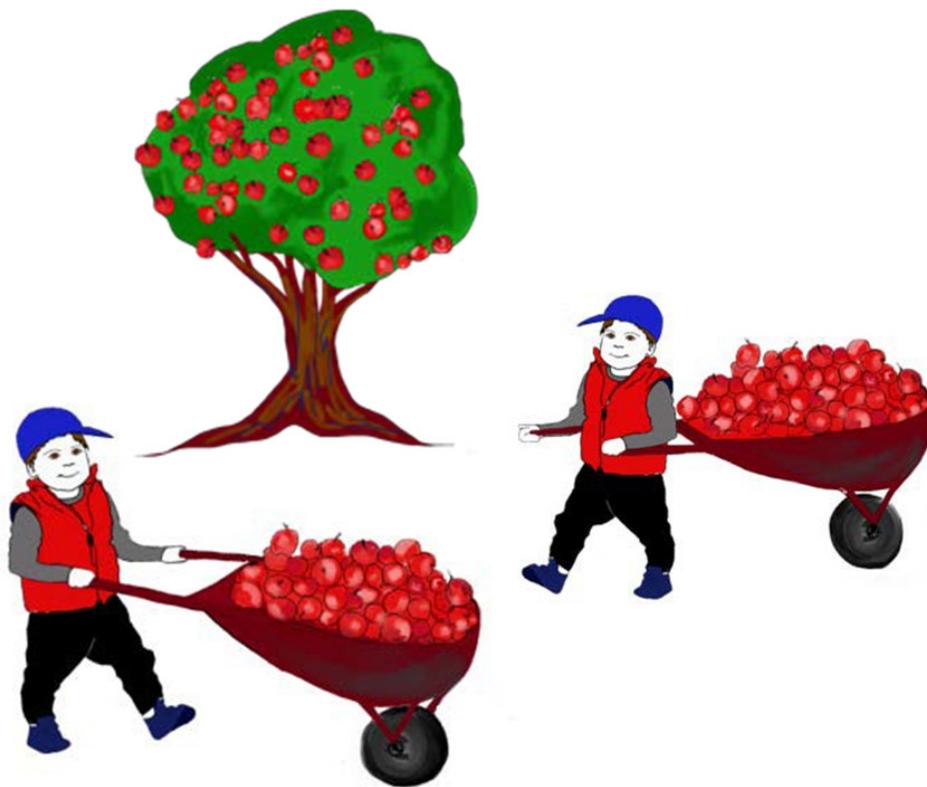


# Push and pull



Year 2  
Science  
5 Day Print Course



## Year 2: Physical Science: Push and Pull

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## Home Tutors

Please remove the Home Tutor Notes from the back as it contains information and solutions.

It is important to read the Home Tutor Notes before your student starts each day.

## Contents

Equipment list

Day 1 Push and Pull

Day 2 Explore Movement

Day 3 Forces Investigation

Day 4 Toys, Toys, Toys!

Day 5 Gravity

Reflection Sheets

Home Tutor Daily Notes

Western Australian Curriculum



This symbol is a **warning**.

Work with Home tutor supervision.

©r

## Equipment You Will Need

(most of these are household supplies)

- 1 rectangular plastic food container
- 3 drinking straws
- 1 balloon
- adhesive tape
- 6 elastic bands
- scissors
- poster putty
- small sharp knife (to be used by the home tutor)
- bath tub or small shallow body of water.
- 3 paperclips
- 2 large cereal boxes or light cardboard
- paint or felt tipped pen
- 1 toy car
- 1 L milk carton
- ruler
- pencil
- masking tape
- camera
- adhesive stick
- 2 metres of string
- 1 broom handle or similar
- 3 L milk or juice container
- 2 large wooden beads or bulldog clips
- 1 tennis ball
- 1 soccer or basketball
- 2 pieces of paper

## Day 1

### Push and Pull

Read the following story.

Pushem and Pullem are twin brothers. They live on an apple farm.



