

Michigan Middle School Science Grades 5 - 7

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Middle School Science	Boardworks Middle School Presentations
<b>GRADE 5</b>	
<b>Physical Science</b>	
P.FM.M.2 Force Interactions- Some forces between objects act when the objects are in direct contact (touching), such as friction and air resistance, or when they are not in direct contact (not touching), such as magnetic force, electrical force, and gravitational force.	
P.FM.05.21 Distinguish between contact forces and non-contact forces.	What Are Forces?
<i>P.FM.05.22 Demonstrate contact and non-contact forces to change the motion of an object.</i>	-
P.FM.M.3 Force- Forces have a magnitude and direction. Forces can be added. The net force on an object is the sum of all of the forces acting on the object. The speed and/or direction of motion of an object changes when a non-zero net force is applied to it. A balanced force on an object does not change the motion of the object (the object either remains at rest or continues to move at a constant speed in a straight line).	
P.FM.05.31 Describe what happens when two forces act on an object in the same or opposing directions.	What Are Forces? Calculating Resultant Force
P.FM.05.32 Describe how constant motion is the result of balanced (zero net) forces.	Calculating Resultant Force
P.FM.05.33 Describe how changes in the motion of objects are caused by a non-zero net (unbalanced) force.	What Are Forces? Calculating Resultant Force
P.FM.05.34 Relate the size of change in motion to the strength of unbalanced forces and the mass of the object.	Calculating Resultant Force
P.FM.M.4 Speed- Motion can be described by a change in position relative to a point of reference. The motion of an object can be described by its speed and the direction it is moving. The position and speed of an object can be measured and graphed as a function of time.	
P.FM.05.41 Explain the motion of an object relative to its point of reference.	Distance, Time and Speed
P.FM.05.42 Describe the motion of an object in terms of distance, time and direction, as the object moves, and in relationship to other objects.	Distance, Time and Speed
P.FM.05.43 Illustrate how motion can be measured and represented on a graph.	Graphing Speed
<b>Life Science</b>	
L.OL.M.4 Animal Systems	

L.OL.05.41 Identify the general purpose of selected animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive).	Cells to Organisms Digestion Chemical Digestion Respiration and The Circulatory System The Respiratory System The Nervous System The Endocrine System The Musculoskeletal System Human Sex Cells and Systems
L.OL.05.42 Explain how animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive) work together to perform selected activities.	Digestion Chemical Digestion Respiration and The Circulatory System The Respiratory System The Nervous System The Endocrine System The Musculoskeletal System Human Sex Cells and Systems
L.HE.M.1 Inherited and Acquired Traits	
L.HE.05.11 Explain that the traits of an individual are influenced by both the environment and the genetics of the individual.	Types of Variation
L.HE.05.12 Distinguish between inherited and acquired traits.	Types of Variation
L.EV.M.1 Species Adaptation and Survival	
L.EV.05.11 Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment.	Adaptations Animal Behavior Types of Animal Behavior
L.EV.05.12 Describe the physical characteristics (traits) of organisms that help them survive in their environment.	Adaptations
L.EV.05.13 Describe how fossils provide evidence about how living things and environmental conditions have changed.	Evolution
L.EV.05.14 Analyze the relationship of environmental change and catastrophic events (for example: volcanic eruption, floods, asteroid impacts, tsunami) to species extinction.	Evolution Environmental Change
L.EV.M.2 Relationships Among Organisms	

