New Jersey Core Curriculum Content Standard Area:

SCIENCE Grade 8

Earth in Space

Machines and Motion

Revised July 2011

By

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North Brunswick Township Public Schools

New Jersey Core Curriculum Content Standard Area: SCIENCE

Topic/Course: Earth & Space **Grade: 8** **Date: Revised July 2011**

Essential Question NJCCCS Standard	*NJCCCS* Skills/Objectives/ Areas of Focus	*Instructional Strategies* Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	*Modifications* ESL / Special Education Academic Support/ G&T	*Assessments* Formative Summative Benchmarks	*Pacing*
Observable, predictable patterns of movement in the Sun, Earth, and Moon system occur because of gravitational interaction and energy from the Sun. What predictable, observable patterns occur as a result of the interaction between the Earth, Moon, and Sun? What causes these patterns? **Standards:** **5.1 Science Practices** **5.4 Earth Systems Science** CPIs: 5.4.6.A.1 5.4.6.A.2 5.4.8.A.2	The height of the path of the Sun in the sky and the length of a shadow change over the course of a year. The Earth's position relative to the Sun and the rotation of Earth on its axis, result in patterns and cycles that define time units of day and year. Use evidence of global variations in day, length, temperature, and the amount of solar radiation striking earth's surface to create models that explain these phenomena and seasons.	SWBAT: Generate and analyze evidence (through simulations) that the sun's apparent motion across the sky changes over the course of a year. Compare sunrise and set times at different latitudes and times of the year. Construct and evaluate models demonstrating the rotation of earth on its axis and the orbit of earth around the sun. Model Earth's orbit. Identify Polaris as the current North Star. Create and use a definition of revolution. Recognize orbit is synonymous with revolution. Relate changes in the apparent path of the sun and length of daylight to Earth's orbit on its tilted axis Create models that explain these phenomena and seasons.	• KWL charts • cooperative learning groups • learning centers • extended time • reduced number of questions • smaller groups • reduced group discussion time • high interest/lower level selections • copies of class notes • anticipatory guides • chapter summaries • books on tape • shorter reading passages assigned • individualized mini-lessons • typed vocabulary lists with definitions • modified rubric • varied notebook entry requirements • graphic organizers	• Pre-unit assessment • Class and team discussions • Notebooks • Class discussion • Anecdotal notes • NJASK • Reflection questions • Student sheets • Group/class participation • Prepared quizzes/tests • Teacher observation during lab investigations • Sun, Earth, Moon Assessment Research Project.	1-2 weeks 1-2 weeks 1-2 weeks

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<u>Standard 5.2</u> **<u>Physical Science:</u>** ***Strand C*** ***Forms of Energy:*** How do we know that things have energy? CPIs: 5.2.6.C.1 5.2.8.C.1 5.2.6.C.2: 5.2.8.C.2	Light travels in a straight line until it interacts with an object or material. Light can be absorbed, redirected, bounced back or allowed to pass through. The path of reflected or refracted light can be predicted. Visible light from the Sun is made up of a mixture of all colors of light. To see an object, light emitted or reflected by that object must enter the eye.	SWBAT: Predict the path of reflected or refracted light using reflecting and refracting telescopes as examples Model and explain current technologies used to capture solar energy for the purposes of converting it to electrical energy. Describe how to prisms can be used to demonstrate that visible light from the Sun is made up of different colors	• KWL charts • cooperative learning groups • learning centers • extended time • reduced number of questions • smaller groups • reduced group discussion time • high interest/lower level selections • copies of class notes • anticipatory guides • chapter summaries • books on tape • shorter reading passages assigned • individualized mini-lessons • typed vocabulary lists with definitions • modified rubric • varied notebook entry requirements • graphic organizers	• Pre-unit assessment • Class and team discussions • Notebooks • Class discussion • Teacher observation • Anecdotal notes • NJASK	1 week 1 week 1 week

