

## K-12 Science Standards/Benchmarks/Grade Level Expectations (GLE)

Updated 4/7/08

### Standard 1: Students can understand and apply skills used in scientific inquiry.

#### Benchmark 1: Uses scientific reasoning to answer questions or solve problems.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Recognizes a problem or asks a question.	a. Recognizes a problem or asks a question.	a. Recognizes a problem or asks a question.	a. Recognizes a problem or asks a question.	a. Asks a question.	a. Recognizes a problem or asks a question.	a. Recognizes a problem or asks a question.
b. Considers many different explanations.	b. Considers many different explanations.	b. Tests and retests the validity of the most promising solution.	b. Considers many different explanations.	b. Considers many different explanations.	b. Considers many different explanations.	b. Considers many different explanations.
c. Tests and retests the validity of the most promising solution.	c. Tests and retests the validity of the most promising solution.	c. Evaluates solution through collaboration and confirmation of others.	c. Tests and retests the validity of the most promising solution.	c. Understands that science is subject to change.	c. Tests and retests the validity of the most promising solution.	c. Tests and retests the validity of the most promising solution.
d. Evaluates solution through collaboration and confirmation of others.	d. Evaluates solution through collaboration and confirmation of others.	d. Communicates findings.	d. Evaluates solution through collaboration and confirmation of others.	d.	d. Evaluates solution through collaboration and confirmation of others.	d. Evaluates solution through collaboration and confirmation of others.
e. Communicates findings.	e. Communicates findings.	e. Understands that science is subject to change.	e. Communicates findings.	e.	e. Communicates findings.	e. Communicates findings.
f. Understands that science is subject to change.	f. Understands that science is subject to change.	f.	f. Understands that science is subject to change.	f.	f. Understands that science is subject to change.	f. Understands that science is subject to change.

#### Benchmark 2: Analyzes scientific procedures and investigations.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Understands the systematic approach (scientific method) to experiments.	a. Understands the systematic approach (scientific method) to experiments.	a. Distinguishes between hypothesis, observation, and conclusion.	a. Distinguishes between hypothesis, observation, and conclusion.	a. Distinguishes between hypothesis, observation, and conclusion.	a. Distinguishes between hypothesis, observation, and conclusion.	a. Distinguishes between hypothesis, observation, and conclusion.
b. Identifies the purpose of an	b. Identifies the purpose of an	b. Identifies the purpose or hypothesis	b. Identifies the purpose, hypothesis,	b. Identifies the purpose, hypothesis, or	b. Identifies the purpose, hypothesis, or	b. Identifies the purpose, hypothesis,

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experiment.	experiment.	of an experiment.	or research question of an experiment.	research question of an experiment.	research question of an experiment.	or research question of an experiment.
c. Recognizes the control in an experiment.	c. Recognizes the control in an experiment.	c. Recognizes the control in an experiment.	c. Identifies the rationale for a procedure.	c. Identifies the rationale for a procedure.	c. Identifies the rationale for a procedure.	c. Identifies the rationale for a procedure.
d. Identifies the relationship between variables.	d. Identifies the relationship between variables.	d. Identifies the relationship between variables.	d. Identifies the relationship between variables.	d. Identifies the relationship between variables.	d. Identifies the relationship between variables.	d. Identifies the relationship between variables.
e. Identifies flaws in experimental design.	e. Identifies flaws in experimental design.	e. Identifies flaws in experimental design.	e. Identifies flaws in experimental design.	e.	e. Identifies flaws in experimental design.	e. Identifies flaws in experimental design.
f. Selects best procedure.	f. Selects best procedure.	f. Understands how to manipulate variable to investigate new question.	f. Selects best procedure.	f.	f. Selects best procedure.	f. Selects best procedure.
g. Recognizes scientific historical work and implications on modern science.			g. Judges appropriateness of a procedure.		g. Judges appropriateness of a procedure.	g. Judges appropriateness of a procedure.
			h. Understands weakness of procedure.		h. Understands weakness of procedure.	h. Understands weakness of procedure.

