Studies Weekly® | SCIENCE HOW TO

Claims/Evidence/Reasoning: A proven framework for investigating science

Name _____

Providing Evidence

Scientists make claims about their findings. A **claim** is a statement of truth. All claims must be backed by evidence. **Evidence** is information that proves a claim is correct.

Hands-On: Learn Science by Doing Science

Investigate!

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Question	How do balanced and unbalanced forces affect the motion of an object?
Describe your investigation:	We will investigate how far the teacher's chair rolls across the room when pushed.
What data will you collect?	We will measure how far the chair rolls when pushed with different amounts of force.
What is the variable?	The ammount of force used
What tools are needed?	The teacher's chair, yard stick
How will you record your findings?	We will make a chart in our science journal.

Consumable: Students can write and do activities on the newspaper

Science 3 Studies Weekly THIRD GRADE

Science in Sports

Did you know science can help you become a better athlete? It can! Science helps us understand why athletes can jump high, throw far, run fast, twist, turn, and catch. This field of science is called physics. In **physics**, we study the physical world.

PHENOMENON

Does science help you to be a better athlete?

Phenomenon-driven Pedagogy: Frames learning in real world situations, making it more relevant

Forces

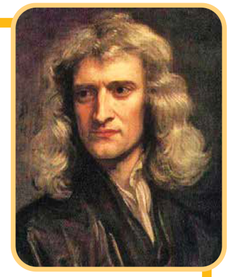
Close Reading: Students can highlight main ideas and supporting detail

Extension Materials: Useful for students who need more challenges or deeper learning

Force

Force is a motion that changes the direction of an object. In order for anything to move, force must be applied. When you jump, you are applying force to the ground. When you kick a ball or ride a bike, you are applying force. The result is movement. The amount of force is determined by the speed and strength of the motions. If you hit a baseball with a bat that is swinging faster, it will go farther. When Donovan Mitchell jumps to dunk a basketball, he is applying force to the ground. This action propels him high into the air. He is able to jump high because of the strength in his legs. Force can be observed all around us.

Isaac Newton



Isaac Newton was a famous physicist. **Physicists** are people who study physics. He came up with three rules that have become central to our understanding of physics.

1. His first law is that nothing can move on its own. There must be some outside force that starts or stops motion.
2. The second law is that the amount of force depends on the speed and strength of the motion that is applied to an object.
3. The third law is that there are always two forces acting on an object. If the object is resting, the forces are balanced. If the object is moving, the forces are unbalanced.

3D Learning: Crosscutting concepts are integral to learning

Cause & Effect

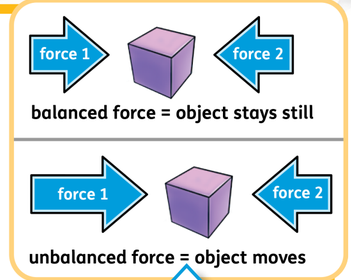
Push vs. Pull

A force can be a push or a pull. A **push** is when you move an object away from you. A **pull** is when you move an object towards you. Imagine a door that says "pull" on it. You need to move the door towards yourself to open it. If the door says "push" on it, you move the door away from yourself to open it. All force is either a push or a pull on an object.

Types of Forces

More than one force can act on an object at once. If one of those forces is stronger than the other, it is called an **unbalanced force**, and the object will move. If both forces have the same strength, it is called a **balanced force**. Balanced forces make objects stand still. **Friction** is a force that slows things down. Friction happens when two objects rub or move against each other. If you kick a ball through grass, it will slow down and eventually stop because of the friction created by rolling in the grass. Gravity is another important force. **Gravity** is a force that pulls objects toward the Earth.

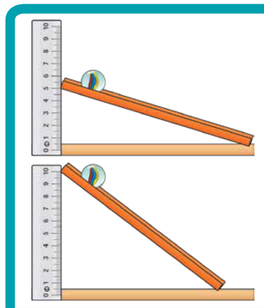
Vocab: Strengthens comprehension



Illustrations: Help students visualize abstract concepts

Science and Engineering Practice: Plan and Carry Out an Investigation explicitly taught in the article

Planning an Investigation



Scientists investigate to answer questions. Every investigation must be carefully planned. Scientists consider their question. They decide what data they will collect, how they will test the question, the tools they will use, and how to record what they see. All investigations have one or more variables. A **variable** is something that changes. If you were to investigate how the steepness of a ramp would affect the distance a marble will roll, you would plan like this:

Question	How does the steepness of a ramp affect how far a marble can roll?
Data	distance of the marble roll
Variable	the steepness of the ramp
Tools	ramp, measuring tape, marble
How will you record the data?	1. Measure the height of the ramp, and record that each time. 2. Measure the distance the marble rolls, and record that each time. 3. Put these measurements in a table. 4. Create a graph from the table to analyze.

Modeling: Provides scaffolded support for students

Plenty of room for students to record their answers.

