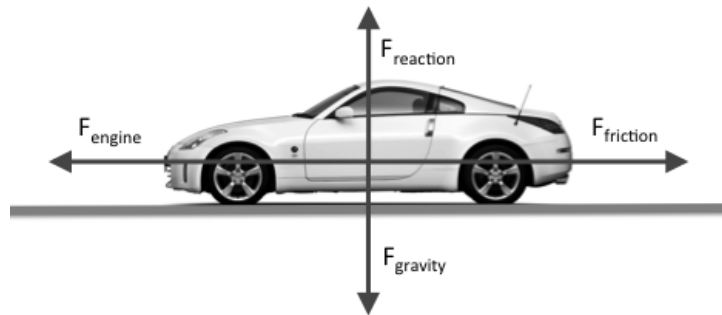


The AWESOME Y7

Fantastic Forces

Workbook of **SCIENCE**



I am owned by:

How did you do?

Vocabulary: _____

Checklist: _____

Personal Target Level: _____

Think Sheet #1: ____/5 (L3)

Think Sheet #2: ____/24 (L3-4)

Think Sheet #3: ____/10 (L3-5)

Think Sheet #4: ____/18 (L3-5)

Think Sheet #5: ____/25 (L3-6)

LAB ACTIVITY (L5-6)

Making a Force Meter

PROJECT (L5-6) 25% of topic marks

Balloon Powered Racer

Forces Vocabulary

	Vocabulary	Definition
1	Forces	
2	Contact Forces	
3	Non-Contact Forces	
4	Friction	
5	Air Resistance	
6	Upthrust	
7	Reaction Force	
8	Surface Tension	
9	Gravity	
10	Magnetic Force	
11	Electrostatic Force	
12	Motion	
13	Balanced Forces	
14	Unbalanced Forces	
15	Newtons	
16	Accelerate	
17	Decelerate	
18	Force Diagram	
19	Speed	
20	Streamline	
21	Drag	
22		
23		
24		
25		

FORCES Checklist

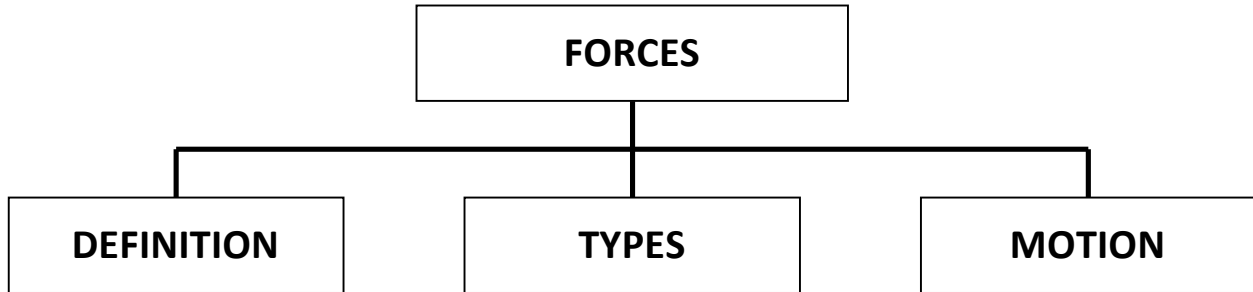
TOPIC	TARGET	GOT IT! 😊	NOT QUITE.	I DON'T KNOW 😞	PLAN OF ACTION
Vocabulary	I have completed the vocabulary list.				
	I understand the definition of each vocabulary word.				
What are forces?	I can describe what forces do to objects.				
	I can recognise examples of forces around me.				
	I can explain the effect of force on a spring.				
Types of Forces	I can identify some examples of contact and non-contact forces.				
Forces	I can describe the differences between balanced and unbalanced forces				
	I can draw simple force diagrams				
	I can explain the effects of balanced and unbalanced forces on an object's movement or motion.				
Speed	I can state what is meant by speed.				
	I can describe how speed is measured.				
	I can calculate the speed of an object.				
	I understand how streamlining and drag can affect the speed of an object.				

