



Park Hill School District

Building Successful Futures • Each Student • Every Day

Middle School 6th Grade Science Curriculum

Course Description: Students will engage within three strands of content within 6th grade science: Life Science, Earth Science, and Physical Science. Units encompass ecology, human impact on the earth, force and motion, thermal energy, and electromagnetic forces. Students will engage in experiences that build foundational knowledge for future science coursework.

Scope and Sequence:

Timeframe	Unit	Instructional Topics
11 Weeks	Interdependent Relationships in Ecosystems	Topic 1: Competition in Ecosystems Topic 2: Organism Interactions in Ecosystems Topic 3: Relationships in Ecosystems Topic 4: Flow of Energy in Ecosystems Topic 5: Dynamic Nature of Ecosystems Topic 6: Ecosystem Biodiversity
8 Weeks	Growth and Development of Organisms	Topic 1: Reproduction in Plants and Animals Topic 2: Growth of Organisms Topic 3: Introduction to Photosynthesis Topic 4: Energy Flow in Organisms
4 Weeks	Potential and Kinetic Energy	Topic 1: Kinetic Energy Topic 2: Potential Energy
9 Weeks	Forces and Motion	Topic 1: Newton's Third Law Topic 2: Changes in Force and Motion Topic 3: Electric and Magnetic Forces Topic 4: Gravitational Forces

Unit 1: MS Life Bundle 3 - Interdependent Relationships in Ecosystems

Subject: Science

Grade: 6

Name of Unit: Interdependent Relationships in Ecosystems

Length of Unit: 11 weeks

Overview of Unit: Students will learn and explore how organisms interact in an ecosystem and the importance of biodiversity in an ecosystem. The students will take the learning from the unit to create a report that maps out the benefits and risks of building an oil pipeline through Yosemite National Park.

Priority Standards for unit:

- 6-8.LS2.A.1 Analyze and interpret data to provide evidence for the effects of resource availability on individual organisms and populations of organisms in an ecosystem.
- 6-8.LS2.A.2 Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem
- 6-8.LS2.B Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- 6-8.LS2.C.1 Construct an argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations.
- 6-8.LS2.C.2 Evaluate benefits and limitations of differing design solutions for maintaining an ecosystem.

Supporting Standards for unit:

- MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
An explanation that predicts the patterns of interactions among in a given ecosystem.	Construct	Create	2
An explanation that predicts the patterns of interactions between the biotic and abiotic	Construct	Ccreate	2

factors in a given ecosystem.			
A model to describe the cycling of matter in an ecosystem.	Develop	Create	3
A model to describe the flow of energy among living and nonliving parts of an ecosystem.	Develop	Create	3
Data to provide evidence for the effects of resource availability on individual organisms in an ecosystem.	Analyze and interpret	Analyze	3
Data to provide evidence for the effects of resource availability on populations of organisms in an ecosystem.	Analyze and interpret	Analyze	3
An argument supported by empirical evidence that explains how changes to physical or biological components of an ecosystem affect populations.	Construct	Evaluate	3
benefits of differing design solutions for maintaining an ecosystem.	Evaluate	Evaluate	4
limitations of differing design solutions for maintaining an ecosystem.	Evaluate	Evaluate	4

Essential Questions:

1. What factors can influence an organism's survival in an ecosystem?
2. What are some limited resources that can affect an organism's growth or population increase?
3. How can competitive, predatory, and mutually beneficial relationships affect organisms?
4. What do food webs demonstrate?
5. How do disruptions to components of ecosystems affect populations?
6. How can changes in biodiversity influence humans?

Enduring Understanding/Big Ideas:

1. Biotic and abiotic factors can affect an organism's survival.
2. Limited resources can affect an organism's growth or population increase.
3. Competitive, predatory, and mutually beneficial relationships affect organisms.
4. Food webs demonstrate the flow of energy in an ecosystem.
5. Disruptions to components of ecosystems can affect populations.
6. Changes in the biodiversity of an ecosystem can affect humans.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Competition Consumers Dynamic Environmental Interactions Interdependent Limited Resources Nutrients Population Recycling Resilience Resources	Abiotic Factors Aquatic Atom Biodiversity Biotic Factors Competitive Interaction Decomposers Dependent Interaction Ecosystem Ecosystem Dynamics Energy Energy Transfer Food Web Matter Cycle Mutually Beneficial Interactions Oceanic Organism Predatory Interaction Primary Consumer Producers Secondary Consumer Species Terrestrial Trophic Level Water Pollution

