

## **Forces Homework 1 – Contact and Non-contact forces**

**Read through the information below to help you answer the questions at the bottom**

A force is a push or a pull. Forces can change the shape of something, its speed or the direction it's moving in.

For many forces the thing providing the force needs to touch an object before the force can affect it. These are called contact forces. For example, when you throw a ball, you need to touch the ball to exert a force on it. When you go down a steep hill on a bicycle, the brakes need to touch the wheel to produce friction to slow you down. Contact forces include friction, air resistance, water resistance, and upthrust (the force that makes things float).

Some forces can affect an object from a distance. These are called non-contact forces. Gravity is a force that pulls objects downwards. Static electricity is caused by a build-up of charged particles and can attract things. Fridge magnets stick because of magnetism, which attracts objects made of iron and some other materials. Magnets can also repel other magnets.

Forces can be big or small. The unit for measuring force is the newton (N). The direction in which the force is acting is important so we use arrows to show forces. The direction of the arrow shows the direction of the force; a bigger arrow shows a bigger force.

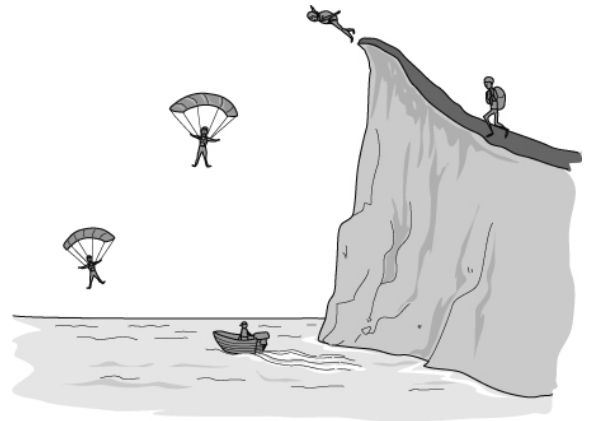
1. Write down three ways in which a force can affect a football.
2. What F is a force that happens when two things rub against each other?
3. What WR slows down objects moving in water?
4. What U force makes things float?
5. What G is a force that pulls things downwards?
6. What S is a force caused by a build-up of charged particles?
7. What M is a force that attracts iron?
8. What are the units for measuring force?

## Forces Homework 2 – Mass and Weight

- 1 The drawing shows some people base jumping (using parachutes to jump off solid objects).

Draw labelled arrows on the diagram to show where the following forces are in action.

- a air resistance (label this arrow A)
- b friction (label this arrow F)
- c gravity (label this arrow G)
- d water resistance (label this arrow W)
- e upthrust (label this arrow U).



- 1 a Which force mentioned in question 1 is a non-contact force?

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- b Name *two* other non-contact forces.

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- 2 Some of these statements describe mass, some describe weight, and some apply to both. Tick the correct boxes in the table.

	Mass	Weight	Mass and weight
a The amount of matter in an object.			
b Measured in newtons.			
c The size of the gravity force pulling down on something.			
d Measured in kilograms.			
e This would not change if an object was taken to the Moon.			
f This would get smaller if an object was taken to the Moon.			
g Gets less when you go to the toilet.			
h Increases when you eat something.			

- 3 Ted has a mass of 60kg. Calculate his weight in newtons.

\_\_\_\_\_ N

## Forces Homework 3 – Balanced and Unbalanced forces

1 Join the boxes to complete the sentences. Some sentences have more than one ending.

An object has balanced forces on it...

Unbalanced forces on an object...

Balanced forces on a stationary object...

Balanced forces on a moving object...

...can make it speed up.

...can change the direction it is moving

...when there are two forces of the same size in opposite directions.

...will not change its speed or direction.

...will not make it move.

...can make it slow down.

2 The drawings show a racing sled. Some of the force arrows have been drawn for you. Draw in the missing arrows and label them as necessary. Remember that the length of the arrow shows the size of the force.

a constant speed



b speeding up



c slowing down



## Forces Homework 4 – Friction

1 Explain why rubber bath mats are useful.

2 Why should you oil the axles of a bicycle?

3 Why must you never put oil on the brakes of a bicycle?



4 Explain why bicycle brakes do not work well in the rain.

5 The tread on bicycle and car tyres are designed to allow water to escape from under the tyre on wet roads. Explain why this is important.



6 Why do car owners have to replace their car tyres regularly?

7 Suggest why racing car tyres do not last as long as the tyres on normal cars.



8 How could you stop a door hinge squeaking?