FORCES : Organizing Information : Think Sheet #1 (L3)

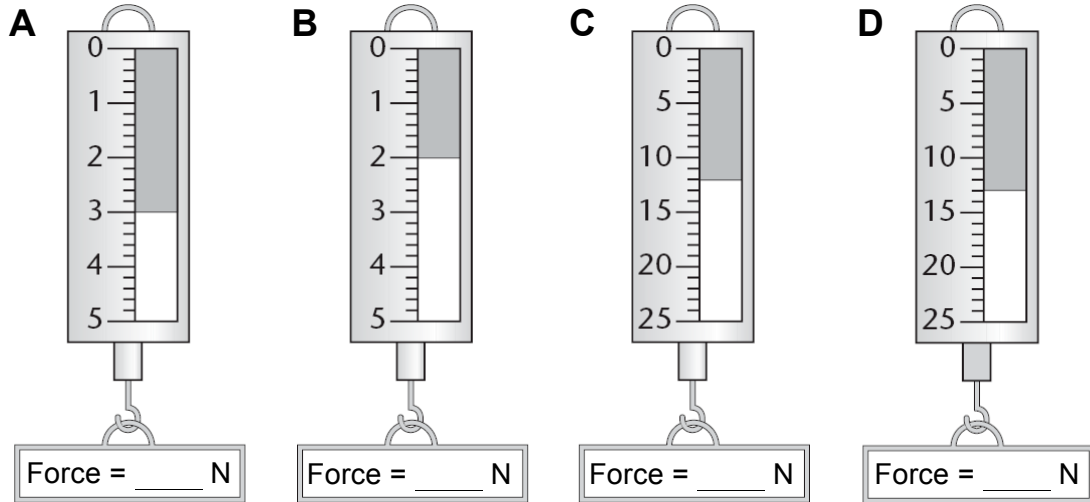
5

Another way of organizing information is to use a WEB ORGANIZER.

Complete the web organizer below to organize information about TYPES OF ENERGY. You may add more boxes or use more paper, if you need to.



1 Look at these forcemeters (newtonmeters).
Each is measuring a different force in newtons (N).



- a Fill in the force each forcemeter is measuring.
- b Which of these forces is the biggest? _____ N
- c Which of these forces is the smallest? _____ N

2 Match the words to the descriptions.

<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 5px auto;">force</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 5px auto;">How much stuff something is made of.</div>
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 5px auto;">weight</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 5px auto;">The pull of the Earth's gravity on something.</div>
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 5px auto;">mass</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 5px auto;">A push or a pull.</div>
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 5px auto;">gravity</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 5px auto;">Weight is measured in these.</div>
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 5px auto;">newtons (N)</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 5px auto;">The units of mass.</div>
<div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 5px auto;">kilograms (kg)</div>	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 5px auto;">The force that makes something fall to the ground.</div>

- 3 Look at this table. It contains information about the weight and mass of some items.

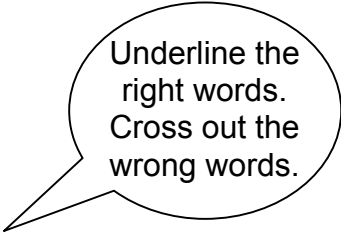
Item	Mass in kg	Weight in N
James	47	470
large book	1	10
bag of sugar	2	20
bag of potatoes	10	100
Janine	53	530

Write *true* or *false* for each sentence.

- a Mass is measured in kilograms. _____
- b Weight is measured in kilograms. _____
- c Weight is caused by gravity pulling down on a mass. _____
- d There are 10 Newtons in 1 kilogram. _____

Look at the table.

- e Which item has a mass of 10 kg? _____
- f Which item has a weight of 100 N? _____
- g Which item has the smallest mass? _____
- h Which item has the smallest weight? _____
- i Which item has the largest weight? _____
- j Which item has the largest mass? _____



Underline the
right words.
Cross out the
wrong words.