Each day, Pushem and Pullem must take their apple carts and go to the orchard to collect apples. They sell their fresh apples at the market.

Pushem and Pullem are twin brothers and they are alike in every way. There is only one way you can tell them apart! One twin likes to push his cart and one likes to pull his cart.



### 1.1 Push and pull

When we push something, we are moving it away from us. When we pull something, we are moving it closer to us.

Look closely at the twins. Which one is Pushem, which one is Pullem? Write the correct names under the carts.

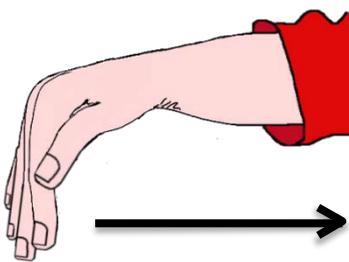


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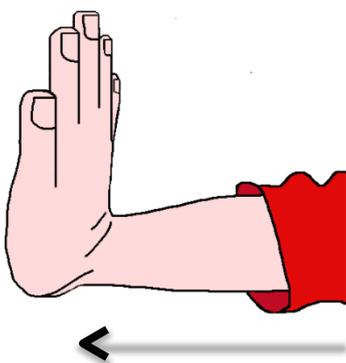
\_\_\_\_\_

Make a motion like this with your hands and move your hands toward your body:



This motion is\_\_\_\_\_.

Make a motion like this with your hands and move your hands away from your body:

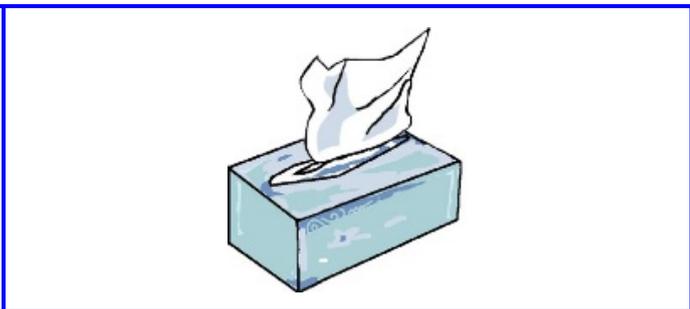


This motion is\_\_\_\_\_.

# 1.2 Let's get moving!



Look at each picture. Is it a push or a pull? Print the word push or pull in the space below each picture



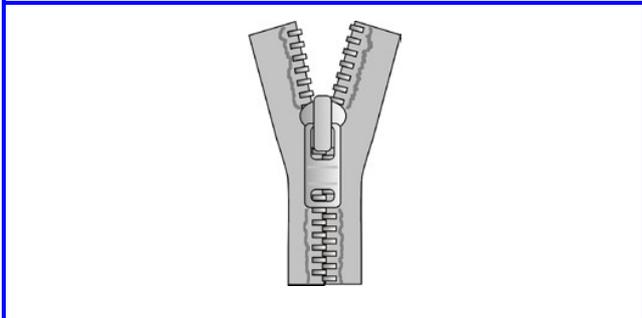
Blank space for writing the answer to the first image.

Blank space for writing the answer to the second image.



Blank space for writing the answer to the third image.

Blank space for writing the answer to the fourth image.

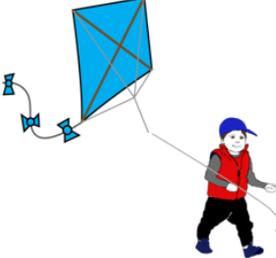
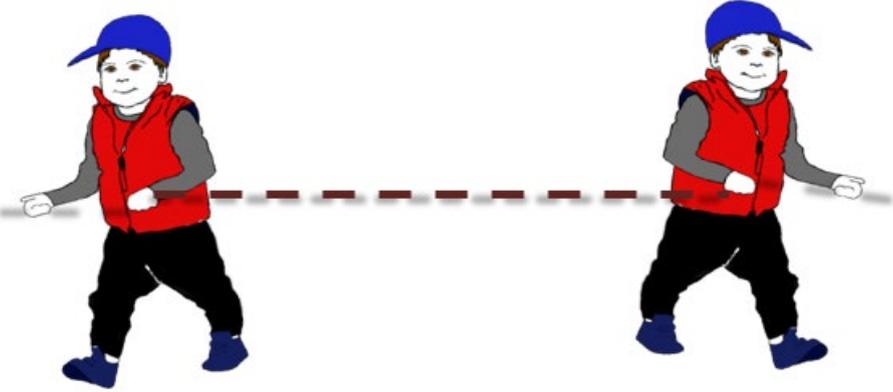


