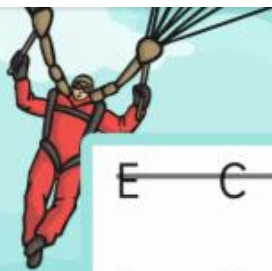
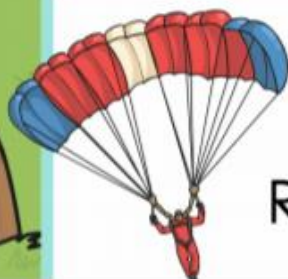
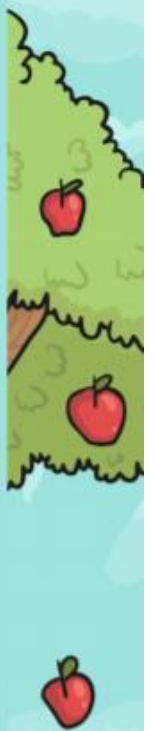


Forces



E	C	R	O	F	Y	P	S	E	P
L	D	A	H	P	C	U	U	C	M
I	E	D	N	R	N	L	L	N	A
Y	C	V	N	E	A	L	U	A	T
T	A	P	E	E	Y	E	M	T	E
I	F	E	D	R	O	E	G	S	R
V	R	S	N	H	U	Z	T	I	I
A	U	R	S	D	B	A	E	S	A
R	S	P	U	L	L	E	Y	E	L
G	O	N	O	I	T	C	I	R	F



GRAVITY
FORCE
PULLEY
RESISTANCE
GEAR

BUOYANCY
FRICTION
LEVER
SURFACE
MATERIAL



On the Move

Activity Sheet

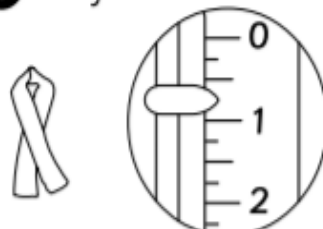


EducationCity

Name: _____ Class: _____

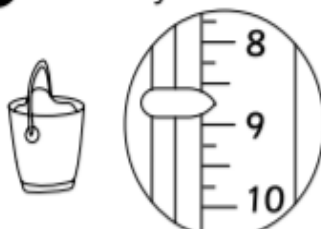
Write the weight of the items in the boxes. Do not forget to write the N for Newtons.
One has been done for you.

1 scarf



weight = 0.75 N

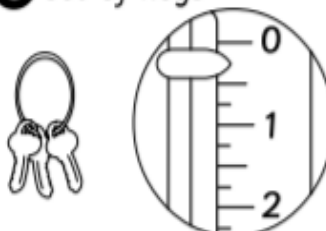
2 bucket of sand



weight = 8.75 N



3 set of keys



weight = 0.25 N

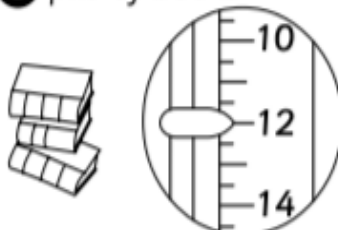
4 jar of jam



weight = 6.5 N

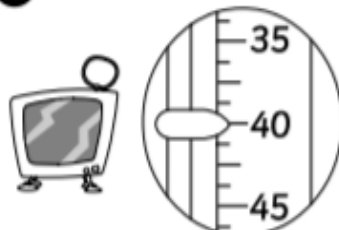
Do the same for these items but be careful, the scales on these forcemeters are different.

5 pile of books



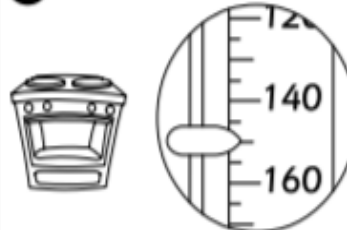
weight = 12 N

6 television



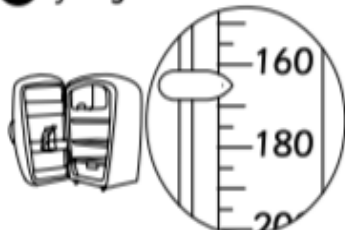
weight = 40 N

7 cooker



weight = 150 N

8 fridge



weight = 165 N



Can I investigate what happens to water in cups when it is dropped?

Equipment

2 plastic or foam cups

Water, Children scissors

Instructions

Take the cups and a jug of water **outside** to complete this investigation.

Half fill one cup with water and drop it to the floor from chest height. Watch what happens.

Make holes in the bottom of the other cup and half fill it with water – watch what happens to the water.

Then half fill the cup with holes in again and drop the cup from chest height and watch what happens.

