## Properties of Matter

<table>
<thead>
<tr>
<th>Kindergarten</th>
<th>First Grade</th>
<th>Second Grade</th>
<th>Third Grade</th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
<th>Sixth Grade</th>
<th>Seventh Grade</th>
<th>Eighth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a. Classify properties of objects and materials according to their observable characteristics. (DOK 2)</td>
<td>2a. Recognize that most things are made of parts. (DOK 1)</td>
<td>2b. Compare and classify solids and liquids. (DOK 2)</td>
<td>2a. Investigate to conclude that when water changes to ice and then melts, the amount of water is the same as it was before freezing. (DOK 2)</td>
<td>2a. Investigate to conclude that the weight of an object is always the sum of its parts, regardless of how it is assembled, (e.g., Lego creation/ separate blocks, bucket/cups of sand, roll/stacks of pennies, etc.) (DOK 2)</td>
<td>2a. Recognize that materials may be composed of parts that are too small to be seen without magnification. (DOK 1)</td>
<td>2a. Determine how the properties of an object affect how it acts and interacts. (DOK 2)</td>
<td>2a. Recognize that all atoms of a given element are all alike but different from atoms of other elements. (DOK 1)</td>
<td>2a. Identify patterns found in chemical symbols, formulas, reactions, and equations that apply to the law of conservation of mass. (DOK 1)</td>
</tr>
<tr>
<td>• Materials (e.g., wood, paper, plastic, and metal)</td>
<td>• Materials (e.g., wood, paper, plastic, and metal)</td>
<td>• Matter (solid or liquid)</td>
<td>• Objects that sink or float in water</td>
<td>• Chemical symbols, properties of an object</td>
<td>• Chemical symbols, properties of an object</td>
<td>• Chemical symbols, properties of an object</td>
<td>• Chemical symbols, properties of an object</td>
<td>• Chemical symbols, properties of an object</td>
</tr>
</tbody>
</table>

