## Chapter 7: Effects of Forces

## Worksheet 1: Identifying Forces

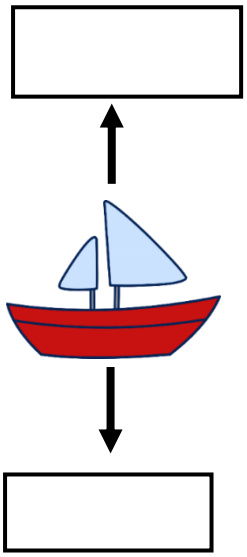
**Date:** / /

**Objective/s:**

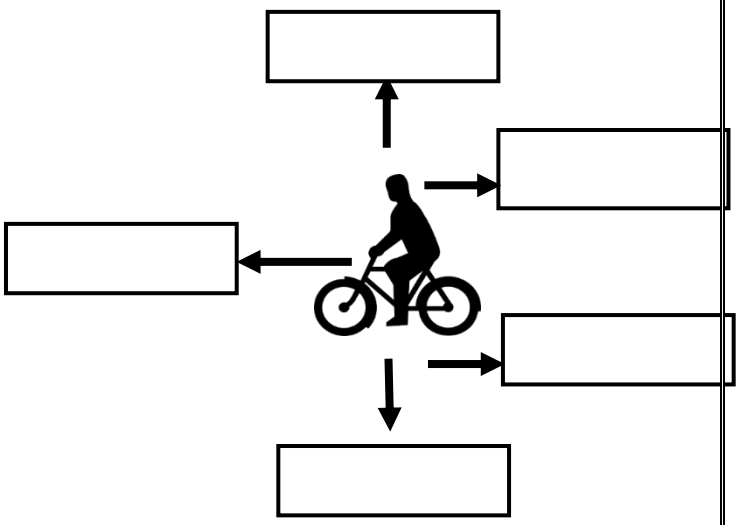
- Identify different forces acting on different objects.

Question 1:

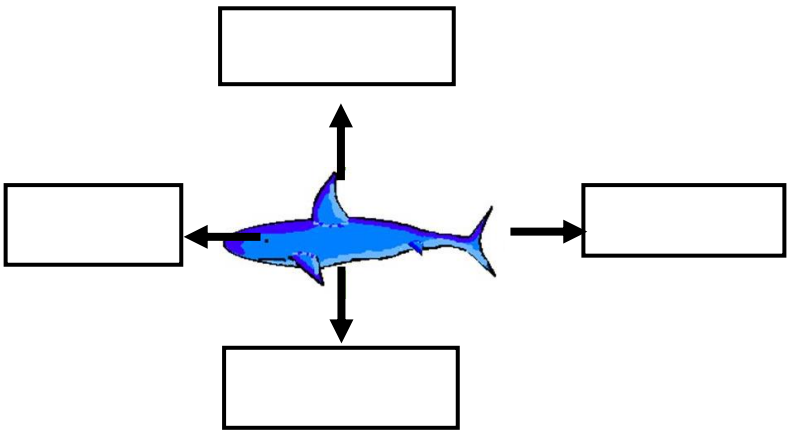
Label the following diagrams with the correct forces acting on each of the objects.



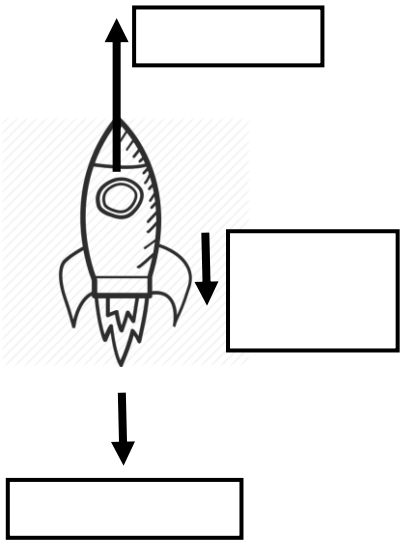
The boat is floating on water but not moving



