

Black-Eyed Susan Science

NGSS
Aligned

Squiggle Sheets

The image displays three versions of a "Squiggle Sheets" worksheet for the topic of Force, designed for NGSS-aligned science education.

Version 1 (Top Left): Understanding Checkpoint

This version includes a cartoon character of a blue sphere labeled "force" holding a clipboard, and a series of multiple-choice questions:

5. The force that always acts in a direction opposite to the motion of an object is:
a. an applied force.
b. friction.
c. gravity.
d. magnetic.
6. _____ is not a force.
a. gravity
b. friction
c. mass
d. all of these
7. Matt pushes a box across the floor. What slows the box to a stop?
a. force
b. inertia
c. mass
d. weight

Version 2 (Bottom Left): Force

This version features a large central title "FORCE" with the subtitle "A PUSH OR PULL ACTING ON AN OBJECT". It includes several examples of forces:

- 1. CAN CAUSE OBJECT TO MOVE
- 2. CAN CHANGE OBJECT'S SPEED

Below this, it states: "FORCE IS A VECTOR QUANTITY - HAS BOTH STRENGTH AND DIRECTION". It defines force as "Represented with arrows. Strength (Magnitude) = Length. Direction = Where it points". It also notes that "MEASURED IN NEWTONS (N)".

Version 3 (Bottom Right): Examples of Force

This version shows four examples of force:

- APPLIED FORCE**: A person pushing a box.
- GRAVITY**: An apple falling from a tree.
- FRICITION**: A person sliding a book across a table.
- ELECTRIC & MAGNETIC**: A magnet attracting a piece of metal.

A portrait of Sir Isaac Newton is shown, with the text: "Force = mass X acceleration F = ma" and "English scientist Sir Isaac Newton created laws that describe force & motion".

Bottom Right Corner: 3 Versions!

Terms of Use

Thank you for your support and interest in Black-Eyed Susan Science! Creating practical, fun, and engaging activities is my goal. I hope you find this resource useful and I look forward to positive feedback.

Please contact me with any questions, concerns, or comments at
blackeyedsusanscience@gmail.com.

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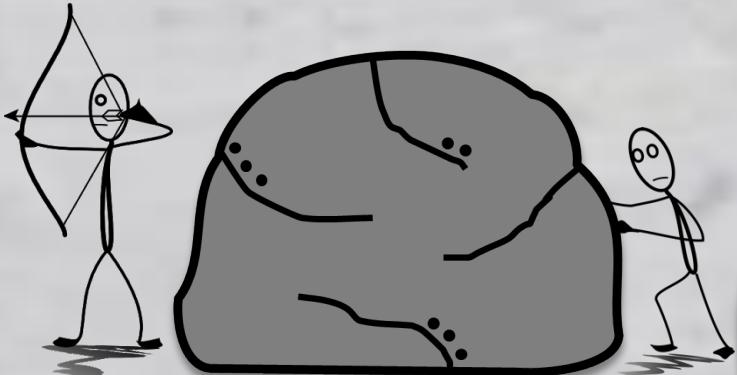
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FORCES CAN AFFECT OBJECTS IN SEVERAL WAYS:

1. CAN CAUSE A RESTING OBJECT TO MOVE
2. CAN CHANGE A MOVING OBJECT'S SPEED
3. CAN CHANGE AN OBJECT'S DIRECTION
4. CAN CHANGE AN OBJECT'S SHAPE



FORCE

A PUSH OR PULL ACTING ON AN OBJECT

FORCE IS A VECTOR QUANTITY
-HAS BOTH STRENGTH AND DIRECTION



$$\text{Force} = \text{mass} \times \text{acceleration}$$
$$F = ma$$

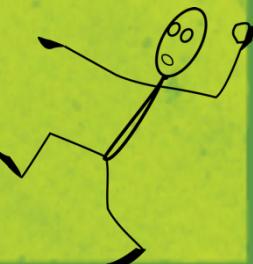
English scientist
Sir Isaac Newton
-created laws
that describe
force & motion

Represented with arrows
Strength (Magnitude) = length
Direction = Where it points
-MEASURED IN NEWTONS (N)