- k James has a *smaller* / *larger* mass
than Janine.
- l Janine weighs *more than* / *less
than* James.

1 Use these words to fill the gaps.

water

opposite

float

upthrust

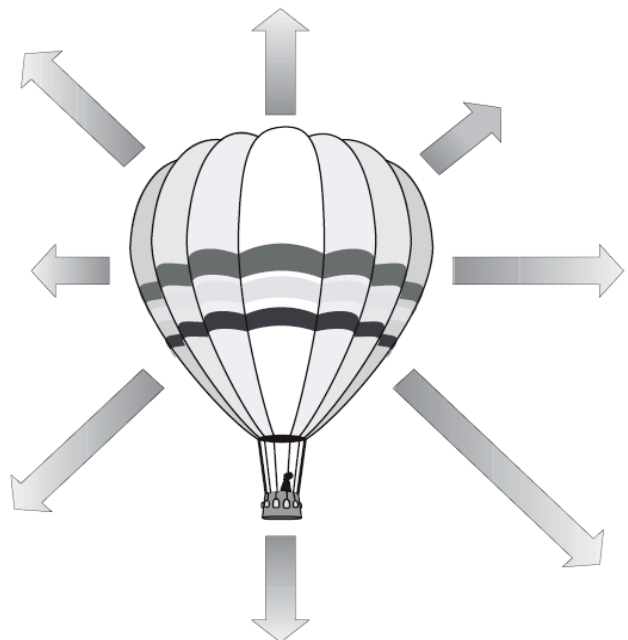
balanced

- a If the forces are _____ an object will not move.
- b Balanced forces are the same size and pull in _____ directions.
- c When you put an object in water, the _____ pushes upwards on the object. This push is called _____.
- d If the upthrust on an object is the same size as its weight, the object will _____.

2 This balloon is floating in the air. Look carefully at the diagram.

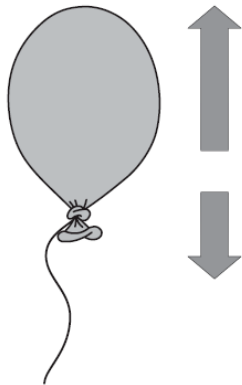
Which arrow shows the upthrust?

Circle the arrow.

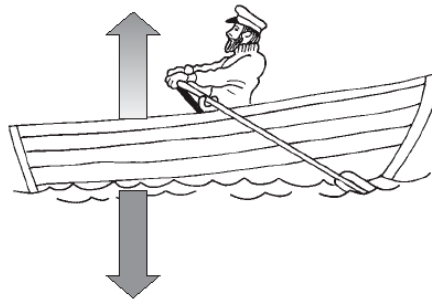


3 Look at these diagrams. The arrows show the size and direction of the forces.

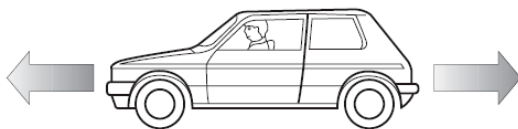
A



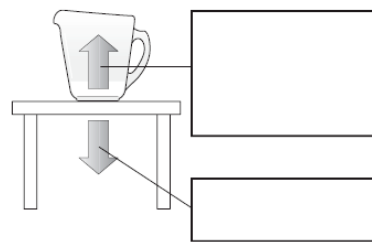
B



C



D






a In which diagrams are the forces balanced? _____

b Will the boat float or sink? _____

c The jug is standing on a table. The *weight* of the jug is the same size as the *reaction force* of the table. Label the forces in diagram D.