The cyclist is moving forward

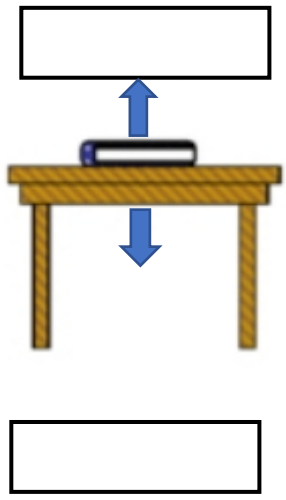


The shark is swimming forward



The rocket is launched upwards

The parachutist is falling downwards



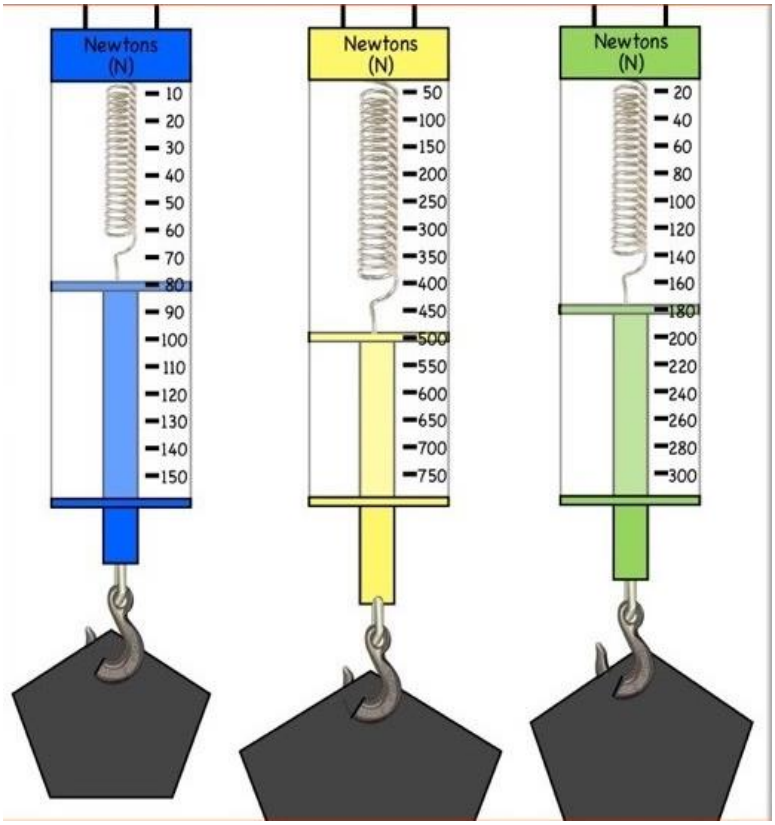
A book placed on a table

**Chapter 7: Effects of Forces**

**Worksheet 2: Mass and Weight** **Date:** / /

**Objective/s:**
- Calculate the weight of different objects on Earth.
- Understand that the mass of an object stays the same on any planet, but weight changes.

Q1: Read the weight shown on each of the following force meters:




Read the weight measurements on each force meter :

_____ _____ _____

Calculate the mass for each object:

_____ _____ _____

**Question 2:** An astronaut has **a mass of 60 Kg**.

Answer the following questions regarding the astronaut's mass and weight:

a) What **device** did the astronaut use to measure his **mass**?

……

b) What is the astronaut **weight** on Earth?

……

c) The astronaut travelled to the moon. On the moon, gravity is **weaker** than Earth.

What would be the astronaut **mass on the moon**?……

d) Will the astronaut **weight** be more or less on the moon? ……..

e) What would be the astronaut's **mass on Jupiter**? …….