EXAMPLE

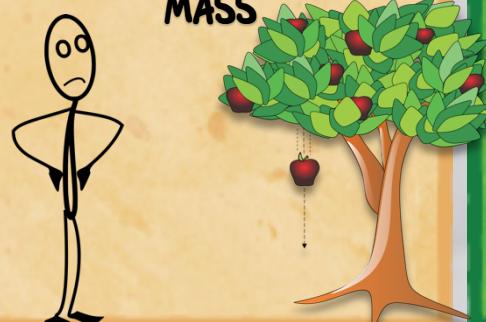
APPLIED FORCE

-A FORCE THAT A PERSON OR THING APPLIES TO AN OBJECT



GRAVITY

-FORCE OF ATTRACTION BETWEEN OBJECTS WITH MASS



EXAMPLE

FRICITION

-FORCE THAT OPPOSES MOTION BETWEEN TWO SURFACES THAT ARE IN CONTACT

Sometimes friction is helpful.



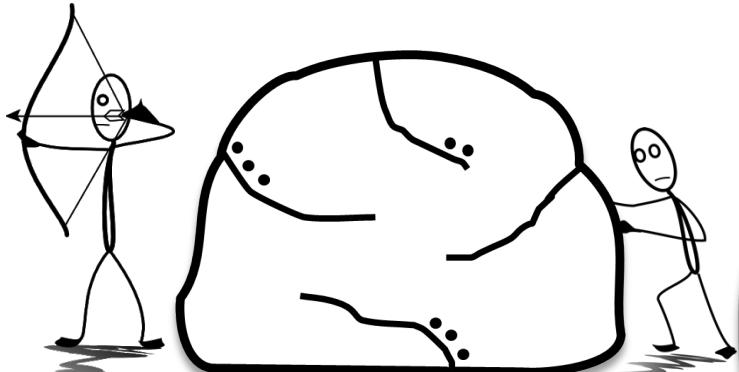
ELECTRIC & MAGNETIC

-FORCES CAUSED BY NEGATIVE AND POSITIVE CHARGES IN MATTER



FORCES CAN
AFFECT OBJECTS
IN SEVERAL WAYS:

1. CAN CAUSE A RESTING OBJECT TO **MOVE**
2. CAN CHANGE A MOVING OBJECT'S **SPEED**
3. CAN CHANGE AN OBJECT'S **DIRECTION**
4. CAN CHANGE AN OBJECT'S **SHAPE**



FORCE

A **PUSH OR PULL ACTING ON AN OBJECT**

FORCE IS A **VECTOR QUANTITY**
-HAS BOTH STRENGTH AND DIRECTION

Represented with **arrows**

Strength (Magnitude) = length

Direction = Where is points

-MEASURED IN NEWTONS (N)



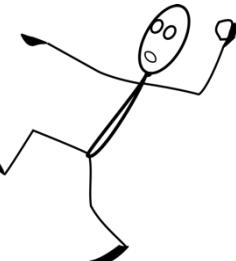
Force=mass X acceleration
 $F=ma$

English scientist
Sir Isaac Newton
-created laws
that describe
force & motion

EXAMPLE

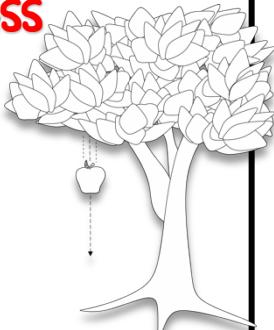
APPLIED FORCE

-A FORCE THAT A PERSON OR THING APPLIES TO AN OBJECT



GRAVITY

-FORCE OF ATTRACTION BETWEEN OBJECTS WITH MASS



FRICITION

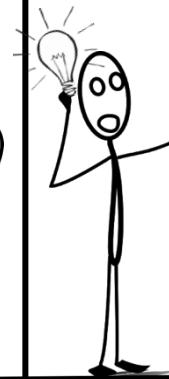
-FORCE THAT OPPOSES MOTION BETWEEN TWO SURFACES THAT ARE IN CONTACT

Sometimes friction is helpful.