Studies Weekly® | SCIENCE HOW TO TEACHER EDITION

★ **The Teacher Edition provides step-by-step support to implement effective science instruction**

Storylines help students make sense of phenomena

Week 5 Storyline: Can science help students to become better athletes? Students will explore balanced and unbalanced forces and the way force affects athletics. The articles provide students with background knowledge so that they can plan an investigation around balanced and unbalanced forces.

	1	2	3	4	5	6	7	8
Science and Engineering Practices								
Planning and carrying out investigations		x				x		x
Disciplinary Core Ideas								
PS2.A: Forces and Motion	x				x		x	x
PS2.B: Types of Interactions			x	x				x
Crosscutting Concepts								
Cause and Effect			x	x				
Depth of Knowledge	2	1	2	2	1	2	2	3

3-D assessments ensure students can demonstrate learning

Social-emotional questions support student well-being

Well-Being Questions:

- What are some things you can do to help your well-being stay balanced? **(Answers will vary but may include: eat healthy food, move, learn, sleep enough, drink enough water, etc.)**
- What does it feel like to be off balance? **(Answers will vary.)**
- What evidence might your peers have that you are a good friend? Is there anything you would change about the way you treat others to give different evidence? **(Answers will vary.)**

Article 1: Science in Sports
Lexile® measure: 610L-800L
Word Count: 44

Phenomenon Lesson Plan: Engage: (15 min)

1. Watch Video: View the phenomenon video "Sports Video."
2. See, think, wonder:
   a. Ask students what they see, and have them write it down on the See, Think, Wonder graphic organizer.
   b. Ask students, "What do you think about what you saw?" Have them write it down. **(Answers will vary.)**
   c. Ask students, "What else are you wondering?" Have them write it down. **(Answers will vary.)**
   d. Share some student answers and discuss.
3. Read the article as a whole class.

Weekly phenomenon drive student learning and exploration

Pre-built graphic organizers and resources enable quick lesson planning

Name: _____ Date: _____

Investigation Plan

QUESTION:	
DATA:	
VARIABLE:	
TOOLS:	
HOW WILL YOU RECORD THE DATA?	

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Lesson Plan: (30 min)

1. Read the article with the students.
2. *Cause and Effect:* Play with toy cars. After the students play for a little bit, ask them to play with the directions they push and pull. Is it only forwards and backwards? After a while, bring the students together and ask them what they discovered. Have students compare what happens when the car is pushed at different speeds. What is the relationship between the cause and effect of pushing the car? Have students compare the cause and effect of the different speeds of the car.

Crosscutting Concepts encourage integrated learning across topics

Science and Engineering Practices (SEPs) spark student curiosity

Lesson Plan: (30 min)

1. *Planning and carrying out investigations:* Read the article as a class.
2. Discuss each part of the plan as you read the article as a class.
   a. Question: Emphasize that the question must be something that will have more than a "yes" or "no" answer. Students should be investigating something that will yield data.
   b. Data: What are you measuring? How will you measure it?
   c. Variable: What will stay the same? What will change?
   d. Tools: What do you need? Be detailed so someone else could replicate your investigation.
   e. How you will record the data: Discuss how you will keep track of data and how you will organize it so it's comprehensible.
3. Create a practice plan as a class.

Extension materials allow for deeper learning

Lesson Plan: *Elaborate:* (30 min)

1. Read the article with the students.
2. Explain: Discuss the meaning of each law, and provide examples.
   a. Discuss the first law and show an object at rest. How will it move? **(Answers will vary.)**
   b. Discuss the second law and show that an object moves farther when you push harder.
   c. Discuss the third law, and demonstrate equal and opposite reactions by discussing skateboarding. Ask students: Have you ever ridden a skateboard? **(Answers will vary.)** What happens when you push back with your foot? **(the skateboard moves forward)**.
3. Have students get into groups and illustrate Newton's Laws on a poster board.
4. Hang the posters on the walls, and allow students to do a gallery walk.

Materials/Kit Needed:
Soccer ball
Football
Jump rope
Tetherball
Toy
Swing set
Basketball

Low-cost, locally sourced tool lists makes science more accessible

Lessons based on the 5E model provide a unique learning experience

Lesson Plan (60 minutes):

1. Prior to this lesson, set up a
   each group gets one egg t
   tarp or other covering to a
   could also put a chair out f
   However, if safety is a conc
   students.
2. Engage: Read the article.
3. Explore: Tell students that it
   process. Remind students c
   shell must be dropped from
   cracking or breaking).
4. Evaluate: Distribute the gra
   to fill out the graphic organ

Lesson Plan (60 minutes):

1. Engage: Ask students: How do you th
   (Answers will vary.) If students are str
   look at the images in the article.
2. Explain: Read the article.
3. Explore: Show students the video "He
4. Engage: Tell students that it is now tir
   design process. Ask students to think
   designs.
5. Evaluate: Have students write a refle
   answers the following questions:
   a. What worked? **(Answers will v**
   b. What didn't work? **(Answers w**
   c. What would you try next time?