

**CALIFORNIA MODIFIED ASSESSMENT  
GRADE 8 SCIENCE**  
(Blueprint adopted by the State Board of Education 09/07)

CALIFORNIA CONTENT STANDARDS: Grade 8	# of Items on CMA	%
<b>Motion</b>	<b>7 items</b>	<b>13%</b>
<b>1. The velocity of an object is the rate of change of its position. As a basis for understanding this concept:</b>		
a. <i>Students know</i> position is defined in relation to some choice of a standard reference point and a set of reference directions.	1	
b. <i>Students know</i> that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.	2	
c. <i>Students know</i> how to solve problems involving distance, time, and average speed.	1	
d. <i>Students know</i> the velocity of an object must be described by specifying both the direction and the speed of the object.	1	
e. <i>Students know</i> changes in velocity may be due to changes in speed, direction, or both.	1	
f. <i>Students know</i> how to interpret graphs of position versus time and graphs of speed versus time for motion in a single direction.	1	
<b>Forces</b>	<b>7 items</b>	<b>13%</b>
<b>2. Unbalanced forces cause changes in velocity. As a basis for understanding this concept:</b>		
a. <i>Students know</i> a force has both direction and magnitude.	1	
b. <i>Students know</i> when an object is subject to two or more forces at once, the result is the cumulative effect of all the forces.	1	
c. <i>Students know</i> when the forces on an object are balanced, the motion of the object does not change.	1	
d. <i>Students know</i> how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.	1	
e. <i>Students know</i> that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).	1	
f. <i>Students know</i> the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.	1	
g. <i>Students know</i> the role of gravity in forming and maintaining the shapes of planets, stars, and the solar system.	1	

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<b>CALIFORNIA CONTENT STANDARDS: Grade 8</b>	<b># of Items on CMA</b>	<b>%</b>
<b>Structure of Matter</b>	<b>8 items</b>	<b>15%</b>
<b>3. Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements. As a basis for understanding this concept:</b>		
a. <i>Students know</i> the structure of the atom and know it is composed of protons, neutrons, and electrons.	<b>2</b>	
b. <i>Students know</i> that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.	<b>1</b>	
c. <i>Students know</i> atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers.	<b>1</b>	
d. <i>Students know</i> the states of matter (solid, liquid, gas) depend on molecular motion.	<b>1</b>	
e. <i>Students know</i> that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.	<b>2</b>	
f. <i>Students know</i> how to use the periodic table to identify elements in simple compounds.	<b>1</b>	
<b>Earth in the Solar System (Earth Science)</b>	<b>7 items</b>	<b>13%</b>
<b>4. The structure and composition of the universe can be learned from studying stars and galaxies and their evolution. As a basis for understanding this concept:</b>		
a. <i>Students know</i> galaxies are clusters of billions of stars and may have different shapes.	<b>1</b>	
b. <i>Students know</i> that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.	<b>2</b>	
c. <i>Students know</i> how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.	<b>†</b>	
d. <i>Students know</i> that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.	<b>2</b>	
e. <i>Students know</i> the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.	<b>2</b>	

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<b>CALIFORNIA CONTENT STANDARDS: Grade 8</b>	<b># of Items on CMA</b>	<b>%</b>
<b>Reactions</b>	<b>6 items</b>	<b>11%</b>
<b>5. Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. As a basis for understanding this concept:</b>		
a. <i>Students know</i> reactant atoms and molecules interact to form products with different chemical properties.	2	
b. <i>Students know</i> the idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.	1	
c. <i>Students know</i> chemical reactions usually liberate heat or absorb heat.	1	
d. <i>Students know</i> physical processes include freezing and boiling, in which a material changes form with no chemical reaction.	1	
e. <i>Students know</i> how to determine whether a solution is acidic, basic, or neutral.	1	
<b>Chemistry of Living Systems (Life Science)</b>	<b>3 items</b>	<b>6%</b>
<b>6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:</b>		
a. <i>Students know</i> that carbon, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.	1	
b. <i>Students know</i> that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.	1	
c. <i>Students know</i> that living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA.	1	
<b>Periodic Table</b>	<b>6 items</b>	<b>11%</b>
<b>7. The organization of the periodic table is based on the properties of the elements and reflects the structure of atoms. As a basis for understanding this concept:</b>		
a. <i>Students know</i> how to identify regions corresponding to metals, nonmetals, and inert gases.	2	
b. <i>Students know</i> each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.	2	
c. <i>Students know</i> substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.	2	

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<b>CALIFORNIA CONTENT STANDARDS: Grade 8</b>	<b># of Items on CMA</b>	<b>%</b>
<b>Density and Buoyancy</b>	<b>5 items</b>	<b>9%</b>
<b>8. All objects experience a buoyant force when immersed in a fluid. As a basis for understanding this concept:</b>		
a. <i>Students know</i> density is mass per unit volume.	1	
b. <i>Students know</i> how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.	2	
c. <i>Students know</i> the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced.	1	
d. <i>Students know</i> how to predict whether an object will float or sink.	1	
<b>Investigation and Experimentation</b>	<b>5 items</b>	<b>9%</b>
<b>9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:</b>		
a. Plan and conduct a scientific investigation to test a hypothesis.	1	
b. Evaluate the accuracy and reproducibility of data.	1	
c. Distinguish between variable and controlled parameters in a test.	1	
d. Recognize the slope of the linear graph as the constant in the relationship $y = kx$ and apply this principle in interpreting graphs constructed from data.	†	
e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.	1	
f. Apply simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed = distance/time, density = mass/volume, force = pressure x area, volume = area x height).	1	
g. Distinguish between linear and nonlinear relationships on a graph of data.	†	
<b>Total</b>	<b>54 items</b>	<b>100 %</b>

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