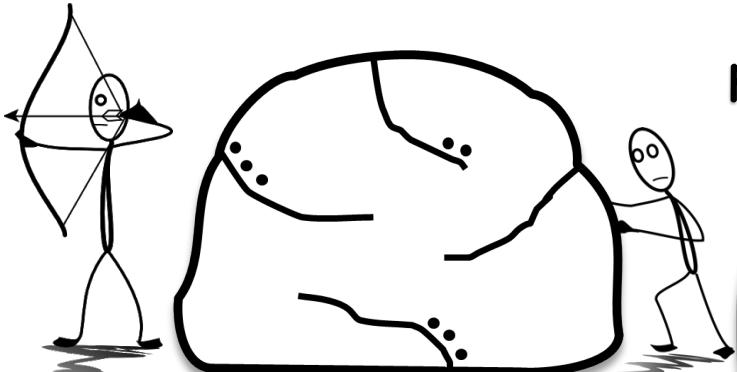


ELECTRIC & MAGNETIC

-FORCES CAUSED BY NEGATIVE AND POSITIVE CHARGES IN MATTER



FORCES CAN
MOVE OBJECTS
IN SEVERAL WAYS:



1. CAN CAUSE A RESTING OBJECT TO _____
2. CAN CHANGE A MOVING OBJECT'S _____
3. CAN CHANGE AN OBJECT'S _____
4. CAN CHANGE AN OBJECT'S _____



$$\text{Force} = \text{mass} \times \text{acceleration}$$
$$F = ma$$

FORCE

A ____ OR PULL ____ ON AN OBJECT

FORCE IS A _____ QUANTITY
- HAS BOTH _____
AND _____
Represented with _____
Strength (_____) = length
_____ = Where is points
- MEASURED IN _____



Sir Isaac Newton
- created _____
that describe
force & motion

APPLIED FORCE

-A FORCE
THAT A
PERSON
OR THING

TO
AN OBJECT

GRAVITY

- FORCE OF _____
BETWEEN OBJECTS WITH _____



FRICITION

- FORCE THAT _____
MOTION BETWEEN TWO
SURFACES THAT ARE IN _____

Sometimes
friction is _____.



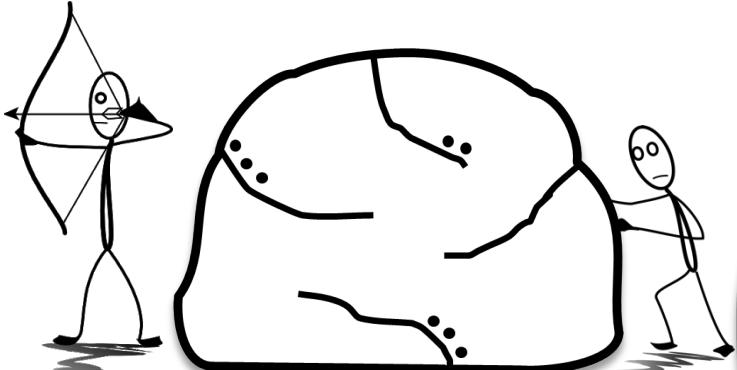
ELECTRIC & MAGNETIC

- FORCES
CALUSED BY
NEGATIVE
AND POSITIVE

IN MATTER



FORCES CAN
MOVE OBJECTS
IN SEVERAL WAYS:



1. CAN CAUSE A RESTING OBJECT TO _____
2. CAN CHANGE A MOVING OBJECT'S _____
3. CAN CHANGE AN OBJECT'S _____
4. CAN CHANGE AN OBJECT'S _____



$$\text{Force} = \text{mass} \times \text{acceleration}$$
$$F = ma$$

FORCE

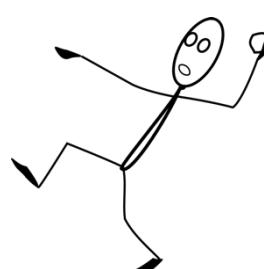
Represented with _____
Strength (_____) = length
_____ = Where is points
-MEASURED IN _____



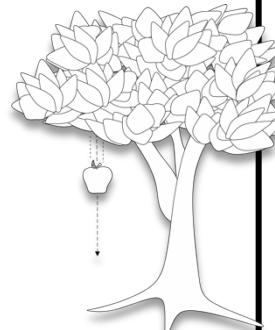
Sir Isaac Newton
-created _____
that describe
force & motion