Blank space for writing the answer to the fifth image.

Blank space for writing the answer to the sixth image.

Look at each picture. Is it a push or a pull?

Print the word push or pull in the space below each picture

### 1.3 Push or pull

Cut out magazine pictures or your own photos to show examples of push and pull. Glue them onto this page underneath the words push or pull. Find as many as you can.

Push	Pull

## 1.4 A Trip to the market

After working all day, Pushem and Pullem need to take the apples they have collected to the market.

Give them directions by filling in the blanks with these words: **backwards, up, down and forwards.**

Look at this picture for clues.



Pushem and Pullem went \_\_\_\_\_ the hill with their apple carts. It was not easy because the hill was very steep.

Pullem tried to pull his cart \_\_\_\_\_ up the hill. It was very difficult.

Pushem laughed at Pullem. "It is much easier to go \_\_\_\_\_ like me," he said.

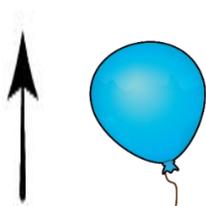
Once they both got to the top of the hill, they could see the market and needed to go \_\_\_\_\_ the hill to get there. They were glad because both of them were tired.

## 1.2 Which way should I go?



Draw an **arrow** to show which way is backwards, which way is forwards or which is up or down. I have done the balloon for you.

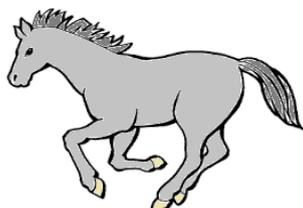
The balloon is flying **up**.



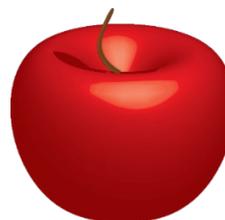
The car is **backing** up.



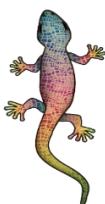
The horse is galloping **forwards**.



The apple is falling **down**.



The gecko is climbing **up**.



The boy is riding **forward**.



The baby is crawling **backwards**.



The turtle is diving **down**.