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Topic 1: Competition in Ecosystems Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS2.A.1	Engage: Investigative Phenomena	15	
6-8.LS2.A.1	Engage: Accessing Prior Knowledge	15	
6-8.LS2.A.1	Engage: Hook	30	
6-8.LS2.A.1	Explore 1 Activity: Ecosystem Events and Relationships	45	
6-8.LS2.A.1	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS2.A.1	Explore 2 Activity: Competition Concentration	45	
6-8.LS2.A.1	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.1	Mission Log: Complete Class Mission Log page 2	20	

Topic 2: Organism Interactions in Ecosystems Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS2.A.1	Engage: Investigative Phenomena	15	
6-8.LS2.A.1	Engage: Accessing Prior Knowledge	15	
6-8.LS2.A.1	Engage: Hook	15	
6-8.LS2.A.1	Explore 1 Activity: Ecosystem Interactions	45	
6-8.LS2.A.1	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS2.A.1	Explore 2 Scientific Investigation: Finding Biotic and Abiotic Factors in the Schoolyard	120	
6-8.LS2.A.1	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.1	Explore 3 Tuva: Wolf and Elk in Yellowstone	45	
6-8.LS2.A.1	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.1	Mission Log: Complete Class Mission Log page 3	20	

Topic 3: Relationships in Ecosystems Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS2.A.2	Engage: Investigative Phenomena	15	
6-8.LS2.A.2	Engage: Accessing Prior Knowledge	15	
6-8.LS2.A.2	Engage: Hook - In More than One Relationship?	30	
6-8.LS2.A.2	Explore 1 Activity: Finding My Ecosystem Buddy	120	
6-8.LS2.A.2	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS2.A.2	Explore 2 Activity: Ecosystem Relationships	120	
6-8.LS2.A.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.2	Explore 3 Activity: Necessary or Nice?	45	
6-8.LS2.A.2	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.1	Mission Log: Complete Class Mission Log page 4	20	

Topic 4: Flow of Energy in Ecosystems Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS2.B	Engage: Investigative Phenomena	15	
6-8.LS2.B	Engage: Accessing Prior Knowledge	15	
6-8.LS2.B	Engage: Hook	45	
6-8.LS2.B	Explore 1 Activity: Food Webs	45	
6-8.LS2.B	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS2.B	Explore 2 Activity: Cycling of Matter and Energy	45	
6-8.LS2.B	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.1	Mission Log: Complete Class Mission Log page 5	20	

Topic 5: Dynamic Nature of Ecosystems Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS2.C.1	Engage: Investigative Phenomena	15	
6-8.LS2.C.1	Engage: Accessing Prior Knowledge	15	
6-8.LS2.C.1	Engage: Hook - What do fish breathe?	30	
6-8.LS2.C.1	Explore 1 Scientific Investigation: Modeling an Algae Bloom	45	
6-8.LS2.C.1	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS2.C.1	Explore 2 Activity: Disruptive Events	120	
6-8.LS2.C.1	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.C.1	Explore 3 Activity: So Squirrely!	120	
6-8.LS2.C.1	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.LS2.C.1	Explore 4 Tuva: Bylot Island Ecology	45	
6-8.LS2.C.1	Explain 4: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 4	20	
6-8.LS2.A.1	Mission Log: Complete Class Mission Log page 6	20	

Topic 6: Ecosystem Biodiversity Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS2.C.2	Engage: Investigative Phenomena	15	
6-8.LS2.C.2	Engage: Accessing Prior Knowledge	15	
6-8.LS2.C.2	Engage: Hook - Parking Lot Diversity	30	
6-8.LS2.C.2	Explore 1 Scientific Investigation: Biodiversity	120	
6-8.LS2.C.2	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS2.C.2	Explore 2 Activity: Ocean Biodiversity	45	
6-8.LS2.C.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.C.2	Explore 3: Engineering Solution - Wetland Mitigation	180	
6-8.LS2.C.2	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.C.2	Explore 4 Tuva: California Condors	45	
6-8.LS2.C.2	Explain 4: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS2.A.1	Mission Log: Complete Class Mission Log page 7	20	

Engaging Scenario



Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Using the Mission Log for Life Science Bundle 3, students will complete the Action Plan from STEMscopes.