EXAMPLE

APPLIED FORCE



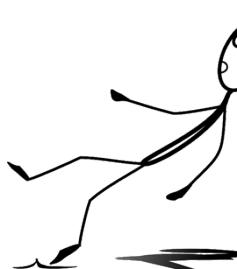
GRAVITY



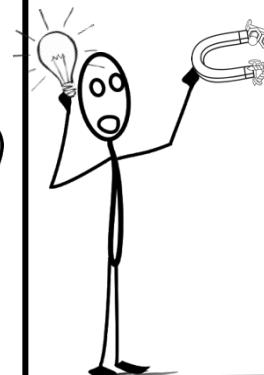
EXAMPLE

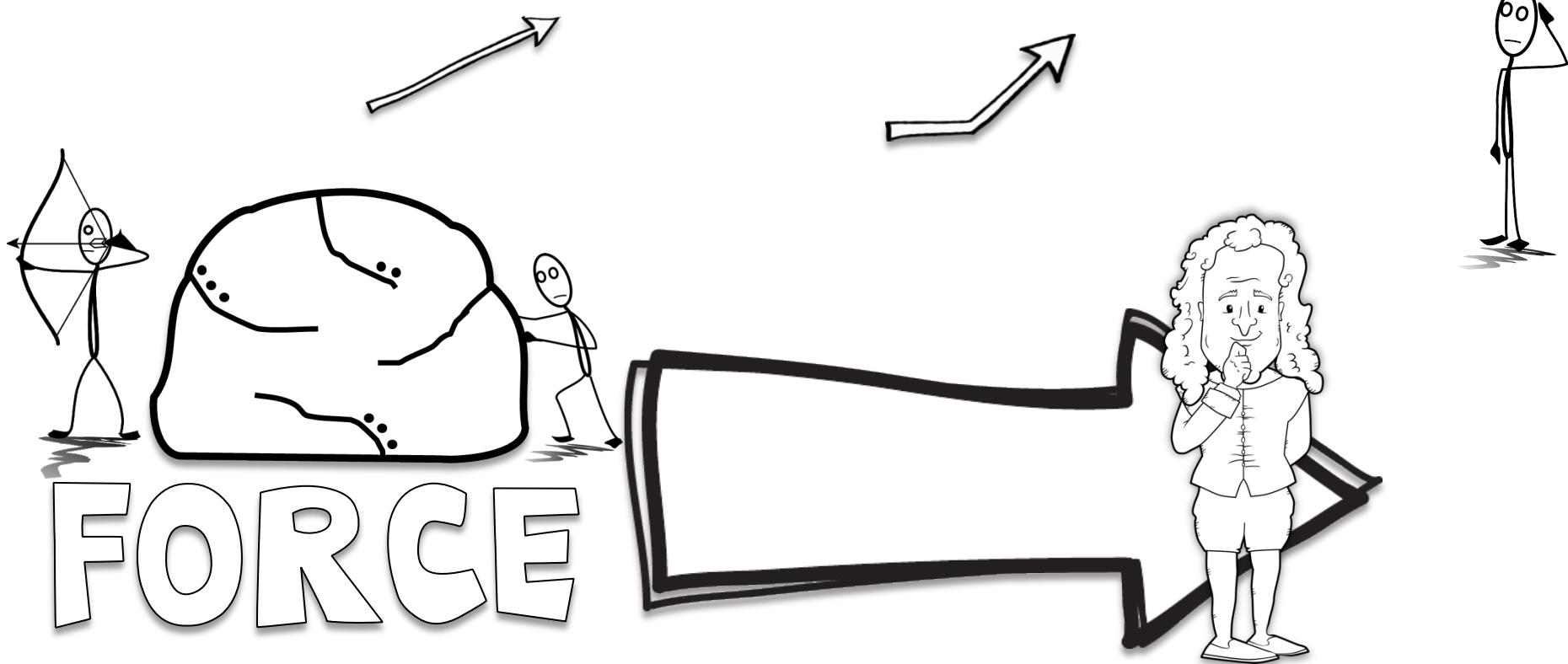
FRICITION

Sometimes
friction is
_____.



