun to planets in our solar system.
    - Relating the size of Earth to the size of other planets in our solar system
    - Identifying technology used to study planets
      Examples: Hubble telescope, space probes, Mars Exploration Rover