## Changes in Properties of Matter

<table>
<thead>
<tr>
<th>Kindergarten</th>
<th>First Grade</th>
<th>Second Grade</th>
<th>Third Grade</th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
<th>Sixth Grade</th>
<th>Seventh Grade</th>
<th>Eighth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2b. Differentiate what happens to water left in an open container (disappears) and water left in a closed container (remains). (DOK 1)</td>
<td>2b. Describe properties and changes of objects and materials. (DOK 1)</td>
<td>2b. Investigate and describe properties and changes of matter. (DOK 2)</td>
<td>2b. Explore and identify physical changes of matter, including melting, freezing, boiling, evaporation, and condensation. (DOK 2)</td>
<td>2b. Distinguish between physical and chemical changes and between objects composed of a single substance from those composed of more than one substance. (DOK 2)</td>
<td>2b. Differentiate between elements, compounds, and mixtures and between chemical and physical changes (e.g., gas evolves, color, and/or temperature changes). (DOK 2)</td>
<td>2b. Distinguish physical properties of matter (e.g., melting points, boiling points, solubility) as it relates to changes in states. (DOK 2)</td>
<td>2b. Categorize types of chemical changes, including synthesis and decomposition reactions, and classify acids and bases using the pH scale and indicators. (DOK 2)</td>
<td>2b. Predict the properties and interactions of given elements using the periodic table of chemical elements. (DOK 2)</td>
</tr>
<tr>
<td>• Processes of melting and freezing</td>
<td>• Unique properties of states of matter (Gases are easily compressed while solids and liquids are not; the shape of a solid is independent of its container; liquids and gases take the shape of their containers)</td>
<td>• Physical changes that occur when a liquid is changed by boiling or freezing</td>
<td>• Chemical changes (e.g., burning wood, making ice cream, cooking an egg) that occur when matter cannot go back to its original state</td>
<td>• Chemical properties and changes of matter including melting, freezing, boiling, evaporation, and condensation. (DOK 2)</td>
<td>• Cite evidence to explain why heating or cooling may change the properties of materials (e.g., boiling an egg, evaporating water, chilling gelatin, making ice cream, etc.) (DOK 2)</td>
<td>• Between solids, liquids, and gases through models that relate matter to particles in motion</td>
<td>• Use of solubility differences to identify components of a mixture (e.g., chromatography)</td>
<td>• Metals and nonmetals</td>
</tr>
<tr>
<td>• How water evaporates and disappears into the atmosphere</td>
<td>• How water condenses onto cold surfaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Chemical changes in matter (e.g., rusting [slow oxidation], combustion [fast oxidation], food spoilage)</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>First Grade</td>
<td>Second Grade</td>
<td>Third Grade</td>
<td>Fourth Grade</td>
<td>Fifth Grade</td>
<td>Sixth Grade</td>
<td>Seventh Grade</td>
<td>Eighth Grade</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>--------------</td>
<td>-------------</td>
<td>--------------</td>
<td>-------------</td>
<td>-------------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
<td><strong>Motions and Forces</strong></td>
</tr>
</tbody>
</table>
| 2c. Compare types of forces and motion.  
(DOK 1)  
- External motion of objects (e.g., straight-line, circular, back-and-forth, and rotational)  
- Internal motion of objects (e.g., bending and stretching) | 2c. Describe the effects of various forms of motion and of forces on objects.  
(DOK 2)  
- Different forms of motion (sliding, rolling, straight line, circular, back-and-forth)  
- Effects that motion can produce (spilling, breaking, bending) | 2c. Describe observable effects of forces, including buoyancy, gravity, and magnetism.  
(DOK 1) | 2c. Investigate and describe forces affecting motion in simple machines (e.g., lever, wheel and axle, block and tackle, inclined plane, screw.)  
(DOK 2)  
- That force exerted over a distance causes work to be done and that the result (work) is the product of force and distance  
- Friction on moving objects and actions that increase or decrease friction  
- Momentum and inertia | 2c. Investigate the causes and effects of forces on motion.  
(DOK 2)  
- The relative positions and movements of objects using points of reference (distance vs. time of moving objects)  
- Force required to move an object using appropriate devices (e.g., spring scale)  
- Variables that affect speed (e.g., ramp height/length/surface, mass of object)  
- Effects of an unbalanced force on an object’s motion in terms of speed and direction | 2c. Investigate the motion of an object in terms of its position, direction of motion, and speed.  
(DOK 2)  
- Gravity, friction, magnetism, drag, lift, and thrust  
- Forces affecting the motion of objects | 2c. Investigate and describe the effects of forces acting on objects.  
(DOK 2)  
- Gravity, friction, magnetism, drag, lift, and thrust  
- Forces affecting the motion of objects | 2c. Investigate the motion of an object by its position, direction of motion, speed, and acceleration and represent resulting data in graphic form in order to make a prediction.  
(DOK 2) | 2c. Compare the force (effort) required to do the same amount of work with and without simple machines (e.g., levers, pulleys, wheel and axle, inclined planes).  
(DOK 2) | 2c. Compare the motion of an object by its position, direction of motion, speed, and acceleration and represent resulting data in graphic form in order to make a prediction.  
(DOK 2) |
| © 2008 Mississippi Department of Education | 2f. Describe the effects of unbalanced forces on the speed or direction of an object’s motion.  
(DOK 2)  
- Variables that describe position, distance, displacement, speed, and change in speed of an object  
- Gravity, friction, drag, lift, electric forces, and magnetic forces | 2c. Describe the effects of unbalanced forces on the speed or direction of an object’s motion.  
(DOK 2)  
- Variables that describe position, distance, displacement, speed, and change in speed of an object  
- Gravity, friction, drag, lift, electric forces, and magnetic forces | 2c. Investigate the motion of an object by its position, direction of motion, speed, and acceleration and represent resulting data in graphic form in order to make a prediction.  
(DOK 2) | 2c. Recognize Newton’s three laws of motion and identify situations that illustrate each law (e.g., inertia, acceleration, action, and reaction forces).  
(DOK 2) | 2c. Recognize Newton’s three laws of motion and identify situations that illustrate each law (e.g., inertia, acceleration, action, and reaction forces).  
(DOK 2) | 2c. Distinguish the motion of an object by its position, direction of motion, speed, and acceleration and represent resulting data in graphic form in order to make a prediction.  
(DOK 2) |
Transfer of Energy: Magnetism and Electricity

2d. Compare the effects that between two magnets and the interaction between magnets and other objects (such as iron, other metals, wood, and water). (DOK 1)

2d. Differentiate between interactions of two magnets and the interaction of a magnet with objects made of iron, other metals, and nonmetals. (DOK 1)

2d. Differentiate between potential and kinetic energy and recognize their conversions. (DOK 1)
   - Potential to kinetic (e.g., winding a clock/clock begins ticking)
   - Kinetic to potential (e.g., roller coaster moving downward/upward to the top of the hill)

2d. Explain how energy flowing through an electrical circuit can be converted from electrical energy to light, sound, or heat energy. (DOK 1)
   - Parts of an electric circuit and resulting actions when circuits are opened or closed
   - Construction and uses of electromagnets
   - Energy transferred through an electrical circuit to a bulb or bell to its surroundings as light, sound, and heat (thermal) energy