What happened when you dropped a complete cup of water?

The cup dropped quickly to the floor and the water spilled out of it. Gravity caused it to fall.

What happened when you put holes in the cup and filled it with water?

As I held the cup the water poured out of the holes because gravity makes the water want to fall to the ground if it can.

What happened when you dropped the cup full of water with holes in?

As I dropped the cup I noticed that the water did not fall out of the holes until the cup hit the ground.

Why do you think the water did not come out of the holes when you dropped the cup?

I think the water stayed in the cup because gravity is pulling on the cup and the cup and water are falling at the same speed



Newton and Gravity Answers

1. When was Isaac Newton born?
Isaac Newton was born in 1643.
2. Why did Newton move from Cambridge to Woolsthorpe Manor?
Newton moved to Woolsthorpe Manor because plague broke out.
3. What fruit did Newton see falling from a tree?
Newton saw an apple falling from a tree.
4. In which direction does gravity pull objects?
Gravity pulls objects down towards the centre of the Earth.
5. Why does the Moon stay in orbit around the Earth?
The Moon stays in orbit around the Earth because gravity pulls it towards the Earth.
6. What are forces measured in?
Forces are measured in newtons (N).
7. What did Albert Einstein think of Isaac Newton?
Albert Einstein thought that Isaac Newton had one of the most brilliant minds of anyone who had ever lived and that he was a 'shining spirit'.
8. What can still be seen from Isaac Newton's old bedroom window?
The apple tree that inspired Newton's ideas about gravity can still be seen from his old bedroom window.

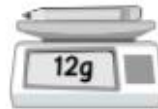


Name: _____

Class: _____

Compare the mass of the objects.

- 1 How much heavier is the ruler than the pencil?



13 g

- 2 How much heavier is the rubber than the scissors?



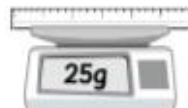
19 g

- 3 How much heavier is the stapler than the glue stick?



24 g

- 4 How much heavier is the glue stick than the ruler?



15 g

- 5 How much heavier is the pencil than the rubber?



12 g

- 6 How much heavier is Sten's pile of books than Klara's pile?



Klara's



Sten's

2 kg

- 7 How much heavier is Rosa's pile of books than Sten's?



Sten's



Rosa's

6 kg

- 8 How much heavier is Sten's pile of books than Manu's?



Sten's



Manu's

4 kg

- 9 How much heavier is Rosa's pile of books than Klara's?



Rosa's



Klara's

8 kg

- 10 How much heavier is Klara's pile of books than Sten's?



Klara's



Sten's

4 kg





Box Carts

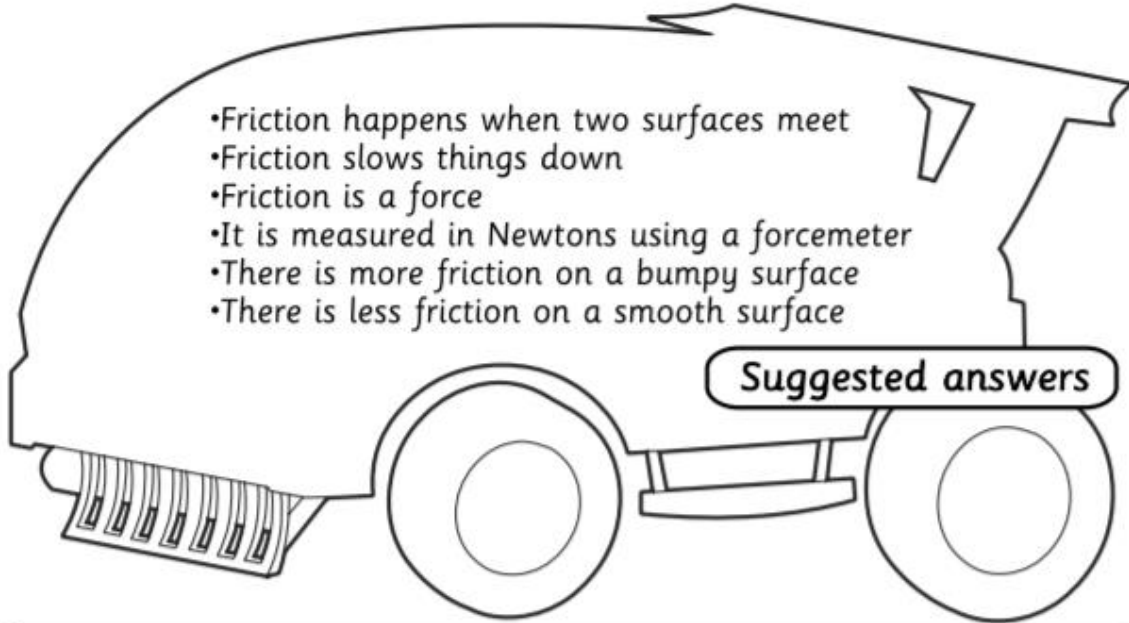
Activity Sheet



EducationCity

Name: _____ Class: _____

What do you know about friction?
Write a list of facts in the box cart below.



