

***Standards By Design:***  

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***Seventh Grade for Science***



# Science

## Seventh Grade

Seventh grade science students refine their understanding of how the components and processes within living and non-living systems interact and affect their characteristics and properties. They learn about gravitation, forces, and laws of motion. They study atoms, elements, and compounds. They develop an understanding of reproduction, inheritance, phenotypes, genotypes, chromosomes, and genes. Students learn about the processes plants and animals use to obtain energy and materials for growth. They study how Earth's atmosphere, land forms, resources, and climate change. Students deepen their understanding of scientific inquiry as the investigation of the natural world based on observation and science principles that includes proposing questions or hypotheses, collecting, analyzing, and interpreting multiple forms of data to produce justifiable evidence-based explanations. They build their understanding of engineering design as a process of identifying needs, problems, and constraints, and developing and evaluating proposed solutions.

\*It is essential that these standards be addressed in contexts that promote scientific inquiry, use of evidence, critical thinking, making connections, and communication.

### 7.1 Structure and Function: Living and non-living systems are composed of components which affect the characteristics and properties of the system.

7.1P.1 Explain that all matter is made of atoms, elements are composed of a single kind of atom, and compounds are composed of two or more different elements.

7.1L.1 Compare and contrast sexual and asexual reproduction. Explain why reproduction is essential to the continuation of every species.

7.1L.2 Distinguish between inherited and learned traits, explain how inherited traits are passed from generation to generation, and describe the relationships among phenotype, genotype, chromosomes, and genes.

### 7.2 Interaction and Change: The components and processes within a system interact.

7.2P.1 Identify and describe types of motion and forces and relate forces qualitatively to the laws of motion and gravitation.

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#### Science Numbering Key Example: K.2P.1

**K** = Grade

**2** = Core Standard strand (strands are 1=Structure and Function; 2=Interaction and change; 3=Scientific Inquiry; 4=Engineering Design)

**P** = Science Discipline (disciplines are P = Physical; L = Life; E = Earth and Space; S = Scientific inquiry; D = Engineering Design)

**1** = Number of the content standard for this grade, strand, and discipline

7.2L.1 Explain how organelles within a cell perform cellular processes and how cells obtain the raw materials for those processes.

7.2L.2 Explain the processes by which plants and animals obtain energy and materials for growth and metabolism.

7.2E.1 Describe and evaluate the environmental and societal effects of obtaining, using, and managing waste of renewable and non-renewable resources.

7.2E.2 Describe the composition of Earth's atmosphere, how it has changed over time, and implications for the future.

7.2E.3 Evaluate natural processes and human activities that affect global environmental change and suggest and evaluate possible solutions to problems.

7.2E.4 Explain how landforms change over time at various rates in terms of constructive and destructive forces.

**7.3 Scientific Inquiry:** Scientific inquiry is the investigation of the natural world based on observations and science principles that includes proposing questions or hypotheses, designing procedures for questioning, collecting, analyzing, and interpreting multiple forms of accurate and relevant data to produce justifiable evidence-based explanations.

7.3S.1 Based on observations and science principles, propose questions or hypotheses that can be examined through scientific investigation. Design and conduct a scientific investigation that uses appropriate tools and techniques to collect relevant data.

7.3S.2 Organize, display, and analyze relevant data, construct an evidence-based explanation of the results of an investigation, and communicate the conclusions including possible sources of error.

7.3S.3 Evaluate the validity of scientific explanations and conclusions based on the amount and quality of the evidence cited.

**7.4 Engineering Design:** Engineering design is a process of identifying needs, defining problems, identifying constraints, developing solutions, and evaluating proposed solutions.

7.4D.1 Define a problem that addresses a need and identify constraints that may be related to possible solutions.

7.4D.2 Design, construct, and test a possible solution using appropriate tools and materials. Evaluate the proposed solutions to identify how design constraints are addressed.

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7.4D.3 Explain how new scientific knowledge can be used to develop new technologies and how new technologies can be used to generate new scientific knowledge.

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