Rubric for Engaging Scenario:

Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 2: MS Life Bundle 2 - Growth & Development of Organisms

Subject: Science

Grade: 6

Name of Unit: MS Life Bundle 2 - Growth & Development of Organisms

Length of Unit: 8 weeks

Overview of Unit: The focus of the unit centers on how organisms grow, adapt, and reproduce. Students will use the information from this unit to design a compost garden for a large company wanting to be environmentally friendly.

Priority Standards for unit:

- 6-8.LS1.B.1 Construct an explanation for how characteristic animal behaviors as well as specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
- 6-8.LS1.B.2 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- 6-8.LS1.C Construct a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.

Supporting Standards for unit:

- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
an explanation for how characteristic animal behaviors as well as specialized plant structures affect the probability of successful reproduction of animals and plants respectively	Construct	Apply	2
a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Construct	Apply	2
a scientific explanation based on evidence for the role of photosynthesis and cellular respiration in the cycling of matter and flow of energy into and out of organisms.	Construct	Apply	2

Essential Questions:

1. What characteristics do plants and animals have to increase reproduction?
2. What factors can affect the growth of a plant?
3. How do plants create their own food?
4. How does energy move through organisms?

Enduring Understanding/Big Ideas:

1. Plants and animals possess adaptations and behaviors that help them reproduce.
2. Genetic as well as environmental factors can affect the growth of plants and animals.
3. Plants use energy from the Sun, carbon dioxide, and water to create their own chemical energy.
4. Animals consume this energy and, through digestion and cellular respiration, break it down into molecules they can use for energy, and remove waste and carbon dioxide that are produced during the process.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Behavior Environmental Factors Products Specialized	Adaptation Anther Chemical Reaction Chloroplast Energy Genetic Factors Glucose Growth Matter Cycle Microorganism Organism Ovary Petals Photosynthesis Phytoplankton Pistol Pollen Pollination Reactant Reproduction Stamen

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Topic 1: Reproduction in Plants and Animals Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.B.1	Engage: Investigative Phenomena	15	
6-8.LS1.B.1	Engage: Accessing Prior Knowledge	15	
6-8.LS1.B.1	Engage: Hook - Observation Walk	45	
6-8.LS1.B.1	Explore 1 Activity: Which Behavior has more success?	120	
6-8.LS1.B.1	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS1.B.1	Explore 2 Activity: Increasing the Odds	120	
6-8.LS1.B.1	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS1.B.1	Explore 3 Engineering Solution: Design a Flower	120	
6-8.LS1.B.1	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.LS1.B.1	Mission Log: Complete Class Mission Log page 2	20	

Topic 2: Growth of Organisms Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.B.2	Engage: Investigative Phenomena	15	
6-8.LS1.B.2	Engage: Accessing Prior Knowledge	15	
6-8.LS1.B.2	Engage: Hook	45	
6-8.LS1.B.2	Explore 1 Activity: What are the Chances?	120	
6-8.LS1.B.2	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS1.B.2	Explore 2 Research: Growth of the Fittest	180	
6-8.LS1.B.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS1.B.1	Mission Log: Complete Class Mission Log page 3	20	

Topic 3: Introduction to Photosynthesis Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.C	Engage: Investigative Phenomena	15	
6-8.LS1.C	Engage: Accessing Prior Knowledge	15	
6-8.LS1.C	Engage: Hook - Soaking up the Sun	45	
6-8.LS1.C	Explore 1 Activity: Modeling Photosynthesis	45	
6-8.LS1.C	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS1.C	Explore 2 Scientific Investigation: Importance of Light	120	
6-8.LS1.C	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS1.B.1	Mission Log: Complete Class Mission Log page 4	20	

Topic 4: Energy Flow in Organisms Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.LS1.C	Engage: Investigative Phenomena	15	
6-8.LS1.C	Engage: Accessing Prior Knowledge	15	
6-8.LS1.C	Engage: Hook - Energy Flow	45	
6-8.LS1.C	Explore 1 Activity: Chemical Reactions in the Digestive System	45	
6-8.LS1.C	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.LS1.B.2	Explore 2 Activity: Cellular Respiration	120	
6-8.LS1.B.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.LS1.B.2	Explore 3 Scientific Investigation: Measuring Energy from Food	45	
6-8.LS1.B.2	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.LS1.B.1	Mission Log: Complete Class Mission Log page 5	20	

Engaging Scenario



Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Using the Mission Log for Life Science Bundle 2, students will complete the Action Plan from STEMscopes.

