

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 understanding

- 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 Goal
Wk 1	Forces and Motions	Do Now Activities (Warm up)	Standard: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
		Review Power Point slides from online information together.	
		Explain and discuss how Newton's Third Law affects the motions of objects.	Learning Goal: Students will be able to design a solution to a problem involving two colliding objects by applying Newton's Third Law.
		Students will work collaboratively to design and test a solution to a problem involving the collision of two objects.	
Wk 2	Weather And Climate	Show videos from You Tube on Newton's Third Law:	Learning Target: Students will be able to design a solution to a problem involving two colliding objects such as a space vehicle by applying Newton's Third Law.
		https://www.youtube.com/watch?v=EgqcGrB3re8	
		https://www.youtube.com/watch?v=r9yuR7ezqf4	Standard: Plan an investigation to design a solution to a problem involving the motion of two colliding objects.
		Assign student worksheets.	
Wk 3		Do Now Activities (Warm up)	Standard: Plan an investigation to design a solution to a problem involving the motion of two colliding objects.
		Review Power Point slides from online information together	
		Students will work collaboratively to plan investigations that use	

Newton's First and Second Laws to show how an objects motion depends on force and mass

Learning Goal:

Students will be able to
an object's motion is de
mass of the object

Show You Tube videos on Newton's First Law:

https://www.youtube.com/watch?v=LEHR8YQNm_Q

<https://www.youtube.com/watch?v=BIFGN2zlDYc>

Learning Target:

Students will be able to
and unbalanced forces to
dependent upon the sum

You Tube videos on Newton's Second Law:

<https://www.youtube.com/watch?v=-KxbIIw8hlc>

<https://www.youtube.com/watch?v=ZvPrn3aBQG8>

Students will be able to
changes in to provide ev
upon the mass of the ob

Assign student worksheets

Do Now Activities (Warm up)

Standard:

All unit standards listed

Complete a list of review topics in preparation for unit assessment.

Learning Goals:

Complete an open-note quiz.

Students will review and
standards-based assess

Wk 3
Forces
- and
Motion
Wk 4

Complete a standards review worksheet.

Learning Targets:

Students will complete a
collaboratively with the
based assessment.

Complete a Unit learning scale on.

Complete a standards-based assessment.

Materials and Resources

- Teacher-created Google Documents
- Scientific hands-on materials
- Teacher choice of YouTube videos on the content
- Teacher-created Google Slides