

# Unit 9.1 Forces Worksheet

## A. Forces around us

### Preparation work p.1-2

1. What is a force?

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2. What are two daily activities involving a force?

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3. Where can you find a force?

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4. Rewrite the sentence from everyday English into academic English in Science.

Example:

Everyday English:

Jane is kicking the football.



Academic English in Science:

Jane **is applying** a force **to** the football.

Jane **is exerting** a force **on** the football.

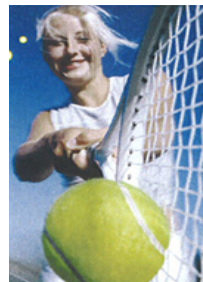
- a. Everyday English:

Betty is hitting the ball.

Academic English in Science:

Betty is applying a force \_\_\_\_\_

Betty is exerting \_\_\_\_\_



- b. Everyday English:

I'm kneading the flour.

Academic English in Science:

I \_\_\_\_\_

\_\_\_\_\_

"A force acts on the flour."



Name: \_\_\_\_\_ (     )

c. Everyday English:

Peter is turning the doorknob.

Academic English in Science:

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5. **To emphasize there is a force acting on an object**, let us change the sentences in question 4 from active voice to passive voice.

Example:

Active voice:

Jane is applying a force to the football.

Passive voice:

A force ***is being applied to*** the football (by Jane).

a. Active voice:

Betty is exerting a force on the ball.

Passive voice:

A force \_\_\_\_\_

b. Active voice:

Peter \_\_\_\_\_

Passive voice:

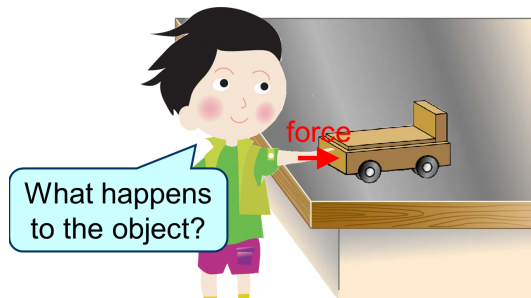
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## B. Effects of a force

### Laboratory Activity 9.1

#### Effects of a force



1. Put a trolley on the bench. Leave it at rest. In other words, make sure it is not moving, or that it is stationary. Now, push it gently.

What happens to the (stationary) trolley?

\_\_\_\_\_

Explanation of the result:

A force (that is) applied to a stationary object \_\_\_\_\_

\_\_\_\_\_

2. Put the trolley at its original position. Push it gently from a stationary position. Before it stops, give it one more push in the direction of its motion.

What happens to the speed of the (moving) trolley?

\_\_\_\_\_

Explanation of the result:

A force (that is) exerted on \_\_\_\_\_

\_\_\_\_\_

3. Put the trolley at its original position. Push it gently from a stationary position. Before it stops, give it one more push in the direction **opposite to** its motion.

What happens to the speed of the (moving) trolley? Has anything happened to its direction?

\_\_\_\_\_

\_\_\_\_\_

Explanation of the result:

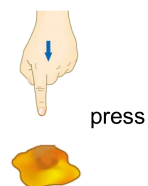
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Press on some plasticine with your finger.

What happens to the plasticine?



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Explanation of the result:

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**Conclusion for Laboratory Activity 9.1 (1-4)    The effects of a force on an object.**

In general,

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## C. Contact and non-contact forces

1. What is a contact force?

\_\_\_\_\_

What is one example of a contact force?

2. What is a non-contact force?

\_\_\_\_\_

What are some examples of non-contact forces?

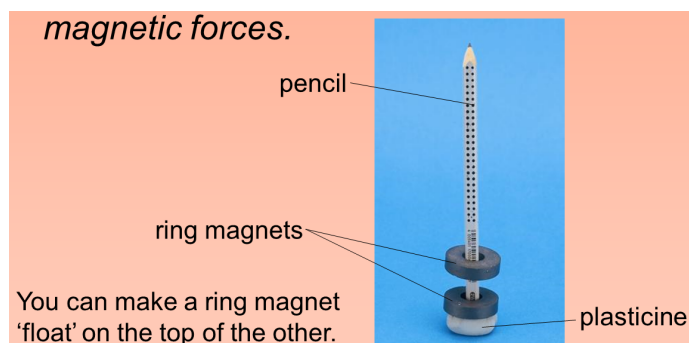
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## Laboratory Activity 9.2

### Experiencing magnetic force (book p.7)

Extra activities

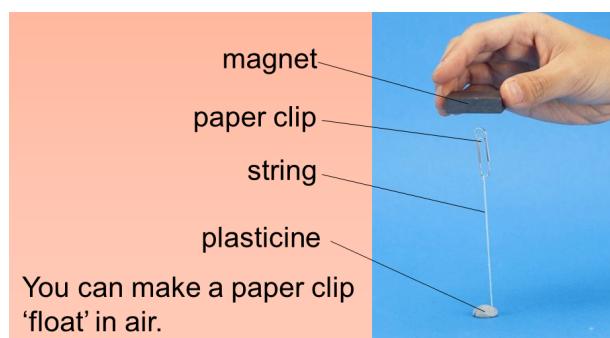
- 1.



Why do the magnets behave that way?

The two magnets have \_\_\_\_\_

- 2.



Why do the magnets behave that way?