Can you make some predictions?
What do you think will happen when the following surfaces meet?

1

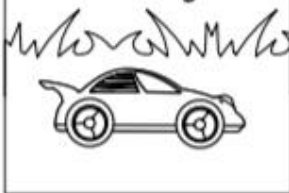
A car on ice



The car will travel faster on the ice because ice is smooth and slippery. This means there is a low level of friction.

2

A car on grass



Grass is bumpy so there will be a higher level of friction. This will slow the car down.

3

Two hands being rubbed together



The hands will warm up because friction produces heat.

Suggested answers



Talk about Forces Answers

To identify forces acting on objects.

Read the story together. Highlight or underline examples of forces in the story. Then, in the second column, briefly explain the forces that are being applied in each example. The first one has been done for you.

The magician reached inside her magic box and lifted up a gigantic magic wand high into the air.

She pushed her very heavy magic box along the wooden floor so that it was by the side of the stage.

Next, she juggled with silk handkerchiefs. After she threw them into the air, they fell gently downwards for her to catch.

After, she lifted a robot penguin out of the box. She held it high in the air.

There was a screen behind the magician and she pushed the screen to one side. Behind the screen was a paddling pool. The magician placed the penguin into the water and it started to swim a length of the pool.

The children laughed and cheered, although they weren't sure what was magical about the robot swimming in the pool! The magician ended her show by popping a big party popper. The popper shot long strips of colourful paper into the air, which then fell softly to the ground.

The magician's force is lifting it up and gravity is pulling it down to Earth.

The magician's force is pushing the magic box and friction is pushing against the box where the floor and the box make contact, slowing down the movement.

The magician's force is throwing them into the air. Gravity is pulling the silk scarves down and air resistance is pushing them upwards and slowing them down.

The magician's force is lifting it up and gravity is pulling it down to Earth.

The magician's force is pushing the screen and friction is pushing against the screen where the floor and the screen make contact, slowing down the movement.

The penguin's force is pushing it forwards and water resistance is pushing against it.

The force of the party popper shoots the pieces of paper into the air and then gravity pulls them down. They go down slowly because air resistance pushes up against them.

MASTERS CHALLENGE $2 \times 2 = 4$	$24 \div 6 = 4$	$10 \times 9 = 90$
$8 \times 7 = 56$	$44 \div 4 = 11$	$8 \times 12 = 96$
$3 \times 3 = 9$	$3 \times 4 = 12$	$8 \times 8 = 64$
$5 \times 4 = 20$	$4 \times 4 = 16$	$54 \div 9 = 6$
$1 \times 1 = 1$	$5 \times 3 = 15$	$40 \div 8 = 5$
$48 \div 6 = 8$	$3 \times 8 = 24$	$6 \times 3 = 18$
$28 \div 4 = 7$	$60 \div 12 = 5$	$6 \times 12 = 72$
$3 \times 6 = 18$	$36 \div 3 = 12$	$3 \times 6 = 18$
$4 \times 7 = 28$	$4 \times 11 = 44$	$4 \times 12 = 48$
$4 \times 5 = 20$	$3 \times 5 = 15$	$9 \times 5 = 45$
$9 \times 7 = 63$	$9 \times 11 = 99$	$9 \times 12 = 108$
$42 \div 7 = 6$	$4 \times 8 = 32$	$8 \times 9 = 72$
$45 \div 5 = 9$	$12 \times 11 = 132$	$12 \times 12 = 144$
$5 \times 6 = 30$	$9 \div 1 = 9$	$10 \div 5 = 2$
$3 \times 7 = 21$	$10 \times 3 = 30$	$6 \times 6 = 36$
$2 \times 9 = 18$	$9 \times 9 = 81$	$90 \div 10 = 9$
$36 \div 9 = 4$	$8 \times 3 = 24$	$10 \times 10 = 100$
$121 \div 11 = 11$	$72 \div 9 = 8$	$10 \times 3 = 30$
$1 \times 7 = 7$	$66 \div 6 = 11$	$48 \div 4 = 12$
$8 \times 4 = 32$	$1 \times 10 = 10$	$54 \div 6 = 9$
$99 \div 9 = 11$	$6 \times 5 = 30$	$108 \div 9 = 12$
$5 \times 7 = 35$	$5 \times 11 = 55$	$5 \times 12 = 60$
$9 \times 2 = 18$	$2 \times 8 = 16$	$8 \times 10 = 80$
$7 \times 7 = 49$	$7 \times 11 = 77$	$7 \times 12 = 84$
$11 \times 7 = 77$	$11 \times 11 = 121$	$11 \times 12 = 132$
$6 \times 10 = 60$	$63 \div 7 = 9$	$3 \times 9 = 27$
$3 \times 7 = 21$	$3 \times 11 = 33$	$3 \times 12 = 36$
$8 \times 5 = 40$	$4 \times 10 = 40$	$18 \div 2 = 9$
$2 \times 11 = 22$	$6 \times 9 = 54$	$10 \times 10 = 100$
$8 \times 7 = 56$	$60 \div 5 = 12$	$12 \div 1 = 12$
$4 \times 7 = 28$	$84 \div 7 = 12$	$9 \times 7 = 63$
$88 \div 8 = 11$	$10 \times 11 = 110$	$72 \div 6 = 12$