### Benchmark 3: Reads and interprets scientific information.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Interprets symbols and data from a table.	a. Interprets symbols and data from a table.	a. Interprets symbols and data from a table.	a. Interprets symbol and data from a table and graph.	a. Interprets symbol and data from a table and graph.	a. Interprets symbol and data from a table and graph.	a. Interprets symbol and data from a table and graph.
b. Selects best evidence.	b. Makes inferences.	b. Makes inferences.	b. Makes inferences.	b. Makes inferences.	b. Makes inferences.	b. Makes inferences.
c.	c.	c.	c. Evaluates adequacy of information.	c.	c. Evaluates adequacy of information.	c. Evaluates adequacy of information.
d.	d.	d.	d. Selects best evidence.	d.	d. Selects best evidence.	d. Selects best evidence.

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### Benchmark 4: Constructs new thinking based on scientific data.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Evaluates hypothesis.	a. Evaluates hypothesis.	a. Evaluates hypothesis.	a. Identifies consequences of changes.	a. Identifies consequences of change.	a. Identifies consequences of change.	a. Identifies consequences of change.
b. Makes predictions.	b. Makes predictions.	b. Summarizes results.	b. Draws conclusion from data.	b. Draws conclusion from data.	b. Draws conclusion from data.	b. Draws conclusion from data.
c.	c. Summarizes results.	c. Makes predictions.	c. Extends conclusion.	c. Extends conclusion.	c. Extends conclusion.	c. Extends conclusion.
d.	d.	d.	d. Makes predictions.	d. Makes prediction.	d. Makes prediction.	d. Makes prediction.

### Benchmark 5: Reads accurately and chooses appropriate tools for scientific investigation

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Understands measurements in the Metric System.	a. Use of metric system for length and mass.	a. Understands measurements in the Metric System.	a. Applies measurements in the metric system from mega-to-micro using factor labeling.	a.	a. Understands and applies measurements in the Metric System from giga-to-nana.	a. Understands measurements in the Metric System.
b.	b.	b. Understands measurements of temperature, volume and density from Kib-to-milli-	b. Understands rate measurements.	b.	b. Understands unit conversions between English and metric.	b. Understands rate measurements.

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**Standard 2: Students can understand concepts and relationships in life science.**

**Benchmark 1: Describes characteristics and the structure and function of cells, organs, and systems in the human body.**

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Understands what determines the size of a cell.	a.	a.	a. Evaluates the effects of events on learning.	a. Knows the relationships between systems of the human body.	a.	a.
b. Describe basic cell processes and the roll of DNA in processes.	b.	b.	b. Identifies factors that influence memory.	b. Identifies the characteristic properties of cells.	b.	b.
c. Understands each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism.	c.	c.	c.	c. Evaluates the effects of events on learning.	c.	c.
d. Describe the steps of mitosis of the animal cell.	d.	d.	d.	d. Identifies factors that influence memory.	d.	d.
e. Understanding of the roles of meiosis in reproduction of animal cells.	e.	e.	e.	e. Identifies interactions and relationships among organs and systems.	e.	e.
f.	f.	f.	f.	f. Understands blood interactions.	f.	f.

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### Benchmark 2: Knows the organization and essential processes of living things.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Understands that living things grow by converting energy from food.	a.	a.	a. Identifies organism requirements for life.	a. Identifies organism requirements for life.	a.	a.
b. Knows life cycle of common insects	b.	b.	b. Understands and applies factors that affect plant growth.	b. Evaluates factors and relationships between photosynthesis and transpiration.	b.	b.
c. Understands how organisms get water.	c.	c.	c.	c.	c.	c.
d. Understands how plants and animals obtain food.	d.	d.	d.	d.	d.	d.

### Benchmark 3: Understands the processes of genetic continuity and diversity.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Knows members in a species show different traits.	a.	a.	a. Understands the relationship between survival and number of offspring.	a. Understands basic Mendelian genetics.	a.	a.
b. Understands sexual and asexual reproduction.	b.	b.	b.	b. Understands factors affecting pollination.	b.	b.
c. Knows that heredity information is contained in genes found on chromosomes of each cell.	c.	c.	c.	c. Understands the purpose, process, and interactions of reproductive cells.	c.	c.
d. Knows that the	d.	d.	d.	d. Understands and	d.	d.