The paper clip \_\_\_\_\_

# Unit 9.1 Forces Worksheet

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## A. Forces around us

### Preparation work p.1-2

1. What is a force?

A force is a push or pull or any action that has the ability to cause an object to undergo a certain change.

2. What are two daily activities involving a force?

Kicking a ball, catching a moving object, pulling a chain, etc.

3. Where can you find a force?

We can find forces everywhere!

4. Rewrite the sentence from everyday English into academic English in Science.

Example:

Everyday English:

Jane is kicking the football.



Academic English in Science:

Jane **is applying** a force **to** the football.

Jane **is exerting** a force **on** the football.

- a. Everyday English:

Betty is hitting the ball.



Academic English in Science:

Betty is applying a force **to the ball**.

Betty is exerting **a force on the ball**.

- b. Everyday English:

I'm kneading the flour.



Academic English in Science:

I'm **applying a force to the flour**.

I'm **exerting a force on the flour**.

"A force acts on the flour"

c. Everyday English:

Peter is turning the doorknob.

Academic English in Science:

Peter is applying a force to the doorknob.

Peter is exerting a force on the doorknob.



5. **To emphasize there is a force acting on an object**, let us change the sentences in question 4 from active voice to passive voice.

Example:

Active voice:

Jane is applying a force to the football.

Passive voice:

A force **is being applied to** the football (by Jane).

a. Active voice:

Betty is exerting a force on the ball.

Passive voice:

A force **is being exerted on the ball** (by Betty).

b. Active voice:

Peter is applying a force to the doorknob.

Peter is exerting a force on the doorknob.

Passive voice:

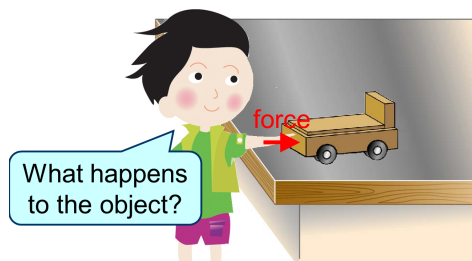
A force **is being applied to the doorknob** (by Peter).

A force **is being exerted on the doorknob** (by Peter).

## B. Effects of a force

### Laboratory Activity 9.1

#### Effects of a force



1. Put a trolley on the bench. Leave it at rest. In other words, make sure it is not moving, or that it is stationary. Now, push it gently.

What happens to the (stationary) trolley?

**It starts to move.**

Explanation of the result:

A force (that is) applied to a stationary object **can move it from rest.**

2. Put the trolley at its original position. Push it gently from a stationary position. Before it stops, give it one more push in the direction of its motion.

What happens to the speed of the (moving) trolley?

**Its speed increases.**

Explanation of the result:

A force (that is) exerted on **a moving object in the direction of its motion can increase its speed.**

3. Put the trolley at its original position. Push it gently from a stationary position. Before it stops, give it one more push but now in the direction **opposite to** its motion.

What happens to the speed of the (moving) trolley? Has anything happened to its direction?

**Its speed decreases. (some SS might also add) It moved in the opposite direction.**

Explanation of the result:

**A force (that is) acted on a moving object in the direction opposite to its motion can decrease its speed. If the force is large enough, it can stop or move the object in the opposite direction.**



4. Press on some plasticine with your finger.

What happens to the plasticine?

Its shape changes.

Explanation of the result:

A force (that is) applied to an object can change its shape.

A force that is exerted on an object can change its shape.



### Conclusion for Laboratory Activity 9.1 (1-4) The effects of a force on an object.

In general,

- If an object is stationary, a force can make the object move.
- If an object is moving, a force can change the object's speed. If the force is large enough and in the opposite direction to the moving object, it can make the moving object stop.
- If an object is moving in one direction, a force can make it change its direction.
- A force can change the shape of an object.

## C. Contact and non-contact forces

1. What is a contact force?

A contact force is a force that acts on an object through direct contact.

What is one example of a contact force?

Pushing some sand.

Turning a cap or pulling a dog (or any reasonable answers)

2. What is a non-contact force?

A non-contact force is a force that acts on an object without direct contact.

What are some examples of non-contact forces?

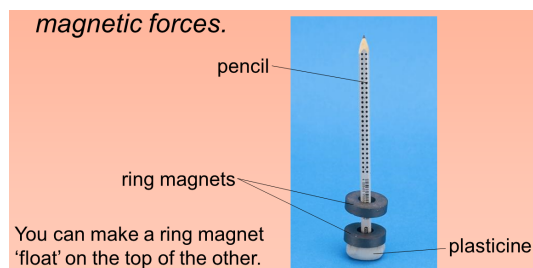
Magnetic force, gravitational force, centrifugal force

## Laboratory Activity 9.2

### Experiencing magnetic force (book p.7)

Extra activities

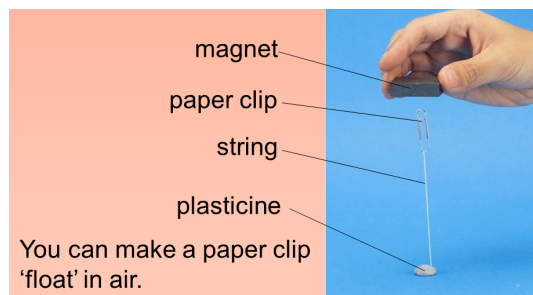
- 1.



Why do the magnets behave that way?

The two magnets have the same poles, so they repel each other.

- 2.



Why do the magnets behave that way?

The paper clip is attracted to the magnet.