**Lesson Question**



**?**

**W**

**2K**

.

effects on

.

.

forces and their

force on an

concept of

and unbalanced

determine the net

**Describe** the

between balanced

**Explain** how to

**Distinguish**

**Lesson Goals**

1. a resistance to motion caused by two surfaces rubbing against each other
2. the size or quantity of something
3. a push or pull
4. the support force a surface exerts on an object; always at a ninety-degree angle to the surfacea push or pull
5. a quantity that has both a size and a direction
6. the force that one massive object exerts to attract another object to it; expressed as the weight of an object

\_\_\_\_\_ magnitude

\_\_\_\_\_ force

\_\_\_\_\_ friction

\_\_\_\_\_ gravity

\_\_\_\_\_ normal force

\_\_\_\_\_ vector

**Words to Know**

*Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.*



# Motion

* Motion is recognized when an object’s from a reference

point changes.

* Motion can be described by:
  + a .
  + a .
  + an .

**Slide**

Magnitude

(N).

* Forces are measured in

value.

* A vector can have a positive or

.

* A vector is indicated with an

is the size or quantity of something.

.

* A vector has both a magnitude and a

.

* Forces are

.

is a push or a

**Forces**

* A

**2**

**4**

is acting in and abbreviations to tell you what type of force each

vector represents.

of the force vector shows which direction the force

of the force.

* The

of a force vector represents the magnitude, or size,

* The

directions represent the magnitudes and directions of the forces acting on an object. Abbreviations are used to identify which type of force each

vector represents.

whose sizes and

**Force Diagrams and Abbreviations**

* A force diagram is a drawing with force

**4**

**7**

**Words to Know**

each other.

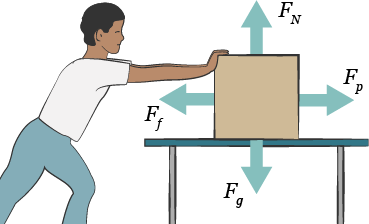
* Forces that act in opposite directions

.

**Multiple Forces**

* Forces that act in the same direction

**Slide**



, *Fg*: weight

•

: slows object down

* Friction,

-degree right angle

a

force, *FN*: always at

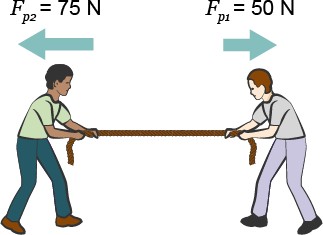
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**Force Diagrams and Abbreviations**

* Some common forces are:
  + Push or pull,

|  |  |
| --- | --- |
| counteract | to act against something, causing it to have of an effect |
| net force | the of all of the forces acting on an object |

**Slide**



**7**

# Net Force

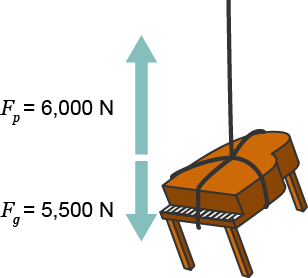
* The net force is the sum of all of the that act on an object.
  + Positive and negatives have to be assigned for before adding forces together.
  + When assigning positives and negatives to forces, forces pointing to the are positive, and forces pointing to the

are negative.

*Label the forces shown as positive (+) or negative (–).*

* + The net force in the illustration is .

**Slide**



**7**

# Parallel Forces

* Only forces can be added together.
  + Left and can be added together.
  + Up and can be added together.

*Label the forces shown as positive (+) or negative (–).*

* + The sum of the forces acting on this piano is .

**Slide**

is no motion. It simply means that there is no change from what is

already happening.

mean there

* It’s important to know that a zero net force does

.

* There is no change in

.

* The net force is

directions are exactly equal:

**Balanced Forces**

* When forces acting in

**10**

force.

* Unbalanced forces can start an object moving or stop an object from moving.

as the net

•

* Both speed and direction
* The motion of the object is in the same

•

.

* There is a change in
* The net force is positive or negative in the direction of the

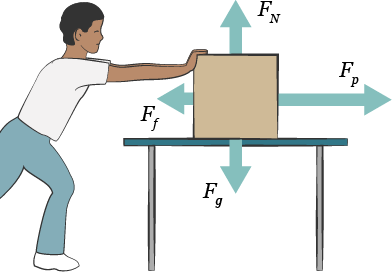
force.

:

**Unbalanced Forces**

* When forces acting in opposite directions are

**Slide**



**12**

# Force Diagrams and Unbalanced Forces

* Force diagrams show when forces are balanced or .
  + The length of the vector represents the of the force.
  + The longer the vector is the force there is.
* The net force and the motion will be in the direction of the vector.

*Circle the vector that represents the largest force.*

How do forces affect the motion of an object?

**Lesson Question**

**Slide**

**?**

, *Ff*

•

, *FN*

•

, *Fg*

•

acting on an object.

* or pull, *Fp*

of the forces

* Force diagrams show the type, magnitude, and

with magnitude and direction.

* Forces are

is a push or a pull.

* A

**Review: Key Concepts**

**FORCES**

**Answer**

**2**

**Slide**

force.

direction of the

* A net force of zero means that all forces are in and there is no change in motion.
* A positive or negative net force causes a change in motion in the

force is the sum of all forces acting on an object.

* The

**Review: Key Concepts**

**NET FORCE**

**2**

*Use this space to write any questions or thoughts about this lesson.*