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characteristics of an organism is a combination of inherited traits.				applies the laws of heredity.		
e. Describe possible allele combinations in a Punnett Square format.						

### Benchmark 4: Analyzes the interactions of living things with their environment.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Understands chronological order of life on Earth.	a. Understands connections between earth's past and present atmospheres and the first unicellular organisms.	a.	a. Identifies types of animal behavior.	a. Identifies physical and biological factors that change populations.	a.	a.
b. Recognizes how specific adaptations can help an organism survive in its environment.	b.	b.	b. Identifies physical and biological factors that change populations.	b.	b.	b.
c. Identifies evidence of an organism's change over time.	c.	c.	c. Evaluates animal competition from physical variations and influences.	c.	c.	c.
d. Knows how species adaptations are related to their roles in ecosystems.	d.	d.	d.	d.	d.	d.
e. Understands the importance of ecological cycles.	e.	e.	e.	e.	e.	e.
f. Understands types of interdependence among plants and	f.	f.	f.	f.	f.	f.

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animals.						
g. Recognizes the components of ecosystems.						

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<b>Standard 3: Students can understand concepts and relationships in Earth/space sciences.</b>						
<b>Benchmark 1: Describes features, composition and of the Earth.</b>			<b>Benchmark 1: Explains the composition and structure of the Earth.</b>			
<b>Grade Level Expectations 6</b>	<b>Grade Level Expectations 7</b>	<b>Grade Level Expectations 8</b>	<b>General Physical Science/Global Perspectives</b>	<b>Biology *Honors Biology **Anatomy/Physiology</b>	<b>Chemistry *Advanced Chemistry</b>	<b>Physics</b>
a. Knows how successive layers of sedimentary rock and fossils can be used to determine age of relative dating.	a. Knows how prominent physical features of the Earth were formed.	a.	a. Applies the properties of rocks and soil types.	a.	a.	a.
b. Knows that fossils provide important evidence of environmental conditions on earth over time.	b. Understands the process of weathering and erosion.	b.	b.	b.	b.	b.
c.	c. Knows the process involved in the rock cycle.	c.	c.	c.	c.	c.
<b>Benchmark 2: Understands atmospheric processes and natural cycles. .</b>						
<b>Grade Level Expectations 6</b>	<b>Grade Level Expectations 7</b>	<b>Grade Level Expectations 8</b>	<b>General Physical Science/Global Perspectives</b>	<b>Biology *Honors Biology **Anatomy/Physiology</b>	<b>Chemistry *Advanced Chemistry</b>	<b>Physics</b>
a.	a. Knows how the attributes of weather affect temperature perception.	a.	a. Understands the impact of conservation and recycling on our environment.	a.	a.	a.
b.	b. Understands the role of the water cycle in cloud formation.	b.	b.	b.	b.	b.
c.	c. Knows that attributes of the	c.	c.	c.	c.	c.

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	environment have an effect on temperature.					
d.	d. Know what attributes of air affect humidity.	d.	d.	d.	d.	d.
e.	e. Explains properties of atmospheric pressure.	e.	e.	e.	e.	e.
f.	f. Makes weather predictions based upon clouds, air pressure, wind direction, and humidity.	f.	f.	f.	f.	f.
g.	g. Knows attributes of lightning.	g.	g.	g.	g.	g.
h..	h. Knows indicators of volcanic eruptions.	h.	h.	h.	h.	h.
i.	i. Understands the impact of conservation and recycling on our environment.	i.	i.	i.	i.	i.
	j. Track the cycles of atmospheric gases, such as nitrogen, oxygen, carbon dioxide, and water vapor.					

### Benchmark 3: Identify the components and the natural forces working throughout Earth's history.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a. Explains the use of fossils in science.	a. Applies information from rock layer or soil	a.	a.	a.	a.	a.

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	profiles.					
	b. Knows earth's crust is divided into plates moving on a mantle.					

### Benchmark 4: Recognizes the relationship between the Earth and space.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a.	a. Understands characteristics of stars.	a.	a.	a.	a.	a.
b.	b. Understands how a star works.	b.	b.	b.	b.	b.
c.	c. Understands how the position of the Earth, Sun and moons affects each other.	c.	c.	c.	c.	c.

