Lake Washington School District
Teaching and Learning Framework

Seventh Grade Science

Power Standards

August 2007

Energy, Machines, and Motion

Power Standards	Evidence of Learning
1. Understand the positions, relative speeds, and changes in the speed of objects. (1.1.2)	Identify or describe an object's motion as speeding up, slowing down, or moving with constant speed using models, numbers, words, diagrams and graphs. (b)
2. Understand that energy is a property of matter, objects, and systems and comes in many forms (i.e., heater {thermal} energy, sound energy, light energy, electrical energy, kinetic energy, potential energy and chemical energy). (1.1.4)	Identify or describe the forms of energy present in matter (substance), an object, or a system (i.e., heat energy, sound energy, light energy, electrical energy, kinetic energy, potential energy, and chemical energy). (a) Identify or describe the form of energy stored in a part of a system (i.e. energy can be stored in many forms; 'stored energy' is not a form of energy). (b) Compare the potential and/or kinetic energy of parts of a system at various locations or times (i.e., kinetic energy is an object's energy of motion; potential energy is an object's energy of position). (c)
3. Analyze how the parts of a system interconnect and influence each other. (1.2.1)	Identify, describe, or explain how the parts of a system interconnect and influence each other. (a) Identify or describe how the flow of matter and energy through a system (i.e., energy and matter inputs, outputs, transfers, transformations). (b)
4. Understand how various factors affect energy transfers and that energy can be transformed from one form of energy to another. (1.2.2)	Identify or describe how an increase in one type of energy of an object or system results in a decrease in other types of energy within that object or system (e.g., a falling object's potential energy decreases while its kinetic energy increases). (b) Identify, describe or explain the transfers or transformations of energy within a physical system (e.g. chemical to electrical to light and heat). (d)
5. Understand factors that affect the strength and direction of forces. (1.3.1)	Identify or describe factors that affect the strength of forces (e.g., an object with a greater mass has a greater gravitational force {weight}; certain types of magnets have greater magnetic forces; a larger muscle can pull with a greater force). (a) Identify or describe how forces acting on an object may balance each other (e.g., the downward force of an object sitting on a table is balanced by an upward force from the table). (b)

Energy, Machines, and Motion (continued)

Power Standards	Evidence of Learning
6. Understand how balanced and unbalanced forces can change the motion of objects. (1.3.2)	Identify or describe how frictional forces act to stop the motion of objects. (b) Identify or describe the balanced and unbalanced forces acting on an object (e.g., a model car speeding up on a table is being acted upon by an unbalanced forward force and a downward gravitational force balanced by an upward force from the table. (c)

Catastrophic Events

Power Standards	Evidence of Learning
7. Understand how various factors affect energy transfers and that energy can be transformed from one form of energy to another. (1.2.2)	Identify, describe, or explain the transfers or transformations of energy within a physical system (e.g. conduction and convection of heat energy). (d)
8. Understand the components and interconnections of Earth's systems. (1.2.4)	Describe the components of Earth's systems (i.e. the core, the mantle, oceanic and crustal plates, landforms, hydrosphere, and atmosphere). (a) Describe the interconnections among the components of Earth's systems (i.e. the core, the mantle, oceanic and crustal plates, landforms, hydrosphere, and atmosphere). (b) Identify or describe magma (i.e. magma comes from Earth's mantle and cools to form rocks). (c)
9. Understand the processes that continually change the surface of Earth. (1.3.4)	Identify or describe how heat energy flow due to the movement of substances (convection currents) beneath Earth's crust can cause earthquakes and volcanoes. (b) Identify or describe how constructive processes change landforms (e.g. crustal deformation, volcanic eruption, deposition of sediment. (c)
10. Analyze the relationship between weather and climate and how ocean currents and global atmospheric circulation affect weather and climate. (1.3.6)	Compare weather and climate. (a) Identify, describe, or explain effects of the water cycle on weather (e.g. cloud formation, storms). (b) Identify, describe, or explain how ocean currents influence the atmosphere in terms of weather and climate. (c) Identify, describe, or explain the causes of atmospheric circulation and oceanic currents (e.g. prevailing winds are the result of hot tropical regions, cold polar regions, and Earth's spin). (d)

Populations and Ecosystems

Power Standards	Evidence of Learning
11. Understand how the components, structures and organization of systems, and the interconnections within and among systems, describe the system. Analyze how the parts of a system interconnect and influence each other. (1.2.1)	Identify, describe, or explain how the parts of a system interconnect and influence each other. (a) Identify or describe the flow of matter and energy through a system (i.e. energy and matter inputs, outputs, transfers, transformations). (b)
12. Understand that organisms pass on genetic information in their life cycle, and that an organism's characteristics are determined by both genetic and environmental influences. (1.2.7)	Identify, describe, or explain that organisms require a set of instructions for specifying their traits (i.e. heredity is the passage of these instructions from one generation to another). (b) Identify or describe that genes inherited from parents are combined in their offspring to produce a new combination of characteristics. (c)
13. Understand how individual organisms, including cells, obtain matter and energy for life processes. (1.3.8)	Identify or describe the different sources of matter and energy required for life processes in plants and animals (e.g. seeds have energy for germination; green plants need light for energy). (a) Identify or describe how organisms acquire materials needed for life processes. (b) Identify or describe that both plants and animals extract energy from food but plants produce their own food from light, air, water, and mineral nutrients while animals consume energy rich foods. (e)
14. Understand how the theory of biological evolution accounts for species diversity, adaptation, natural selection, extinction, and change in species over time. (1.3.9)	Identify or describe how individual organisms with certain traits are more likely than others to survive and have offspring (i.e. natural selection, adaptation). (b) Identify or describe how biological evolution accounts for the diversity of species developed through gradual processes over many generations. (c)
15. Understand how organisms in ecosystems interact with and respond to their environment and other organisms. (1.3.10)	Identify or describe how energy flows through a food chain or web. (a) Identify, describe, or explain the role of different organisms in an ecosystem (i.e. predator, prey, consumer, producer, decomposer, scavenger, carnivore, herbivore, and omnivore). (c) Identify or describe how a population of an organism responds to a change in its environment. (d)