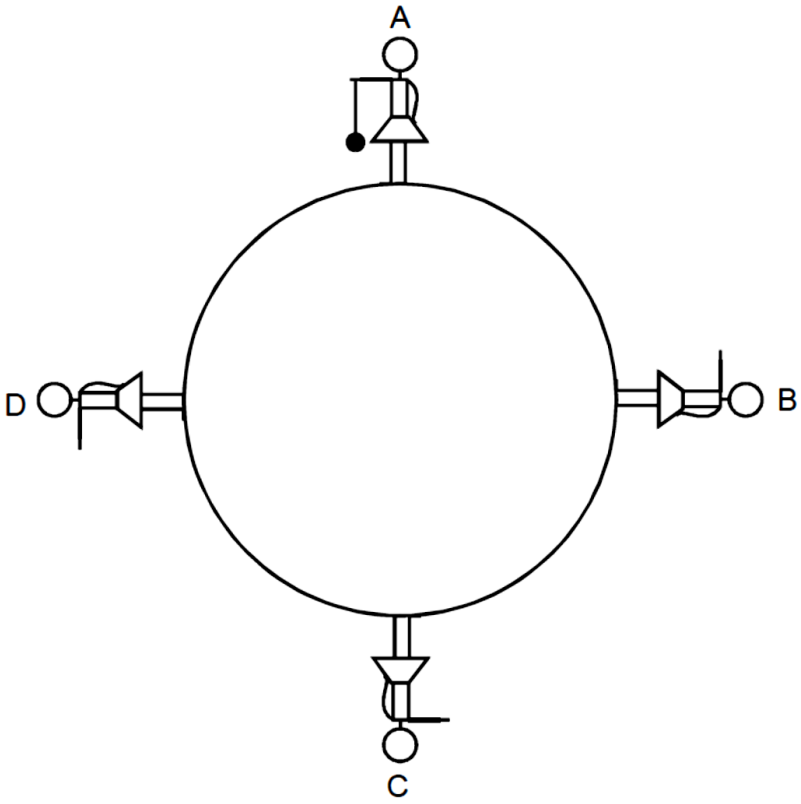
**Question 3:**

Complete the following table: Knowing that:

- On Earth, Each 1 Kg is pulled by a gravitational force of 10 N.
- So: Weight on Earth = Mass *10
- Gravity on the moon is **weaker** than Earth, it equals to 1/6 of gravity on Earth.

| Object | Mass on Earth | Weight on Earth | Mass on the moon | Weight on the moon | Mass on Jupiter |
|---|---|---|---|---|---|
| **A bag of flour** | **3 Kg** | | | | |
| **A Chair** | **6 Kg** | | | | |
| **A Brick** | **12 Kg** | | | | |
| **A boy** | **30 Kg** | | | | |
| **A car** | **180 Kg** | | | | |

**Q 4:** Lisa drew a picture of herself standing at four different positions on the Earth,




(a) (i) Draw an arrow at **each** of the four positions to show the direction of the force of gravity on Lisa.

(ii) The drawing at position A shows Lisa holding a ball on a string.
Draw the ball and string in positions B, C and D.

**Q 5:** In some Science fiction stories, there are humans living on Mars. Gravity is weaker on Mars than on Earth.

Tick (✓) True or False for the following statements.

| Statement | True | False |
|---|---|---|
| The mass of someone would be less on Mars than on Earth. | | |
| The weight of someone would be less on Mars than on Earth. | | |
| Mass and weight would be both the same on Mars and Earth. | | |
| Mass is measured in Newtons. | | |
| Weight is measured in Kilograms. | | |

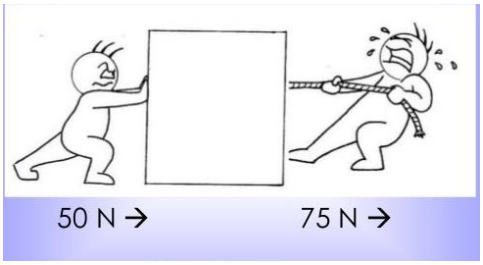
**Chapter 7: Effects of Forces**

**Worksheet 3: Balanced and unbalanced forces** **Date:** / /

**Objective/s:**

- Identify balanced and unbalanced forces acting on different objects, and calculate the resultant force.