ELECTRIC & MAGNETIC





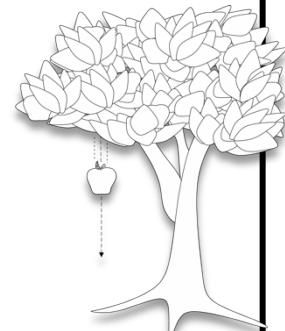
FORCE

EXAMPLE

APPLIED FORCE



GRAVITY

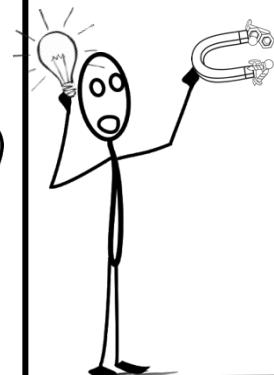


FRICITION

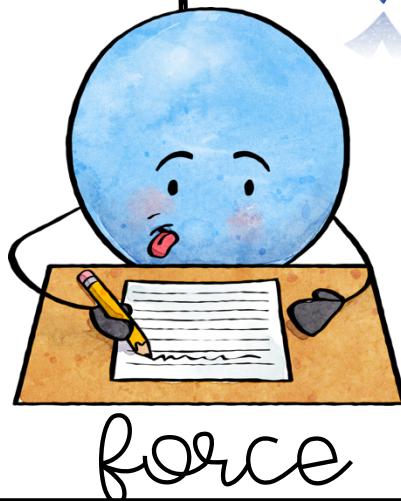


EXAMPLE

ELECTRIC & MAGNETIC



Understanding Checkpoint



Name _____

Date _____

Period _____

1. A force is a _____ or _____ acting on an object.

2. Force is measured in
a. Watts.
b. Joules.
c. Newtons.
d. horse power.

3. Arrows are used to represent force, they represent both
a. strength and direction.
b. direction and speed.
c. strength and speed.
d. mass and strength.

4. The formula to calculate force is:
a. mass X weight.
b. mass X acceleration.
c. mass / speed.
d. weight X acceleration.

5. The force that always acts in a direction opposite to the motion of an object is:
- a. an applied force.
 - b. friction.
 - c. gravity.
 - d. magnetic.

6. _____ is not a force.
- a. gravity
 - b. friction
 - c. mass
 - d. all of these

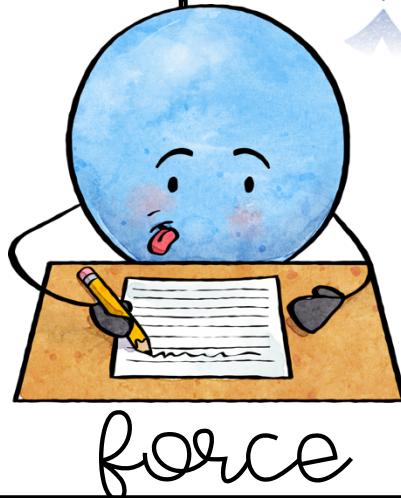
7. Jeff pushes a box across the floor.
What causes the box to move?
a. an applied force
b. gravity
c. electric
d. inertia

8. True or False: Because force is a vector measurement, it has both magnitude and direction.

9. True or False: Gravity is the force that pulls objects toward Earth.

10. True or False: Friction can be represented with a vector.

Understanding Checkpoint



Name _____

Date _____ **KEY**

Period _____

1. A force is a push or pull acting on an object.

2. Force is measured in
a. Watts.
b. Joules.
c. **Newton's**.
d. horse power.

3. Arrows are used to represent force, they represent both
a. **strength and direction**.
b. direction and speed.
c. strength and speed.
d. mass and strength.

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8. **True** or False: Because force is a vector measurement, it has both magnitude and direction.

9. **True** or False: Gravity is the force that pulls objects toward Earth.

10. **True** or False: Friction can be represented with a vector.

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Next Generation Science Standards

Prince Padania

Teachers Resource Force

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Teach To Tell

Amy Groesbeck

Free stickman clipart:

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