Rubric for Engaging Scenario:

Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 3: Physical Bundle 4 - Potential and Kinetic Energy

Subject: Science

Grade: 6

Name of Unit: Potential and Kinetic Energy

Length of Unit: 4 weeks

Overview of Unit: In this unit, students will be learning about the difference between potential and kinetic energy and how they are related in a system. Students will use the knowledge from the unit to create a ski jump for use in the summertime.

Priority Standards for unit:

- 6-8.PS3.A.1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
- 6-8.6-8.PS3.A.2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
- 6-8.PS3.B Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

Supporting Standards for unit:

- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	Develop	Create	3
arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Construct	Evaluate	4
arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Use	Analyze	2
arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Present	Analyze	2
graphical displays of data to describe the	Construct	Apply	3

relationships of kinetic energy to the mass of an object.			
graphical displays of data to describe the relationships of kinetic energy to the mass of an object.	Interpret	Analyze	3

Essential Questions:

1. What is the difference between kinetic and potential energy?
2. What does kinetic energy depend upon?
3. What does potential energy depend upon?
4. What is the relationship between potential and kinetic energy?

Enduring Understanding/Big Ideas:

1. Kinetic energy is motion energy, and potential energy is stored energy.
2. Kinetic energy depends on the mass and speed of an object.
3. Potential energy depends on the mass and height of an object.
4. At each point in a system, the kinetic energy and potential energy add up to the same value.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Speed System	Energy Force Kinetic Energy Law of Conservation of Energy Mass Motion Potential Energy Relative Position

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Topic 1: Kinetic Energy Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS3.A.1 6-8.PS3.B	Engage: Investigative Phenomena	15	
6-8.PS3.A.1 6-8.PS3.B	Engage: Accessing Prior Knowledge	15	
6-8.PS3.A.1 6-8.PS3.B	Engage: Hook - Dominos	30	
6-8.PS3.A.1 6-8.PS3.B	Explore 1 Activity: Speed and Motion	45	
6-8.PS3.A.1 6-8.PS3.B	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.PS3.A.1 6-8.PS3.B	Explore 2 Scientific Investigation: The Effect of Mass	120	
6-8.PS3.A.1 6-8.PS3.B	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.PS3.A.1 6-8.PS3.B	Explore 3 Tuva: NFL Helmet Physics	45	
6-8.PS3.A.1 6-8.PS3.B	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.PS3.A.1 6-8.PS3.B	Mission Log: Complete Class Mission Log page 2	20	

Topic 2: Potential Energy Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.6-8.PS3.A.2	Engage: Investigative Phenomena	15	
6-8.6-8.PS3.A.2	Engage: Accessing Prior Knowledge	15	
6-8.6-8.PS3.A.2	Engage: Hook - Rubber Band Energy	30	
6-8.6-8.PS3.A.2	Explore 1 Scientific Investigation: Potential Predictions	45	
6-8.6-8.PS3.A.2	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.6-8.PS3.A.2	Explore 2 Scientific Investigation: Static Potential Energy	120	
6-8.6-8.PS3.A.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.6-8.PS3.A.2	Explore 3 Activity: Energy in a Skate Park	30	
6-8.6-8.PS3.A.2	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.6-8.PS3.A.2	Explore 4 Engineering Solution: Half Pipe Design	120	
6-8.6-8.PS3.A.2	Explain 4: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 4	20	
6-8.6-8.PS3.A.2	Mission Log: Complete Class Mission Log page 3	20	

Engaging Scenario



Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Using the Mission Log for Physical Science Bundle 4, students will complete the Action Plan from STEMscopes.

