Name & Surname: _____ Class: _____ Date: _____

Forces Change Motion



Plan a test of force, mass, and motion

About 60 minutes Level ★★★☆☆

How Forces Change Motion

A change in motion means speeding up, slowing down, or turning. It is caused by the **net force** acting on an object and limited by its **mass**.

- Net force is the **sum** of all pushes and pulls. Balanced forces cancel to zero and motion does not change.
- An unbalanced force causes **acceleration**. Bigger net force on the same mass means bigger acceleration.
- Bigger **mass** means smaller acceleration for the same net force. Mass measures resistance to change.
- In an investigation, change one variable, keep others the same, and measure **distance** or time.



Task A

/4

Complete the map for net force using the notes above.

Definition (in my own words)

.....

.....

.....

Characteristics

.....

.....

.....

net force

Examples

two pushes of 5 N same way = 10 N net force

.....

.....

.....

Non-examples

mass of the object in kilograms

.....

.....

.....

Created with LessonDino.com · AI lesson planner with checkable sources

Build Your Argument

Plan reasons and evidence for your investigation claim.

Key words

force: a push or a pull

net force: the sum of all pushes and pulls on an object

mass: amount of matter; resists change in motion

acceleration: how fast velocity changes

inertia: tendency to keep the same motion

friction: force that opposes sliding

Task B

Plan to convince a reader with evidence about motion.

Goal **A change in motion depends on net force and mass**

Reason 1

Bigger net force causes bigger change in motion

Fact 1a _____

Fact 1b _____

Fact 1c _____

Reason 2

Bigger mass causes smaller change with the same force

Fact 2a _____

Fact 2b _____

Fact 2c _____

Reason 3

Balanced forces cause no change in motion

Fact 3a _____

Fact 3b _____

Fact 3c _____

Conclusion

Created with LessonDino.com · AI lesson planner with checkable sources

Design Your Test

Draw and describe your plan to collect evidence.

Task C

Draw your setup to test force and mass clearly.

Draw a cart or ball setup that tests pushes and mass, then write your plan: what you will change, keep the same, and measure

Draw here

Write here

Created with LessonDino.com · AI lesson planner with checkable sources

Review in Minutes

Summarize what you know in each wedge of the clock.

Task D

Fill each wedge with short notes or a small sketch.



Created with LessonDino.com · AI lesson planner with checkable sources

Check Your Thinking

Sort ideas and answer with evidence from your plan.

Task E

/3

Circle the odd one out using force ideas.

1. 3 N push | 5 N push | 2 kilograms | 10 N pull

Why?

2. turning | speeding up | staying at rest | slowing down

Why?

3. net force of 0 N | balanced forces | constant velocity | large acceleration

Why?

Created with LessonDino.com · AI lesson planner with checkable sources

Forces Change Motion

Task F

/3

Answer fully using claims and evidence.

1. **How would doubling the net force affect a cart of the same mass?**
   I think doubling net force will... because...

2. **How would doubling the mass affect motion with the same push?**
   I think doubling mass will... because...

3. **Describe one fair investigation plan to test force and mass.**
   I will change... keep the same... and measure...

How did I do?

Circle a face for each line.

I can explain how net force and mass affect motion	☹	😐	☺
I can plan a fair investigation with variables	☹	😐	☺
I can use evidence to support a claim	☹	😐	☺

Created with LessonDino.com · AI lesson planner with checkable sources

Answer sheet: Forces Change Motion

Task A

Definition: the sum of all pushes and pulls acting on an object

Characteristics: found by adding forces in the same direction, found by subtracting forces in opposite directions, zero means balanced forces

Examples: two pushes of 5 N same way = 10 N net force, push of 10 N and pull of 4 N opposite = 6 N net force

Non-examples: mass of the object in kilograms, speed of the object alone

Task B

Answers will vary, e.g. Bigger net force causes bigger change in motion; Bigger mass causes smaller change with the same force; Balanced forces cause no change in motion

Task C

Answers will vary.

Task D

Answers will vary.

Task E

1. 2 kilograms (It is a mass, the others are forces.)
2. staying at rest (It is no change in motion, the others are changes.)
3. large acceleration (It needs unbalanced force, the others mean balanced or no change.)

Task F

1. Doubling net force will about double the acceleration and the cart will gain speed faster because acceleration is directly related to net force for the same mass.
2. Doubling mass will make acceleration about half as large, so the cart will speed up more slowly because larger mass resists change in motion.
3. Push a cart with 1, 2, then 3 rubber bands for different net force while keeping mass the same, then repeat with added mass; measure distance in meters in the same time or time to travel the same distance to show motion change depends on sum of forces and mass.

Pictures: Illustration: agrorocha · Pixabay; "Cart png sticker illustration, transparent" is marked with CC0 1.0. To view the terms, visit https://creativecommons.org/publicdomain/zero/1.0/.