Q1: **Find the resultant force in each of the following situations:**

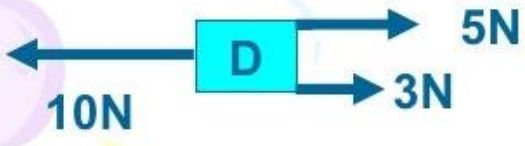



Resultant Force = ……


Resultant Force = ……


Resultant Force = ……

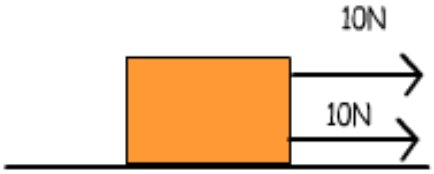

Resultant Force = ……




Resultant Force = ……

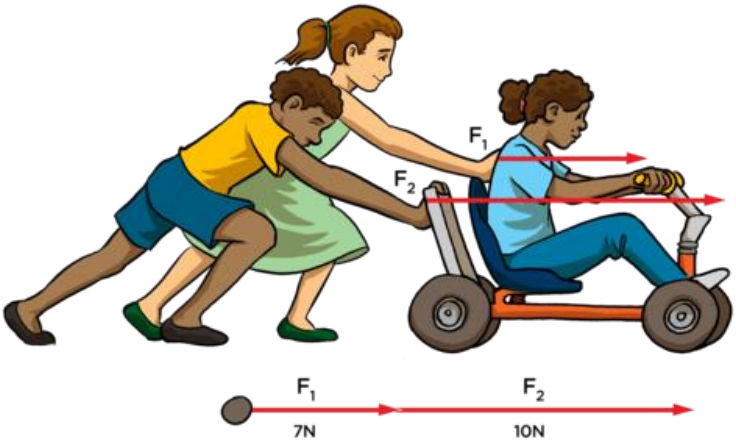
……


Resultant Force= ……

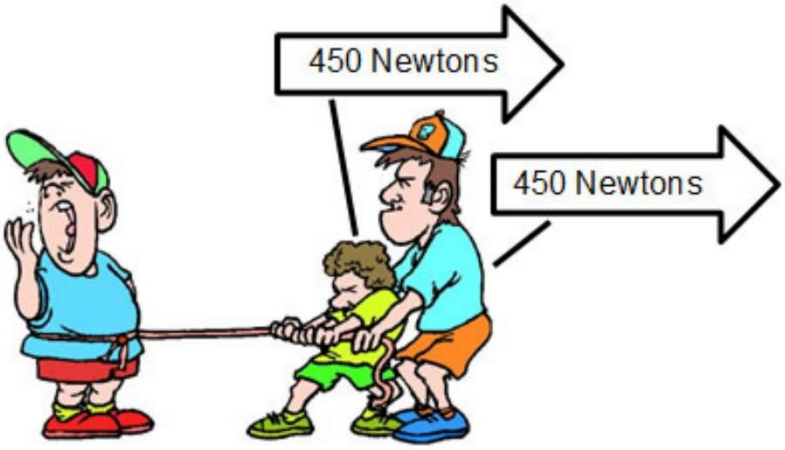



Resultant Force= ……

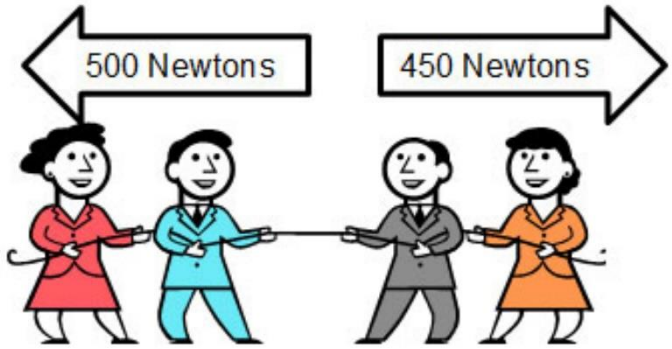

Resultant Force = ……



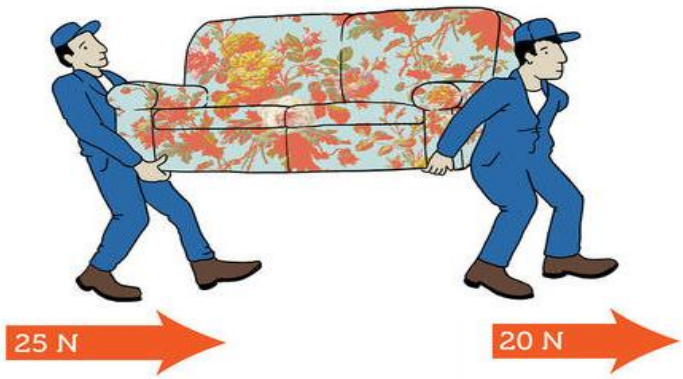

Resultant Force =



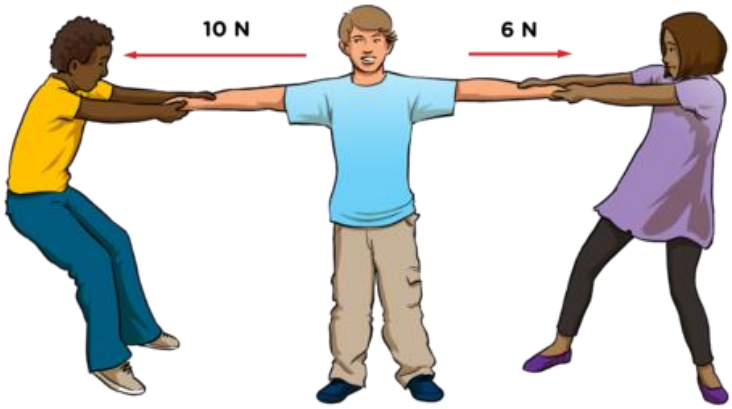

Resultant Force =




Resultant Force =




Resultant Force =

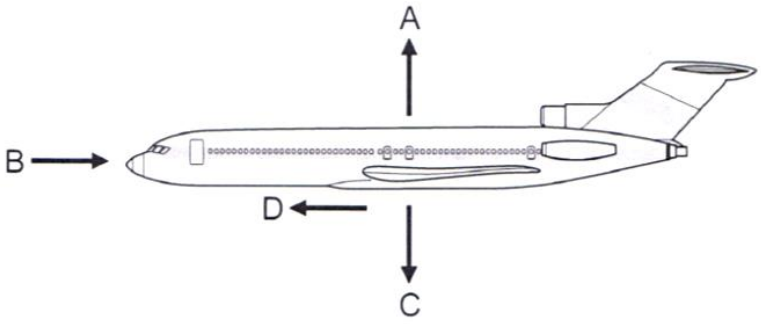



Resultant Force =

**Balanced forces do not cause a change in the object's motion.** When balanced forces act on a moving object, the object will continue moving at the same speed in the same direction.

**Unbalanced forces change the motion of an object**, they may cause the object to speed up, slow down or change direction.

Q2: The picture shows an aeroplane flying.