### Standard 4: Students can understand concepts and relationships in physical science.

### Benchmark 1: Applies characteristic properties of forces

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a.	a.	a. Understands and applies friction.	a.	a.	a.	a.
b.	b.	b. Understands the properties of gravity.	b.	b.	b.	b.
c.	c.	c. Understands the basic principles of simple machines.	c.	c.	c.	c.
		d. Understands how the buoyant force of a fluid affects the weight of an object immersed in it.				

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		e. Applies the properties of fluids.				
<b>Benchmark 2: Explain laws of motion.</b>			<b>Benchmark 2: Relates constancy and change to the laws of motion.</b>			
Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a.	a.	a. Understands Newton's Laws and how they apply.	a.	a.	a.	a. Evaluates the factors that affect and object in motion.
b.	b.	b.	b.	b.	b.	b.
c.	c.	c.	c.	c.	c.	c.
d.	d.	d.	d.	d.	d.	d.
e.	e.	e.	e.	e.	e.	e.
<b>Benchmark 3: Describes the nature and transformation of energy.</b>			<b>Benchmark 3: Describes the nature of energy and its transformations.</b>			
Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a.	a. Applies the relationship between heat transfer and temperature changes.	a. Understands basic characteristics of heat energy.	a.	a.	a. Applies the principles of energy transfer.	a. Applies the principles of energy transfer.
b.	b.	b. Distinguishes between conductors and insulators.	b.	b.	b. Applies the relationship between heat transfer and temperature changes.	b.
c.	c.	c. Understands how heat is conducted through objects.	c.	c.	c. Evaluates how energy affects phase changes and motion of particles.	c.
d.	d.	d. Understands properties of light waves.	d.	d.	d.	d.
e.	e.	e. Knows the range and properties of the	e.	e.	e.	e.

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		electromagnetic spectrum.				
f.	f.	f. Knows how light interacts with another medium.	f.	f.	f.	f.
		g. Understands how sound is conducted through objects.				
		h. Understands the characteristics of sound waves.				
		i. Understands the principle of reflection.				
		j. Understands the factors that effect gravitational potential energy.				
		k. Applies the principles of energy transfer.				

### Benchmark 4: Knows and describes properties of matter.

### Benchmark 4: Explains the properties, structure, and physical and chemical transformations of matter.

Grade Level Expectations 6	Grade Level Expectations 7	Grade Level Expectations 8	General Physical Science/Global Perspectives	Biology *Honors Biology **Anatomy/Physiology	Chemistry *Advanced Chemistry	Physics
a.	a. Identifies states of matter.	a. Applies the principles of density.	a. Understands and interprets a structural diagram.	a.	a. Knows the relationship between temperature and solubility.	a. Knows the relationship between temperature and solubility.
b.	b. Understands characteristics of state of matter.		b. Understands how changing the state of a substance affects the substance.	b.	b. Uses laboratory equipment and measurements to calculate density.	b. Applies principles of density.
c.	c. Understands changes in state of matter.	c.	c. Applies the principles of the conservation of mass and energy in a chemical reaction.	c.	c. Identifies evidence of chemical and physical changes and properties.	c. Identifies evidence of chemical and physical changes.

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d.	d.	d.	d. Understands common chemical reactions.	d.	d. Understands the chemical reactions of acids and bases.	d. Understands the interaction of acids and bases.
			e. Classifies matter as elements, compounds, and mixtures.		e. Understands and applies properties and laws of gases.	
			f. Interprets a chemical equation.		f. Utilizes periodic trends to predict electron arrangement, reactivity and atomic size of elements.	
			g. Identifies evidence of chemical and physical changes.		g. Writes symbols, names, and formulas of basic elements and compounds.	
			h. Understands the interaction of acids and bases.		h. Predicts products or reactants of the 5 basic chemical reactions.	
			i. Understands how elements are arranged in the periodic table, and how this arrangement shows repeating patterns among elements with similar properties.		i. Utilizes relationships in chemical formulas and equations to perform math calculations.	
			j. Identify and locate parts of an atom.			