2d. Categorize examples of potential energy as gravitational (e.g., boulder on a hill, child on a slide), elastic (e.g., compressed spring, slingshot, rubber band), or chemical (e.g., unlit match, food). (DOK 2)

2d. Investigate the mechanical and chemical forms of energy and demonstrate the transformations from one form to another. (DOK 2)
   - Energy transformations represented in the use of common household objects
   - Mechanical energy transformed to another form of energy (e.g., vibrations, heat through friction)
   - Chemical energy transformed to another form of energy (e.g., light wands, lightning bugs, batteries, bulbs)

2d. Describe cause and effect relationships of electrical energy. (DOK 2)
   - Energy transfers through an electric circuit (using common pictures and symbols)
   - Electric motor energy transfers (e.g., chemical to electrical to mechanical motion) and generators

2d. Describe how electrical energy transfers through electric circuits, generators, and power grids including (but not limited to) contributions from Mississippi companies. (DOK 2)
   - The Electrical Power Products Division of Howard Industries is a leading manufacturer of electrical distribution equipment in such locations as Laurel and Ellisville, MS.
   - Kuhlman Electric Corporation, located in Crystal Springs, MS

Transfer of Energy: Light

2e. Describe changes in shadows over time and predict how a shadow will look as the light source moves. (DOK 2)

2e. Recognize that an object can be seen only if either light falls on it or it emits light, and that color is a property of light. (DOK 1)

2e. Explain how light waves travel (e.g., in a straight line until they strike an object, through transparent and translucent objects, from reflecting and refracting surfaces, at the surface of opaque objects). (DOK 1)

2e. Describe how light behaves (travels in a straight line, is absorbed, reflected, or refracted, appears transparent or translucent). (DOK 1)

2e. Differentiate between the properties of light as reflection, refraction, and absorption. (DOK 1)
   - Image reflected by a plane mirror and a curved-surfaced mirror
   - Light passing through air or water
   - Optical tools such as prisms, lenses, mirrors, and eyeglasses

2e. Apply the laws of reflection and refraction to explain everyday phenomena (DOK 2)
   - Properties of reflection, refraction, transmission, and absorption of light
   - Images formed by plane, convex, and concave lenses and mirrors, and reflecting and refracting telescopes.
   - Objects that are opaque, transparent, or translucent

2e. Distinguish how various types of longitudinal and transverse waves (e.g., water, light, sound, seismic) transfer energy. (DOK 2)
   - Frequency
   - Wavelength
   - Speed
   - Amplitude

2e. Contrast various components of the electromagnetic spectrum (e.g., infrared, visible light, ultraviolet) and predict their impacts on living things. (DOK 2)
<table>
<thead>
<tr>
<th>Kindergarten</th>
<th>First Grade</th>
<th>Second Grade</th>
<th>Third Grade</th>
<th>Fourth Grade</th>
<th>Fifth Grade</th>
<th>Sixth Grade</th>
<th>Seventh Grade</th>
<th>Eighth Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transfer of Energy: Sound</strong></td>
<td>2g. Identify vibrating objects that produce sound and classify sounds (e.g., high or low pitched, loud or soft). (DOK 1)</td>
<td>2g. Identify vibration as the source of sound and categorize different types of media (e.g., wood, plastic, water, air, metal, glass) according to how easily vibrations travel. (DOK 2)</td>
<td>2f. Differentiate the movement of vibrations in waves (e.g., sound and seismic waves), and cite examples to explain that vibrations move through different materials at different speeds. (DOK 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2f. Investigate and draw conclusions about the relationship between the rate of vibrating objects and the pitch of the sound. (DOK 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Transfer of Energy: Heat** | | | | 2f. Investigate and draw conclusions about the relationship between the rate of vibrating objects and the pitch of the sound. (DOK 3) | | | | |
| | | | 2g. Describe how heat flows from a warm object to a cold one and categorize examples of materials that may or may not be used as insulators. (DOK 2) | | | | | |
| | | | 2g. Categorize materials as conductors or insulators and discuss their real life applications (e.g., building, construction, clothing, animal covering). (DOK 2) | | | | | |
| | | | 2g. Predict and explain factors that affect the flow of heat in solids, liquids, and gases. (DOK 3) | | | | | |
| | | | • Insulating factors in real-life applications (e.g., building, construction, clothing, animal covering) | | | | | |
| | | | • Conduction, convection, or radiation factors used to enhance the flow of heat | | | | | |
| | | | • Temperature differences on the movement of water | | | | |