**(a)** Draw a line to connect each **letter** to the correct **force**.

| letter | force |
|---|---|
| A | air resistance |
| B | moving aeroplane upwards |
| C | moving aeroplane forwards |
| D | gravity |

**(b)** The force moving the aeroplane forward is increased more than the air resistance.

What happens to the aeroplane?

Tick (✓) **one** box.

| | |
|---|---|
| moves up in the air | |
| moves down in the air | |
| speeds up | |
| slows down | |
| stops moving | |

**(c)** Write down **one** way air resistance can be reduced.

.....

**Chapter 7: Effects of Forces**

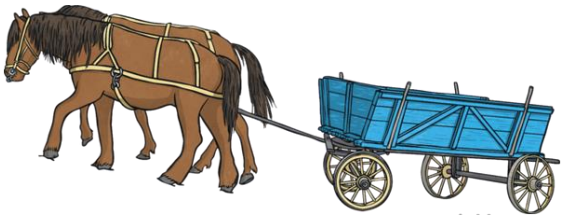
**Worksheet 4: Friction** **Date:** / /

**Objective/s:**
- Know that friction is a force that acts in the opposite direction of movement.
- Identify situations and decide whether friction is useful or a problem.
- Relate the amount of the force of friction to the roughness of surfaces.
- Represent results in a bar chart.

Question 1:
Draw an arrow to <u>show the direction of the force of friction</u> on each of the following pictures:

1.

3.