1 Match the words to the sentences.

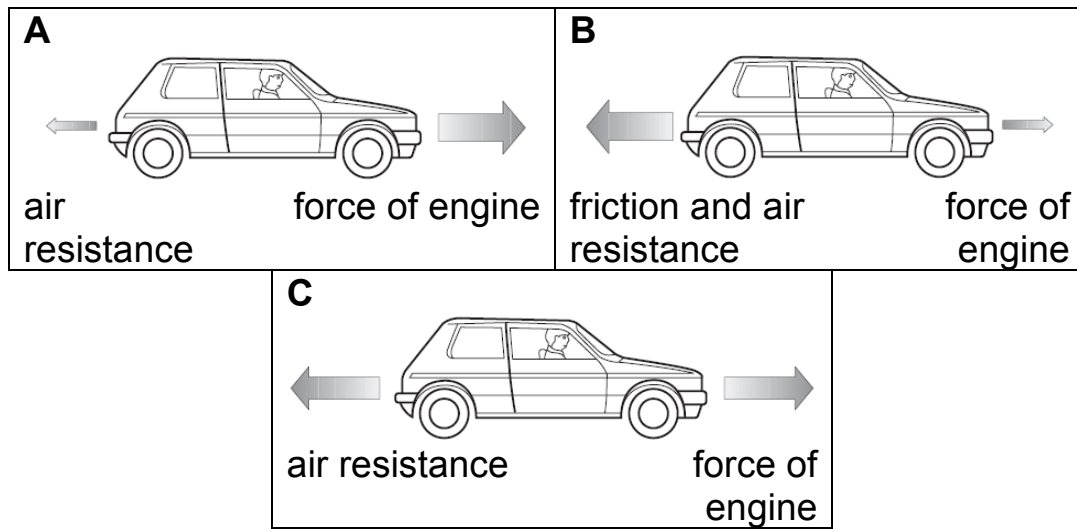
 <p>air resistance</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> These forces make something move faster or slower. </div>
 <p>friction</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> This force slows things down when they move through the air. </div>
 <p>unbalanced</p>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> This force acts when two things rub together. </div>

2 Use these words to fill the gaps.

gets faster	move	faster
slows down	unbalanced	bigger

- a If one force on an object is bigger than another, the forces are _____.
- b When unbalanced forces act on an object it starts to _____ in the direction of the _____ force. It gets _____.
- c If the bigger force is in the same direction as the object is moving, the object _____.
- d If the bigger force is opposite to the direction the object is moving, the object _____.

3 Look at these diagrams. The arrows show the forces acting on the cars.



Use words from the diagrams to fill in the gaps.

- a _____ is a type of friction force, caused by the car moving through the air.
- b The force of the _____ is in the opposite direction to the _____.
- c _____ is the force acting when the driver applies the brake.

Use **A**, **B** or **C** to answer these questions.

- d In which car are the forces balanced? _____
- e Which car is travelling at a steady speed? _____
- f In which car is the engine force bigger than the friction? _____
- g Which car is getting faster? _____
- h Which car is slowing down? _____

- 1 Use *high* or *low* to fill in the gaps.
- a If you travel a long distance in a short time then your speed is _____.
 - b If you travel a short distance in a long time then your speed is _____.

- 2 Look at these words and units.
- a Draw lines to match the words to the units.
 - b Colour or shade the words and units used to measure speed.

kilometres per hour	km
metres per second	s
kilometres	m/s
metres	km/h
seconds	m

- 3 a Match the words to the descriptions.

thinking distance	+	braking distance	=	stopping distance
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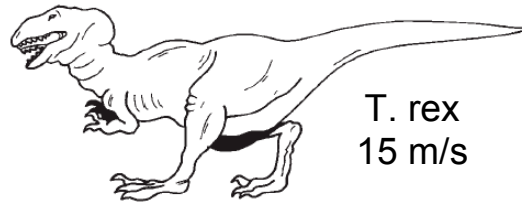
The distance a car travels while the car slows down and stops.	The total distance a car travels while the driver thinks, brakes and brings the car to a stop.	The distance a car travels while the driver decides to brake.
--	--	---

- b As a car moves faster, the stopping distance *gets smaller / stays the same / gets bigger*.