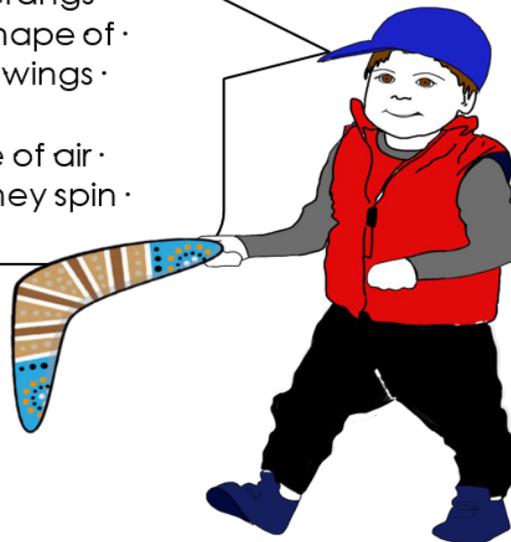


## Day 2

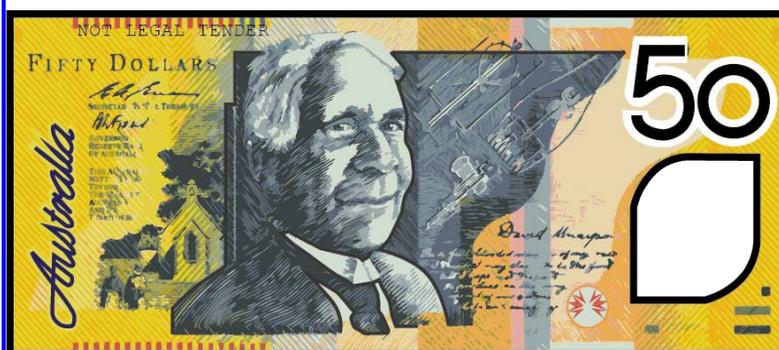
### Explore Movement

Helicopters, boats and boomerangs are objects that use forces to make them move. **Leonardo Di Vinci** drew helicopters nearly 500 years ago. The did not look like our helicopters today.

Did you know that boomerangs are like helicopters? The shape of the blade is like two bird's wings stuck together.¶  
Boomerangs use the force of air pressure to lift them and they spin to move them forward.¶



**David Unaipon** was an inventor and a well-known Indigenous Australian of the Ngarrindjeri people. One of his inventions was the design of a helicopter based on a boomerang.



David Unaipon is featured on the Australian \$50 note in commemoration for his inventions.

Today you will be exploring the movement of a boat, a helicopter and a boomerang. You will make and test them to explore their movement.

## 2.2 Helicopter



Gather the materials first and then read the procedure to make your helicopter.