Question 2:
Determine whether friction is useful or a problem in each of the following situation:

| Situation | Friction is useful | Friction is a problem |
|---|---|---|
| **Stopping the tires of a car** | | |
| **Sliding on a playground slide** | | |
| **Goalkeeper's gloves** | | |
| **Tying your shoe lace** | | |
| **When you open a drawer** | | |
| **You are Ice skating** | | |
| **You are Climbing rope** | | |

Question 3:

**(a)** Use the words below to complete the sentence.

colour direction speed weight

When the footballer kicks a football, the force of the kick can change the .....and the .....of the ball. [2]

**(b)** The footballer must make sure his feet do not slip when he kicks the ball.

Name the force that gives him a good grip so he does not slip.

..... [1]

**Investigating friction in different surfaces:**

Question 4:

Pedro and Arturo measured how far their toy car moved on different surfaces. These are their results.

| | Distance car moved in cm | | | |
|---|---|---|---|---|
| **Surface** | **Test 1** | **Test 2** | **Test** 3 | **Average** |
| grass | 11 | 10 | 9 | |
| wet tar | 19 | 21 | 20 | |
| sand | 12 | 14 | 13 | |
| cement | 15 | 18 | 18 | |

**1** Why did Pedro and Arturo repeat their measurements?

_____

_____

_____

**2** Calculate the average distance the car moved on each surface and write it in the table.

**Average= the sum of all the readings on one surface ÷ the number of tests**

**3-** Name the **independent variable** in this investigation?

……..

**4-** Name the **dependent variable** in this investigation?

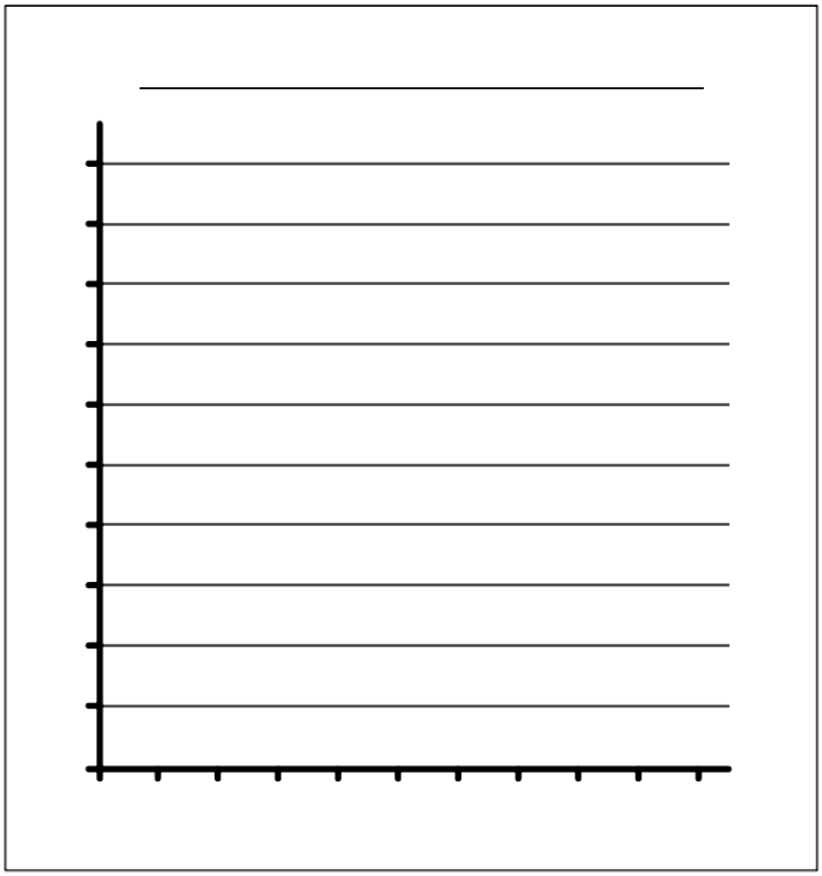
……..

**5-** Name two **controlled variables** in this investigation (must stay the same)?

……..

6-

**a** Draw a bar chart of the results.



**b** On which surface did the car move furthest? Suggest a reason for this.

**c** Suggest a reason why the car did not move far on the grass.

7 Predict how the results would be affected if the tar surface was dry. Explain why.