Forces and Newton's First

Engage

What To Do:

1. Talk to your partners and list as many types of forces as you can remember in the space below.

Materials: 2-liter soda bottle filled with water, piece of paper

What To Do:

2. Take a look at the picture to the right.
3. Predict what will happen when your teacher pulls the paper from under the bottle.

_____

3. What forces do you think are acting on the bottle as it is sitting there?

_____

4. Watch your teacher perform the demonstration. Describe what happened.

_____

5. Watch the video "Pulling Paper under a Glass" at https://www.youtube.com/watch?v=I7PJWlkqWg8&t=4s
The language is Hindi, so if you don't understand it, you can turn off the sound.

6. Describe what happened.

_____

Explore

Materials: Toy car, penny, 3 books same height, small book, ramp, meter stick or ruler

What To Do:

1. Set up your ramp to look like the picture except use only one book for the height of the ramp.
2. Place the small book at the end of the ramp to stop the car.
3. Place the penny on top of the car and let it roll down the ramp.
4. Use the ruler or meter stick to measure how far the penny goes from the end of the ramp.
5. Add another book and repeat.
6. Add a third book and repeat.
7. Record your measurements in the data table.

Number of Books	Distance Penny Traveled in cm
1	
2	
3	

Questions:

1. In this activity we changed the number of books that were under the ramp. How did this change the motion of the car?

_____

2. What happened to the penny? _____

3. Since you didn't push the car, what force do you think pulled it down the ramp?

_____

4. Watch the animation called Car and the Wall from the website
http://www.physicsclassroom.com/mmedia/newtlaws/cci.cfm

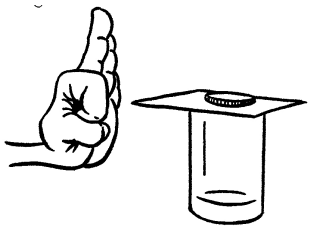
5. Describe what happens to the guy in the car after it hits the wall.

_____

6. How is this like the car and the penny from the first activity?

_____

Materials: Beaker, penny and index card
What to Do:
1. Lay an index card on the top of the beaker.
2. Place a penny on the card, centered over the beaker.
3. With a flick of your finger, give the card a quick thump.



7. Describe what happened.

_____

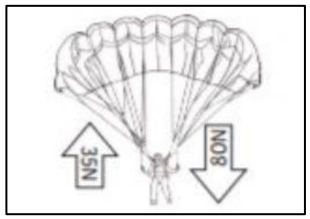
8. How did you make the card move?

_____

9. What force acted on the penny to make it fall into the beaker?

_____

10. Label the pictures with Balanced Forces or Unbalanced Forces



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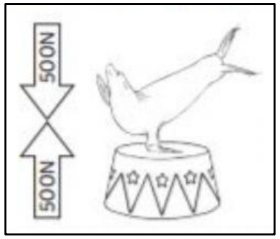


_____

11. Which one is moving? _____

Explain

Effect of Forces on Motion

Newton's 1st Law

Inertia

Forces

Elaborate

1. Watch the video Balanced & Unbalanced Forces with Newton's 1st Law of Motion found at https://www.youtube.com/watch?v=MZp4bmm5YzU

2. Complete the following activities

Fill in the Blanks while watching the video

WORD BANK			
Inertia	rest	motion	unbalanced
change	rest	opposite	equal

Newton's First Law of Motion states "An object at _____ will remain at _____ and an object in _____ will remain in _____ unless acted on by an unbalanced _____."

Newton's first is often called the Law of _____.

Inertia is the tendency of an object to resist a _____ in motion.

When forces acting on an object have _____ strength and act in _____ directions the motion remains unchanged.

Pause the video.

Calculate the net force and direction of motion in each of the scenarios on the screen.

A. _____ C. _____

B. _____ D. _____

Restart the video.

WORD BANK			
motion	inertia	same	speres

If an object is already at rest _____ will keep it at rest.
If an object is already in _____ inertia will keep it moving.
The _____were already in motion and wanted to keep going in that _____ motion.

Pause the video. Check for Understanding.

How does this represent someone driving without a seatbelt?

_____

_____

How does the cart hitting the wall represent the concept of balanced and unbalanced forces?

_____

_____

Restart the video.

In the card, coin, and glass activity, which objects are at rest?

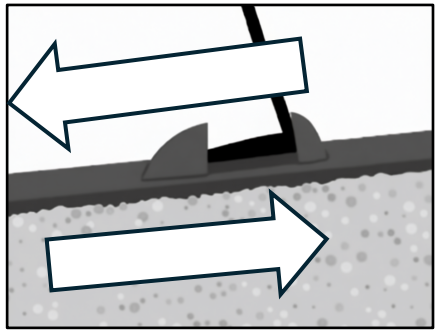
_____

What gets moving first? _____
What gets it moving? _____
What gets moving second? _____
What gets it moving? _____

WORD BANK		
opposes	contact	will not move
will move	stops	slide

Friction force is the force that is generated when two surfaces _____ and _____ against each other.

Label the arrows **FRICTION** and **PUSHING FORCE**



Friction force _____ motion and eventually _____object from moving, in most cases.

If the forces acting on an object are balanced, then the object _____.

If the forces acting on an object are unbalanced, then the object _____.

Evaluate

Name _____ period ____

Exit Ticket

Forces and Newton's First

1. What type of force will make an object move or change its motion?

A. Balanced force
B. Unbalanced force

2. Who was the scientist that developed the Laws of Motion?

A. Galileo
B. Newton
C. Armstrong

3. The tendency of an object to resist change is called -

A. Friction
B. Motion
C. Inertia
D. Force

4. Which force opposes motion and will cause objects to stop?

A. Friction
B. Gravity
C. Inertia
D. Buoyancy

5. Net forces can be calculated by -

A. Multiplying
B. Just subtracting
C. Just adding
D. Adding and subtracting