L.EV.05.21 Relate degree of similarity in anatomical features to the classification of contemporary organisms.	Classifying Organisms
<b>Earth Science</b>	
E.ES.M.6 Seasons	
E.ES.05.61 Demonstrate and explain seasons using a model.	Days, Years and Seasons
E.ES.05.62 Explain how the revolution of the Earth around the sun defines a year.	Days, Years and Seasons
E.ST.M.1 Solar System	
E.ST.05.11 Design a model that of the solar system that shows the relative order and scale of the planets, dwarf planets, comets, and asteroids to the sun.	The Solar System
E.ST.M.2 Solar System Motion	
E.ST.05.21 Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.	Gravity
E.ST.05.22 Explain the phases of the moon.	The Earth, Moon and Sun
E.ST.05.23 Explain the apparent motion of the stars (constellations) and the sun across the sky.	Days, Years and Seasons
E.ST.05.24 Explain lunar and solar eclipses.	The Earth, Moon and Sun
<i>E.ST.05.25 Explain the tides of the oceans as they relate to the gravitational pull and orbit of the moon.</i>	–
<b>GRADE 6</b>	
<b>Physical Science</b>	
P.EN.M.1 Kinetic and Potential Energy	
P.EN.06.11 Identify kinetic or potential energy in everyday situations (for example: stretched rubber band, objects in motion, ball on a hill, food energy).	What is Energy?
<i>P.EN.06.12 Demonstrate the transformation between potential and kinetic energy in simple mechanical systems (for example: roller coasters, pendulums).</i>	–
P.EN.M.4 Energy Transfer	
P.EN.06.41 Explain how different forms of energy can be transferred from one place to another by radiation, conduction, or convection.	Heat and Temperature Conduction and Convection Radiation
P.EN.06.42 Illustrate how energy can be transferred while no energy is lost or gained in the transfer.	Heat and Temperature What is Energy?
P.CM.M.1 Changes in State	
P.CM.06.11 Describe and illustrate changes in state, in terms of the arrangement and relative motion of the atoms or molecules.	Changing State Particles in Action
P.CM.06.12 Explain how mass is conserved as a substance changes from state to state in a closed system.	Conservation of Mass

<b>Life Science</b>	
L.OL.M.5 Producers, Consumers, and Decomposers	
L.OL.06.51 Classify producers, consumers, and decomposers based on their source of food (the source of energy and building materials).	Feeding Types
L.OL.06.52 Distinguish between the ways in which consumers and decomposers obtain energy.	Feeding Types Pyramids of Number and Biomass
L.EC.M.1 Interactions of Organisms	
L.EC.06.11 Identify and describe examples of populations, communities, and ecosystems including the Great Lakes region.	Habitats
L.EC.M.2 Relationships of Organisms	
L.EC.06.21 Describe common patterns of relationships between and among populations (competition, parasitism, symbiosis, predator/prey).	Competition Feeding Types
L.EC.06.22 Explain how two populations of organisms can be mutually beneficial and how that can lead to interdependency.	Food Chains Food Webs
L.EC.06.23 Predict how changes in one population might affect other populations based upon their relationships in the food web.	Food Chains Food Webs
L.EC.M.3 Biotic and Abiotic Factors	
L.EC.06.31 Identify the living (biotic) and nonliving (abiotic) components of an ecosystem.	Habitats
L.EC.06.32 Identify the factors in an ecosystem that influence changes in population size.	Competition Feeding Types
L.EC.M.4 Environmental Impact of Organisms	
L.EC.06.41 Describe how human beings are part of the ecosystem of the Earth and that human activity can purposefully, or accidentally, alter the balance in ecosystems.	Environmental Change
L.EC.06.42 Predict possible consequences of overpopulation of organisms, including humans, (for example: species extinction, resource depletion, climate change, pollution).	Environmental Change Greenhouse Gases Acid Rain
<b>Earth Science</b>	
E.SE.M.1 Soil	
E.SE.06.11 Explain how physical and chemical weathering lead to erosion and the formation of soils and sediments.	Physical Weathering Chemical Weathering Erosion, Transportation and Deposition Soil

