

Grade 8 Expectations in Science and Technology/Engineering

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Learning standards are taken from the October, 2006 MA Science and Technology/Engineering Curriculum Framework. The learning standard numbers in this document correspond to the learning standard numbers in the Framework.

Learning standards from the MA Science and Technology/Engineering Curriculum Framework for the end of Grade 8 are numbered and printed in bold. All students are expected to master all grade level expectations.

Strand 1: INQUIRY

**Inquiry is integrated throughout all units rather than taught as a separate unit.*

Curriculum Framework Learning Standard
1. Design and conduct an investigation specifying variables to be changed, controlled and measured.
2. Use more complex tools (e.g., microscopes, graduated cylinders, and timers), technologies (e.g., computer probes) and appropriate measurement units to make observations, collect and organize qualitative and quantitative data.
3. Present and explain data and findings using multiple representations including tables, mathematical and physical models, demonstrations and graphs.
4. Communicate scientific procedures, results, and explanations using appropriate science and technology terminology.
5. Critique and revise investigation explanations and procedures without changing data to match expected results.

**Strand 2: DOMAINS OF SCIENCE
LIFE SCIENCE (BIOLOGY)**

Curriculum Framework Learning Standard
Systems in Living Things
5. Describe the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms.
6. Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion, protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other.
Reproduction and Heredity
7. Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another.
8. Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different pairs of chromosomes.
9. Compare sexual reproduction (offspring inherit half of their genes from each parent) with asexual reproduction (offspring is an identical copy of the parent's cell).
Evolution and Biodiversity
10. Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms.
11. Recognize that evidence drawn from geology, fossils, and comparative anatomy provides the basis of the theory of evolution.
12. Relate the extinction of species to a mismatch of adaptation and the environment.
Energy and Living Things
16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms.
Changes in Ecosystems Over Time
18. Recognize that biological evolution accounts for the diversity of species developed through gradual processes over many generations.

**Strand 3: DOMAINS OF SCIENCE
PHYSICAL SCIENCE (CHEMISTRY AND PHYSICS)**

Curriculum Framework Learning Standard
Properties of Matter
2. Differentiate between volume and mass. Define density.
3. Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits.
4. Explain and give examples of how mass is conserved in a closed system.
Elements, Compounds, and Mixtures
5. Recognize that there are more than 100 elements that combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
6. Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound).
7. Give basic examples of elements and compounds.
8. Differentiate between mixtures and pure substances.
9. Recognize that a substance (element or compound) has a melting point and a boiling point, both of which are independent of the amount of the sample.
10. Differentiate between physical changes and chemical changes.