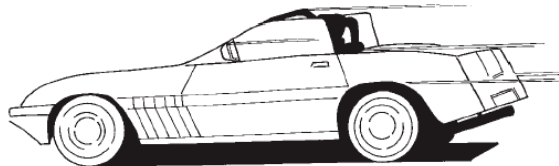
Circle the right words. Cross out the wrong words.

4 Look at the speeds of these different things. Use them to answer the questions.

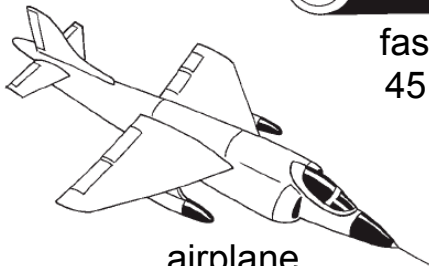
top sprinter
10 m/s



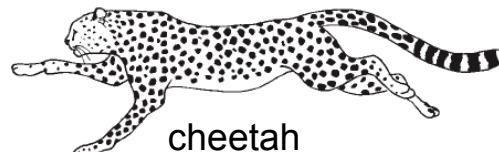
T. rex
15 m/s



fast car
45 m/s



airplane
200 m/s



cheetah
27 m/s

- a What is a cheetah's speed? _____ m/s
- b What has a speed of 45 m/s? _____
- c What is the slowest thing? _____
- d What is the fastest thing? _____
- e If you were a top sprinter and were being chased by a T. rex, could you out run it? _____

Why do you think that?

Because _____



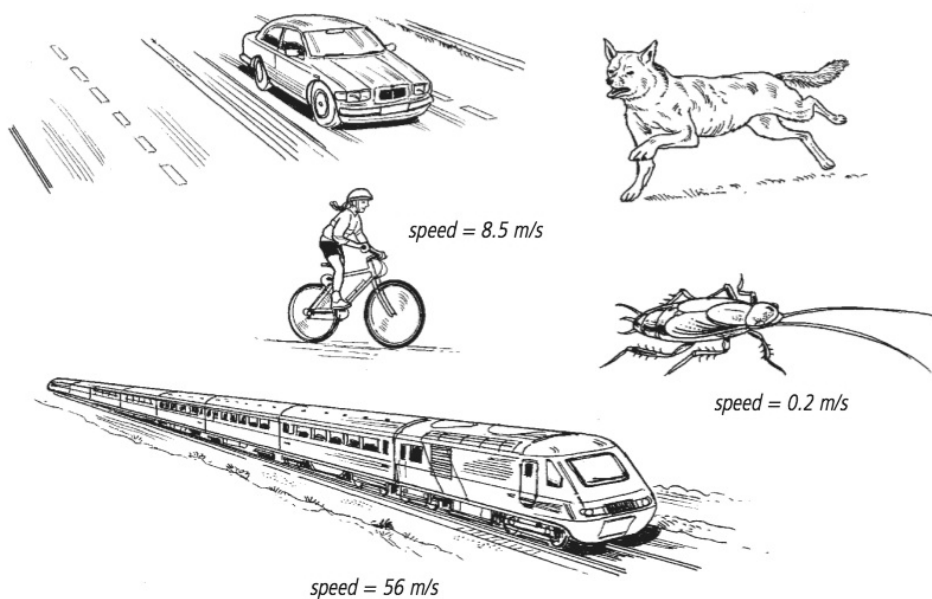
To work out a speed you have to know a distance and a time. You can calculate the speed using this formula:

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Sometimes we know the speed of something, and we want to find out how far it will go in a certain time, or how long it will take to get somewhere.