Rubric for Engaging Scenario:

Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit 4: Physical Bundle 3: Forces and Motion

Subject: Science

Grade: 6

Name of Unit: Forces and Motion

Length of Unit: 9 weeks

Overview of Unit: Students will learn about motion and how outside forces affect the motion of an object. Students will use the knowledge gained to design a 3D maze game that uses the principles of magnetism, electricity, and gravity to move a marble from its starting position to the finish line.

Priority Standards for unit:

- 6-8.PS2.A.1 Apply physics principles to design a solution that minimizes the force of an object during a collision and develop an evaluation of the solution.
- 6-8.PS2.A.2 Plan and conduct an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.
- 6-8.PS2.B.1 Analyze diagrams and collect data to determine the factors that affect the strength of electric and magnetic forces.
- 6-8.PS2.B.2 Create and analyze a graph to use as evidence to support the claim that gravitational interactions depend on the mass of interacting objects.
- 6-8.PS2.B.3 Conduct an investigation and evaluate the experimental design to provide evidence that electric and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact.

Supporting Standards for unit:

- MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- ISTE - INNOVATIVE DESIGNER.4: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom’s Taxonomy Levels	Webb’s DOK
physics principles to design a solution that minimizes the force of an object during a collision	Apply	Create	2

an evaluation of the design a solution that minimizes the force of an object during a collision	Develop	Evaluate	3
an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	Plan	Create	4
an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	Conduct	Create	4
diagrams to determine the factors that affect the strength of electric and magnetic forces.	analyze	Analyze	2
data to determine the factors that affect the strength of electric and magnetic forces	collect	Apply	2
Gravitational interactions depend on the mass of interacting objects.	Create	Create	3
Gravitational interactions depend on the mass of interacting objects.	Analyze	Analyze	4
an investigation to provide evidence that electric and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact.	conduct	Apply	1
the experimental design to provide evidence that electric and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact.	evaluate	Evaluate	3

Essential Questions:

1. What is Newton's Third Law?
2. What is motion?
3. How can motion change?
4. What forces exist in our world?
5. How can forces impact objects without directly touching them?

Enduring Understanding/Big Ideas:

1. All objects that collide exert equal and opposite forces on one another.
2. The motion of an object is determined by the sum of the forces acting on it.
3. To change an object's motion, either the forces on the object and/or the mass of the object must change.

4. Fields exist between objects and exert forces on each other even when the objects are not touching.
5. Electric, magnetic, and gravitational forces all act at a distance between objects.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
<p style="text-align: center;">Attractive Direction</p>	<p style="text-align: center;">Accelerate Charged Object Charged Particle Collide/Collision Current Electric Charge Electric Force Electromagnetic Force Force Gravitational Force Interacting Object Magnetic Field Mass Motion Net Force Newton (N) Newton’s Third Law Reference Frame Spring Scale Weight</p>

Resources for Vocabulary Development:

STEMscopedia & Picture Vocabulary

Topic 1: Newton's Third Law Scope

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS2.A.1	Engage: Investigative Phenomena	15	
6-8.PS2.A.1	Engage: Accessing Prior Knowledge	15	
6-8.PS2.A.1	Engage: Hook - What is a system?	45	
6-8.PS2.A.1	Explore 1 Activity: How can we measure forces?	45	
6-8.PS2.A.1	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.PS2.A.1	Explore 2 Activity: Action-Reaction Contact Forces Lab	120	
6-8.PS2.A.1	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.PS2.A.1	Explore 3 Engineering Solution: Shock Absorber	180	
6-8.PS2.A.1	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.PS2.A.1	Mission Log: Complete Class Mission Log page 2	20	

Topic 2: Changes in Force and Motion

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS2.A.2	Engage: Investigative Phenomena	15	
6-8.PS2.A.2	Engage: Accessing Prior Knowledge	15	
6-8.PS2.A.2	Engage: Hook - Newton Knew that Mass Matters	45	
6-8.PS2.A.2	Explore 1 Activity: Balanced and Unbalanced Forces	120	
6-8.PS2.A.2	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.PS2.A.2	Explore 2 Inquiry Investigation: Newton's Second Law	180	
6-8.PS2.A.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.PS2.A.2	Explore 3 Tuva: BMX Dirt Bike Racing	120	
6-8.PS2.A.2	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.PS2.A.2	Mission Log: Complete Class Mission Log page 3	20	