E.SE.06.12 Explain how waves, wind, water, and glacier movement, shape and reshape the land surface of the Earth by eroding rock in some areas and depositing sediments in other areas.	Erosion, Transportation and Deposition
E.SE.06.13 Describe how soil is a mixture made up of weather eroded rock and decomposed organic material.	Soil
<i>E.SE.06.14 Compare different soil samples based on particle size and texture.</i>	–
<b>E.SE.M.4 Rock Formation</b>	
E.SE.06.41 Compare and contrast the formation of rock types (igneous, metamorphic, and sedimentary) and demonstrate the similarities and differences using the rock cycle model.	Different Types of Rocks Igneous Rock Metamorphic Rock Sedimentary Rock The Rock Cycle
<b>E.SE.M.5 Plate Tectonics</b>	
E.SE.06.51 Explain plate tectonic movement and how the lithospheric plates move centimeters each year.	What is Plate Tectonics?
E.SE.06.52 Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from these plate motions.	Plate Boundaries Earthquakes
E.SE.06.53 Describe layers of the Earth as a lithosphere (crust and upper mantle), convecting mantle, and dense metallic core.	The Structure of the Earth
<b>E.SE.M.6 Magnetic Field of Earth</b>	
E.SE.06.61 Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or manufactured magnet.	Magnetic Materials Magnetic Fields
E.SE.06.62 Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on land and sea.	Magnetic Fields
<b>E.ST.M.3 Fossils</b>	
E.ST.06.31 Explain how rocks and fossils are used to understand the age and geological history of the Earth (timelines and relative dating, rock layers).	Sedimentary Rock Evolution
<b>E.ST.M.4 Geologic Time</b>	
<i>E.ST.06.41 Explain how Earth processes (erosion, mountain building, and glacier movement) are used for the measurement of geologic time through observing rock layers.</i>	–
E.ST.06.42 Describe how fossils provide important evidence of how life and environmental conditions have changed.	Evolution
<b>GRADE 7</b>	
<b>Physical Science</b>	
<b>P.EN.M.3 Waves and Energy</b>	

P.EN.07.31 Identify examples of waves, including sound waves, seismic waves, and waves on water.	What is Light? What is Sound?
P.EN.07.32 Describe how waves are produced by vibrations in matter.	What is Sound?
P.EN.07.33 Demonstrate how waves transfer energy when they interact with matter (for example: tuning fork in water, waves hitting a beach, earthquake knocking over buildings).	Earthquakes What is Sound? Refraction What is Light?
P.EN.M.4 Energy Transfer	
P.EN.07.43 Explain how light energy is transferred to chemical energy through the process of photosynthesis.	What is Photosynthesis?
P.EN.M.6 Solar Energy Effects	
<i>P.EN.07.61 Identify that nuclear reactions take place in the sun, producing heat and light.</i>	–
<i>P.EN.07.62 Explain how only a tiny fraction of light energy from the sun is transformed to heat energy on Earth.</i>	–
P.PM.M.1 Chemical Properties	
P.PM.07.11 Classify substances by their chemical properties (flammability, pH, and reactivity).	The pH Scale What Are Acids and Alkalis? Making Gases
P.PM.M.2 Elements and Compounds	
P.PM.07.21 Identify the smallest component that makes up an element.	Elements and Compounds What Are Atoms?
P.PM.07.22 Describe how the elements within the Periodic Table are organized by similar properties into families (highly reactive metals, less reactive metals, highly reactive nonmetals, and some almost completely non-reactive gases).	The Periodic Table
P.PM.07.23 Illustrate the structure of molecules using models or drawings (water, carbon dioxide, table salt).	Elements and Compounds Making Compounds
P.PM.07.24 Describe examples of physical and chemical properties of elements and compounds (boiling point, density, color, conductivity, reactivity).	Elements and Compounds Making Compounds Conduction and Convection
P.CM.M.2 Chemical Changes	
P.CM.07.21 Identify evidence of chemical change through color, gas formation, solid formation, and temperature change.	Types of Chemical Reactions
P.CM.07.22 Compare and contrast the chemical properties of a new substance with the original after a chemical change.	Types of Chemical Reactions Making Compounds