$10 \times 7 = 70$	$10 \times 11 = 110$	$10 \times 12 = 120$
$3 \times 12 = 36$	$120 \div 12 = 10$	$36 \div 3 = 12$

Master Master Challenge

$72 \div 8 = 9$	$6 \div 1 = 6$	$56 \div 7 = 8$	$18 \div 2 = 9$
$64 \div 8 = 8$	$18 \div 3 = 6$	$24 \div 3 = 8$	$40 \div 8 = 5$
$28 \div 7 = 44$	$30 \div 6 = 5$	$8 \div 8 = 1$	$56 \div 7 = 8$
$9 \div 9 = 1$	$32 \div 8 = 4$	$12 \div 4 = 3$	$24 \div 6 = 4$
$54 \div 9 = 6$	$12 \div 4 = 3$	$35 \div 7 = 5$	$12 \div 2 = 6$
$40 \div 8 = 5$	$18 \div 6 = 3$	$15 \div 3 = 3$	$9 \div 1 = 9$
$1 \div 1 = 1$	$16 \div 8 = 2$	$56 \div 8 = 7$	$35 \div 7 = 5$
$63 \div 9 = 7$	$2 \div 2 = 1$	$36 \div 4 = 9$	$42 \div 6 = 7$
$27 \div 9 = 3$	$36 \div 4 = 9$	$9 \div 1 = 9$	$15 \div 5 = 3$
$16 \div 2 = 8$	$54 \div 6 = 9$	$12 \div 6 = 2$	$6 \div 1 = 6$
$7 \div 1 = 7$	$72 \div 9 = 8$	$36 \div 9 = 4$	$9 \div 9 = 1$
$12 \div 3 = 4$	$14 \div 2 = 7$	$30 \div 5 = 6$	$24 \div 6 = 4$
$27 \div 3 = 9$	$24 \div 4 = 6$	$6 \div 1 = 6$	$45 \div 5 = 9$
$10 \div 2 = 5$	$30 \div 6 = 5$	$48 \div 6 = 8$	$8 \div 4 = 2$
$16 \div 4 = 4$	$45 \div 9 = 9$	$2 \div 2 = 1$	$7 \div 1 = 7$
$3 \div 3 = 1$	$16 \div 4 = 4$	$21 \div 7 = 3$	$9 \div 9 = 1$
$18 \div 3 = 6$	$21 \div 7 = 3$	$9 \div 3 = 3$	$30 \div 5 = 6$
$40 \div 5 = 8$	$81 \div 9 = 9$	$30 \div 6 = 5$	$32 \div 4 = 8$
$32 \div 4 = 8$	$16 \div 2 = 8$	$14 \div 2 = 7$	$12 \div 3 = 4$
$24 \div 4 = 6$	$35 \div 5 = 7$	$56 \div 8 = 7$	$63 \div 9 = 7$
$45 \div 5 = 9$	$49 \div 7 = 7$	$36 \div 4 = 9$	$24 \div 8 = 3$
$40 \div 5 = 8$	$54 \div 9 = 6$	$18 \div 9 = 2$	$25 \div 5 = 5$
$20 \div 4 = 5$	$15 \div 3 = 5$	$20 \div 5 = 4$	$32 \div 4 = 8$
$48 \div 6 = 8$	$20 \div 5 = 4$	$24 \div 8 = 3$	$36 \div 9 = 4$

$54 \div 6 = 9$	$28 \div 7 = 4$	$24 \div 4 = 6$	$48 \div 8 = 6$
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