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Standard 5.2 **Physical Science:** ***Strand D*** ***Energy Transfer and Conservation:*** How do we know that things have energy? Energy takes many forms. CPIs: 5.2.6.D.1 5.2.8.D.1 5.2.8.D.2	The flow of current in an electric circuit depends upon the components of the circuit and their arrangement, such as in series or parallel. Electricity flowing through an electrical circuit produces magnetic effects in the wires. When energy is transferred from one system to another, the quantity of energy before transfer equals the quantity of energy after transfer. As an object falls, its potential energy decreases as its speed, and consequently its kinetic energy, increases. While an object is falling, some of the object's kinetic energy is transferred to the medium through which it falls, setting the medium into motion and heating it.	**SWBAT:** To build a wet cell battery To observe what happens when a battery operates To describe what makes up a battery Identify the energy changes that take place when a battery is connected to different devices Investigate the power of batteries connected in series. Use simple circuits involving batteries and motors to compare and predict the current flow with different circuit arrangements Describe the flow of energy from the Sun to the fuel tank of an automobile Nuclear reactions take place in the sun. In plants, light energy from the sun is transferred to oxygen and carbon compounds, which in combination, have chemical potential energy (photosynthesis). Relate the kinetic and potential energies of a roller coaster at various points on its path. To relate knowledge to new experiences.	• KWL charts • cooperative learning groups • learning centers • extended time • reduced number of questions • smaller groups • reduced group discussion time • high interest/lower level selections • copies of class notes • anticipatory guides • chapter summaries • books on tape • shorter reading passages assigned • individualized mini-lessons • typed vocabulary lists with definitions • extended time • modified rubric • varied notebook entry requirements • graphic organizers	• Pre-unit assessment • Class and team discussions • Notebooks • Class discussion • Teacher observation • Anecdotal notes • NJASK	1 week 4 days 2 days 1 week 1 week 1-2 weeks 1 week

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<u>Standard 5.2</u> **<u>Physical Science:</u>** ***Strand E*** ***Forces and Motion:*** How can energy be transferred from one material to another? What happens to a material when energy is transferred to it? CPIs: 5.2.6.E.1 5.2.8.E.1	An object's position can be described by locating the object relative to other objects or a background. The description of an object's motion from one observer's view may be different from that reported from a different observer's view. An object is in motion when its position is changing. The speed of an object is defined by how far it travels divided by the amount of time it took to travel that far. Magnetic, electrical, and gravitational forces can act at a distance.	SWBAT: Model and explain how the description of an objects motion from one observers view may be different from a different observers view. Compare the motion of an object acted on by balanced forces with the motion of an object acted on by unbalanced forces in a given specific scenario. Describe the force between two magnets as the distance between them is changes. Observe and describe the forces that create the Earth's magnetosphere and the connections to Magnetic north.	• KWL charts • cooperative learning groups • learning centers • extended time • reduced number of questions • smaller groups • reduced group discussion time • high interest/lower level selections • copies of class notes • anticipatory guides • chapter summaries • books on tape • shorter reading passages assigned • individualized mini-lessons • typed vocabulary lists with definitions • extended time • modified rubric • varied notebook entry requirements • graphic organizers	• Pre-unit assessment • Class and team discussions • Notebooks • Class discussion • Teacher observation • Anecdotal notes • NJASK	1-2 weeks 1-2 weeks 1 week 1 week

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<u>Standard 5.2</u> **<u>Physical Science:</u>** ***Strand E*** ***Forces and Motion:*** How can energy be transferred from one material to another? What happens to a material when energy is transferred to it? CPIs 5.2.6.E.2 5.2.8.E.2 5.2.6.E.3	Friction is a force that acts to slow or stop the motion of objects. Forces have magnitude and direction. Forces can be added. The net force on an object is the sum of all the forces acting on the object. An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion at constant velocity will continue at the same velocity unless acted on by an unbalanced force.	SWBAT: Demonstrate and explain the frictional force acting on an object with the use of a physical model Observe the properties of sliding friction. Measure the force of friction on a wooden block pulled across different surfaces. Measure the force of friction on loads of different weights. Determine the role of surface area on friction Define work as a force multiplied by a distance. Describe the units of measure for work. To calculate work. Compare the work done by different forces. Calculate the time it takes a motor to lift a load. To demonstrate knowledge of energy, forces, work and power.	• KWL charts • cooperative learning groups • learning centers • extended time • reduced number of questions • smaller groups • reduced group discussion time • high interest/lower level selections • copies of class notes • anticipatory guides • chapter summaries • books on tape • shorter reading passages assigned • individualized mini-lessons • typed vocabulary lists with definitions • extended time • modified rubric • varied notebook entry requirements • graphic organizers	• Pre-unit assessment • Class and team discussions • Notebooks • Class discussion • Teacher observation • Anecdotal notes • NJASK	2 days 3 days 3 days 2 days 1 day 3 days 2 days 1 day 3 days 1 week 1 week