P.CM.07.23 Describe the physical properties and chemical properties of the products and reactants in a chemical change.	Types of Chemical Reactions
<b>Life Science</b>	
L.OL.M.2 Cell Functions	
L.OL.07.21 Recognize that all organisms are composed of cells (single cell organisms, multicellular organisms).	Animal and Plant Cells
L.OL.07.22 Explain how cells make up different body tissues, organs, and organ systems.	Cells to Organisms
L.OL.07.23 Describe how cells in all multicellular organisms are specialized to take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or organism needs.	Animal and Plant Cells Releasing Energy
L.OL.07.24 Recognize that cells function in a similar way in all organisms.	Animal and Plant Cells
L.OL.M.3- Growth and Development	
L.OL.07.31 Describe growth and development in terms of increase of cell number and/or cell size.	Where Do Cells Come From?
L.OL.07.32 Examine how through cell division, cells can become specialized for specific functions.	Animal and Plant Cells
L.OL.M.6 Photosynthesis	
L.OL.07.61 Recognize the need for light to provide energy for the production of carbohydrates, proteins and fats.	What is Photosynthesis?
L.OL.07.62 Explain that carbon dioxide and water are used to produce carbohydrates, proteins, and fats.	What is Photosynthesis?
L.OL.07.63 Describe evidence that plants make, use and store food.	Leaves and Glucose
L.HE.M.2 Reproduction	
L.HE.07.21 Compare how characteristics of living things are passed on through generations, both asexually and sexually.	Types of Reproduction
L.HE.07.22 Compare and contrast the advantages and disadvantages of sexual vs. asexual reproduction.	Types of Reproduction
<b>Earth Science</b>	
<b>E.ES.M.1 Solar Energy</b>	
E.ES.07.11 Demonstrate, using a model or drawing, the relationship between the warming by the sun of the Earth and the water cycle as it applies to the atmosphere (evaporation, water vapor, warm air rising, cooling, condensation, clouds).	The Water Cycle Precipitation
E.ES.07.12 Describe the relationship between the warming of the atmosphere of the Earth by the sun and convection within the atmosphere and oceans.	What is Weather?

E.ES.07.13 Describe how the warming of the Earth by the sun produces winds and ocean currents.	Wind and Ocean Currents
<b>E.ES.M.4 Human Consequences</b>	
E.ES.07.41 Explain how human activities (surface mining, deforestation, overpopulation, construction and urban development, farming, dams, landfills, and restoring natural areas) change the surface of the Earth and affect the survival of organisms.	Environmental Change Greenhouse Gases Acid Rain Flooding Weather Hazards
E.ES.07.42 Describe the origins of pollution in the atmosphere, geosphere, and hydrosphere, (car exhaust, industrial emissions, acid rain, and natural sources), and how pollution impacts habitats, climatic change, threatens or endangers species.	Environmental Change Greenhouse Gases Acid Rain
<b>E.ES.M.7 Weather and Climate</b>	
E.ES.07.71 Compare and contrast the difference and relationship between climate and weather.	Climate Zones
E.ES.07.72 Describe how different weather occurs due to the constant motion of the atmosphere from the energy of the sun reaching the surface of the Earth.	What is Weather?
E.ES.07.73 Explain how the temperature of the oceans affects the different climates on Earth because water in the oceans holds a large amount of heat.	Wind and Ocean Currents
E.ES.07.74 Describe weather conditions associated with frontal boundaries (cold, warm, stationary, and occluded) and the movement of major air masses and the jet stream across North America using a weather map.	What is Weather?
<b>E.ES.M.8 Water Cycle</b>	
E.ES.07.81 Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.	The Water Cycle Precipitation
<i>E.ES.07.82 Analyze the flow of water between the components of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater.</i>	–
<b>E.FE.M.1 Atmosphere</b>	
E.FE.07.11 Describe the atmosphere as a mixture of gases.	The Atmosphere
E.FE.07.12 Compare and contrast the composition of the atmosphere at different elevations.	The Atmosphere