Topic 3: Electric and Magnetic Forces

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS2.B.1 6-8.PS2.B.3	Engage: Investigative Phenomena	15	
6-8.PS2.B.1 6-8.PS2.B.3	Engage: Accessing Prior Knowledge	15	
6-8.PS2.B.1 6-8.PS2.B.3	Engage: Hook - Electromagnetic Straw	45	
6-8.PS2.B.1 6-8.PS2.B.3	Explore 1 Activity: Magnetic Fields	45	
6-8.PS2.B.1 6-8.PS2.B.3	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.PS2.B.1 6-8.PS2.B.3	Explore 2 Activity: Electrical Force	45	
6-8.PS2.B.1 6-8.PS2.B.3	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.PS2.B.1 6-8.PS2.B.3	Explore 3 Scientific Investigation: Electromagnetic Strength	120	
6-8.PS2.B.1 6-8.PS2.B.3	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.PS2.B.1 6-8.PS2.B.3	Mission Log: Complete Class Mission Log page 4	20	

Topic 4: Gravitational Forces

Standard	Topic & Section	Suggested # of Minutes	Notes
6-8.PS2.B.2	Engage: Investigative Phenomena	15	
6-8.PS2.B.2	Engage: Accessing Prior Knowledge	15	
6-8.PS2.B.2	Engage: Hook - How strong is Earth?	30	
6-8.PS2.B.2	Explore 1 Activity: Mass and Gravitational Force	45	
6-8.PS2.B.2	Explain 1: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 1	20	
6-8.PS2.B.2	Explore 2 Scientific Investigation: Gravitational Force Between Objects	120	
6-8.PS2.B.2	Explain 2: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 2	20	
6-8.PS2.B.2	Explore 3 Activity: Gravitational Forces in Space	120	
6-8.PS2.B.2	Explain 3: Choose from Vocabulary, STEMscopedia, linking literacy, and/or connection videos connected to Explore 3	20	
6-8.PS2.B.2	Mission Log: Complete Class Mission Log page 5	20	

Engaging Scenario



Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Using the Mission Log for Physical Science Bundle 3, students will complete the Action Plan from STEMscopes.

Rubric for Engaging Scenario:

Use CCC and SEP Inventory of Skills to assess Action Plan.

Unit of Study Terminology

Appendices: All Appendices and supporting material can be found in this course's shell course in the District's Learning Management System.

Assessment Leveling Guide: A tool to use when writing assessments in order to maintain the appropriate level of rigor that matches the standard.

Big Ideas/Enduring Understandings: Foundational understandings teachers want students to be able to discover and state in their own words by the end of the unit of study. These are answers to the essential questions.

Engaging Experience: Each topic is broken into a list of engaging experiences for students. These experiences are aligned to priority and supporting standards, thus stating what students should be able to do. An example of an engaging experience is provided in the description, but a teacher has the autonomy to substitute one of their own that aligns to the level of rigor stated in the standards.

Engaging Scenario: This is a culminating activity in which students are given a role, situation, challenge, audience, and a product or performance is specified. Each unit contains an example of an engaging scenario, but a teacher has the ability to substitute with the same intent in mind.

Essential Questions: Engaging, open-ended questions that teachers can use to engage students in the learning.

Priority Standards: What every student should know and be able to do. These were chosen because of their necessity for success in the next course, the state assessment, and life.

Supporting Standards: Additional standards that support the learning within the unit.

Topic: These are the main teaching points for the unit. Units can have anywhere from one topic to many, depending on the depth of the unit.

Unit of Study: Series of learning experiences/related assessments based on designated priority standards and related supporting standards.

Unit Vocabulary: Words students will encounter within the unit that are essential to understanding. Academic Cross-Curricular words (also called Tier 2 words) are those that can be found in multiple content areas, not just this one. Content/Domain Specific vocabulary words are those found specifically within the content.

Symbols:



This symbol depicts an experience that can be used to assess a student's 21st Century Skills using the rubric provided by the district.



This symbol depicts an experience that integrates professional skills, the development of professional communication, and/or the use of professional mentorships in authentic classroom learning activities.