Forces and Motion

Content Area: **Science**
Course(s): **Science 6**
Time Period: **November**
Length: **4 weeks**
Status: **Published**

Forces and Motion Overview

Over a 4 week period, students will use *system and system models* and *stability and change* to understand ideas related to why some objects will keep moving and why objects fall to the ground. Students apply Newton's third law of motion to related forces to explain the motion of objects. Students also apply an engineering practice and concept to solve a problem caused when objects collide.

Forces and Motion Priority Standards

SCI.MS-PS2-1	Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
SCI.MS-PS2-2	Plan 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.

Forces and Motions Learning Goals

- Students will be able to design a solution to a problem which involves the motion of two colliding objects by applying Newton's Third Law to the solution.
- Students will be able to plan an investigation to provide evidence that the change in an object's motion is dependent upon the sum of forces on the object and the mass of the object.

Forces and Motions Learning Targets

- Students will be able to identify patterns in collisions to aid in design.
- Students will be able to predict the change in motion of an object in a collision when given force and mass data.
- Students will be able to recite Newton's First and Second Law.
- Students will be able to recite Newton's Third Law.
- Students will be able to recognize how acceleration and mass influence force.
- Students will be able to use engineering design to create a solution.
- Students will recognize or recall specific vocabulary, including: force, collision, mass, constraints.
- Students will recognize or recall specific vocabulary, including: inertia, velocity, acceleration, Newton.

Forces and Motions Essential Questions

- How do Newton's First and Second Laws affect the change in an object's motion?
- How does Newton's Third Law affect the collision of two objects?

21st Century Themes

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Marzano Elements

- Communicating High Expectations for Each Student to Close the Achievement Gap
- Establishing & Acknowledging Adherence to Rules & Procedures
- Establishing & Maintaining Effective Relationships in a Student Centered Classroom
- Helping Students Engage in Cognitively Complex Tasks
- Helping Students Examine Similarities & Differences
- Helping Students Examine their Reasoning
- Helping Students Practice Strategies, Skills, & Processes
- Helping Students Process New Content
- Helping Students Revise Knowledge
- Identifying Critical Content from the Standards
- Organizing Students to Interact with Contact
- Previewing New Content
- Providing Feedback & Celebrating Success
- Reviewing Content
- Using Engagement Strategies
- Using Formative Assessment to Track Progress
- Using Questions to Help Students Elaborate on Content

Differentiated Instruction

- Have individual students explain content understanding in their own words
- Use a variety of visual aids to help student understanding
- Use different teaching styles to introduce, explain, and reinforce content understanidng

- Use small groups to check for understanding.

Assessments

- Do Now Activities
- MS-PS2-1 Learning Scale
- MS-PS2-2 Learning Scale
- Teacher-created quizzes
- Teacher-created worksheets
- Unit Benchmark Assessment

Learning Plan

Week	Topic	Lesson Activities	Standard/Learning Go
Wk 1	Forces and Motions	Do Now Activities (Warm up) Review Power Point slides from online information together. Explain and discuss how how Newton's Third Law affects the motions of objects. Students will work collaboratively to design and test a solution to a problem involving the collision of two objects. Show videos from You Tube on Newton's Third Law: https://www.youtube.com/watch?v=EgqcGrB3re8 https://www.youtube.com/watch?v=r9yuR7ezqf4 Assign student worksheets.	**Standard:** Apply Newt the motion of two collid **Learning Goal:** Students will be able to two colliding objects by **Learning Target:** Students will be able to colliding objects such as space vehicle by applyir
Wk 2 - Wk 3	Weather And Climate	Do Now Activities (Warm up) Review Power Point slides from online information together Students will work collaboratively to plan investigations that use	**Standard:** Plan an investigation to depends on the sum of t

		Newton's First and Second Laws to show how an objects motion depends on force and mass Show You Tube videos on Newton's First Law: https://www.youtube.com/watch?v=LEHR8YQNm_Q https://www.youtube.com/watch?v=BlFGN2zlDYc You Tube videos on Newton's Second Law: https://www.youtube.com/watch?v=-KxbIIw8hlc https://www.youtube.com/watch?v=ZvPrn3aBQG8 Assign student worksheets Do Now Activities (Warm up) Complete a list of review topics in preparation for unit assessment. Complete an open-note quiz.	**Learning Goal:** Students will be able to an object's motion is dep mass of the object **Learning Target:** Students will be able to and unbalanced forces t dependent upon the sum Students will be able to changes in to provide ev upon the mass of the ob **Standard:** All unit standards listed **Learning Goals:** Students will review and standards-basesd assess
Wk 3 - Wk 4	Forces and Motion	Complete a standards review worksheet. Complete a Unit learning scale on. Complete a standards-based assessment.	**Learning Targets:** Students will complete a collaboratively with the based assessment.

Materials and Resources

- eacher-created Google Documents
- Scientific hands-on masterials
- Teacher choice of You Tube videos on the content
- Teacher-created Google Slides