The formula can be arranged like this:

$$\text{distance} = \text{speed} \times \text{time} \quad \text{or} \quad \text{time} = \frac{\text{distance}}{\text{speed}}$$



- 1 The car on the motorway can travel 1860 metres in 60 seconds. Work out how fast the car is going. Don't forget the units!
- 2 The dog runs 1980 metres in 5 minutes. How fast is he running?
(Hint: Remember, there are 60 seconds in each minute.)
- 3 a How far will the girl cycle in 1 hour? (Hint: 1 hour = 3600 seconds)
b How far will the train go in 60 seconds?
c How far will the cockroach run in 10 seconds?
- 4 How long will it take for the girl to cycle 4 km?
- 5 a How many metres will the train travel in 1 hour?
b How far is this in kilometres?

Y7 FORCES: Making a Force Meter : (L5-6)

Name: _____ Partner: _____

Testable Question: What happens to the length of a spring when you add weight to it?

IMPORTANT INFORMATION:

1. A **force meter** is used to measure force.
2. The unit of force is **newton (N)**, named after Sir Isaac Newton.
3. Weight in **N** = mass in kg X 10

MATERIALS AND APPARATUS:

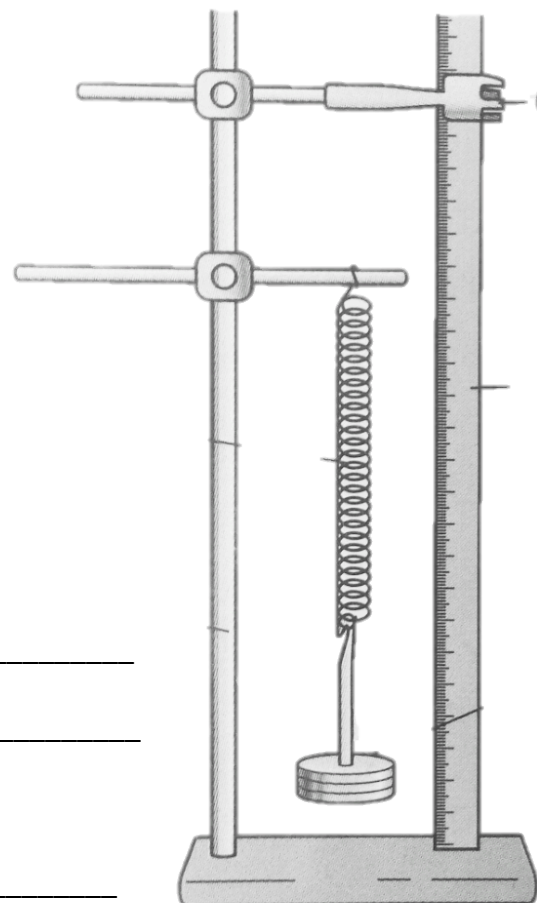
MATERIALS	APPARATUS
Spring	Retort stand
Mass hanger	2 clamps
(7) 50g masses	Meter stick
	Plastic ruler

PROCEDURE:

1. Set up the apparatus as shown in the diagram.
2. Measure the length of the spring with no masses on it. This is your starting length. Record it in the table below.
3. Check the weight of your mass hanger. Record it.
4. Attach it to the spring. Record how much the spring stretched.
5. Add one 50g mass at a time and record how much the spring has stretched each time.
6. When done, return all materials and apparatus.

Answer the following questions.

1. What is the **independent variable**? _____
2. What is the **dependent variable**? _____
3. Give two examples of **controlled variables**.



RESULTS:

	Weight (N) (show computation)	Total Weight (N)	Length of Spring (cm)
No mass attached	0		
Mass hanger			
Additional mass 1			
Additional mass 2			
Additional mass 3			
Additional mass 4			
Additional mass 5			
Additional mass 6			
Additional mass 7			

Draw a graph of your results. Use the graph paper provided. Write your name on it.

THINK!!!

1. The **independent variable** goes on the **x-axis**.
2. The **x-axis** is the line that goes left to right. The **y-axis** goes up and down.
3. Which variable goes on the **y-axis**?

ANALYSIS:

What is the relationship between the mass of an object and the length of the spring?

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