### Equipment:

- helicopter template
- scissors
- paperclip

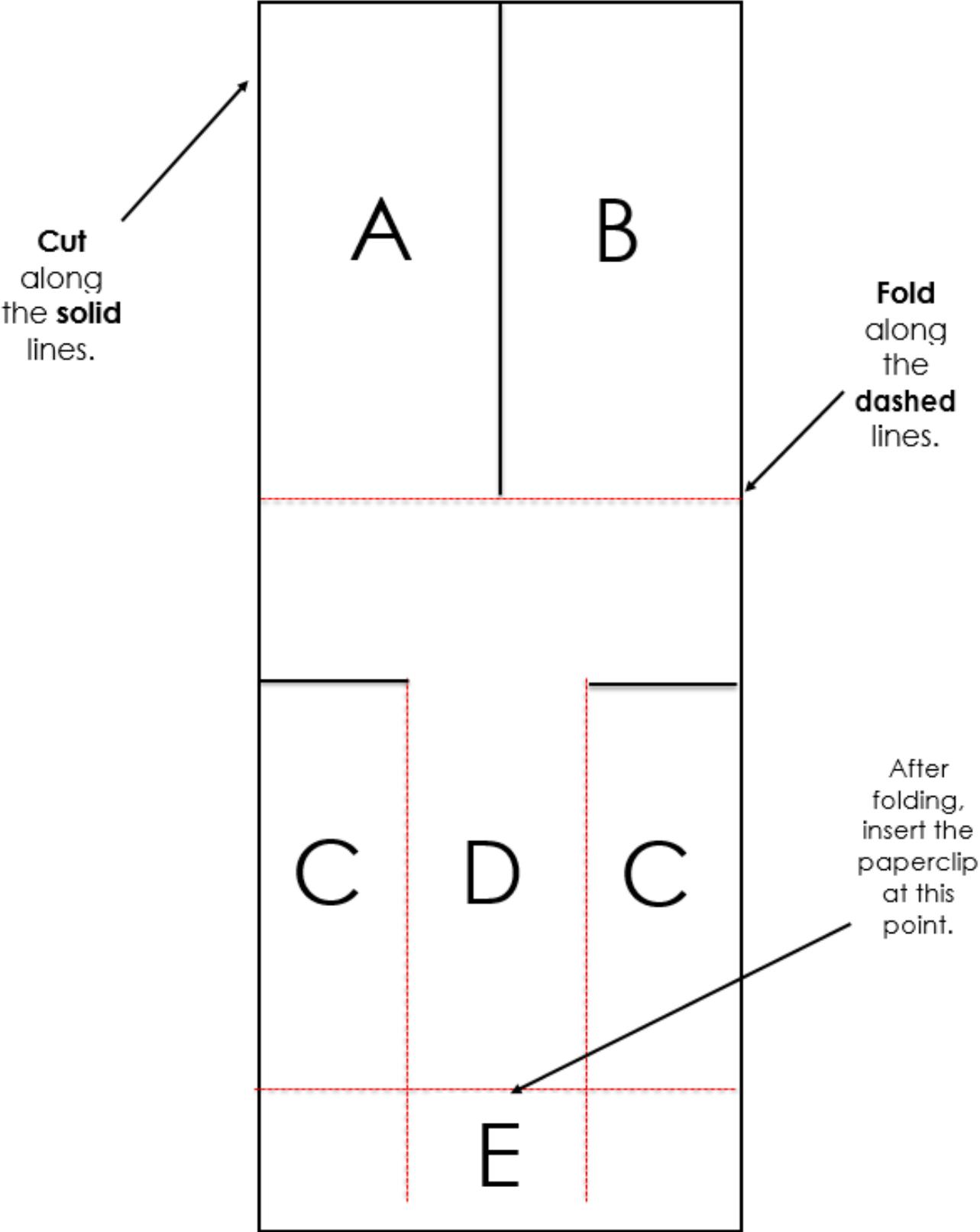


### Procedure:

1. Carefully cut out the helicopter template along the **solid** lines only.
2. Next, along the **dashed** lines, fold **A** toward you and **B** away from you.
3. **Fold** the **C** and **D** over each other so they overlap.
4. **Fold** the bottom **E** up and put a paperclip on it.
5. Hold the helicopter's paperclip and throw it like a baseball to explore its movement. Observe what happens.
6. Complete question 1 on the **Explore movement** activity sheet.

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# Helicopter Template



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## 2.2 Balloon powered boat



Gather the materials and follow the instructions to make your balloon powered boat.

### Materials:

- 1 rectangular plastic food container
- drinking straw
- balloon adhesive tape
- small elastic band
- scissors
- poster putty
- small sharp knife (Home tutor)
- bath tub, wading pool or large sink (Supervision by home tutor)



Cut a hole here.



### Procedure:

#### Make Your Boat

1. Ask the home tutor to use the knife to make a small hole in one end of the container as close to the rim as possible and just big enough for the straw to fit.
2. Cut your straw in half and attach the balloon to one end using sticky tape and an elastic band. It should be secure enough to blow air into the balloon without it leaking around the sides.

3. Thread your straw through the hole, making sure the **balloon is on the inside** of the container.
4. Use the poster putty to secure the straw in the hole and make your boat water tight.
5. Explore movement by blowing the balloon up and placing the boat on water. Observe what happens.
6. Complete question 2 on the **Explore Movement** activity sheet.

We can use our five senses to observe. Senses are what we can see, feel, taste, smell or hear.



## 2.4 Boomerangs



Boomerangs have been around for many, many years. They are still used for hunting by some Aboriginal people.

### Materials

- scissors
- large cereal box
- boomerang template
- paint

### Procedure:

1. Cut out the template for the boomerang.
2. Place the template for the boomerang on the side of the cereal box and tape it down.
3. Using your scissors carefully cut out the boomerang shape.
4. Paint your boomerang with patterns.
5. Turn the boomerang over and fold the right side of all of the wings back slightly. Fold just 2.5 cm of the boomerang back. Make sure you've folded the same side of each blade the same amount.



## Testing:

1. Safety First - Do not throw the boomerang at anyone!
2. Test the flight of your boomerang by following the tips in the speech bubble below.
3. Try to hit a target. Observe how the boomerang moves and what happens.
4. Complete question 3 on the **Explore movement** activity sheet.

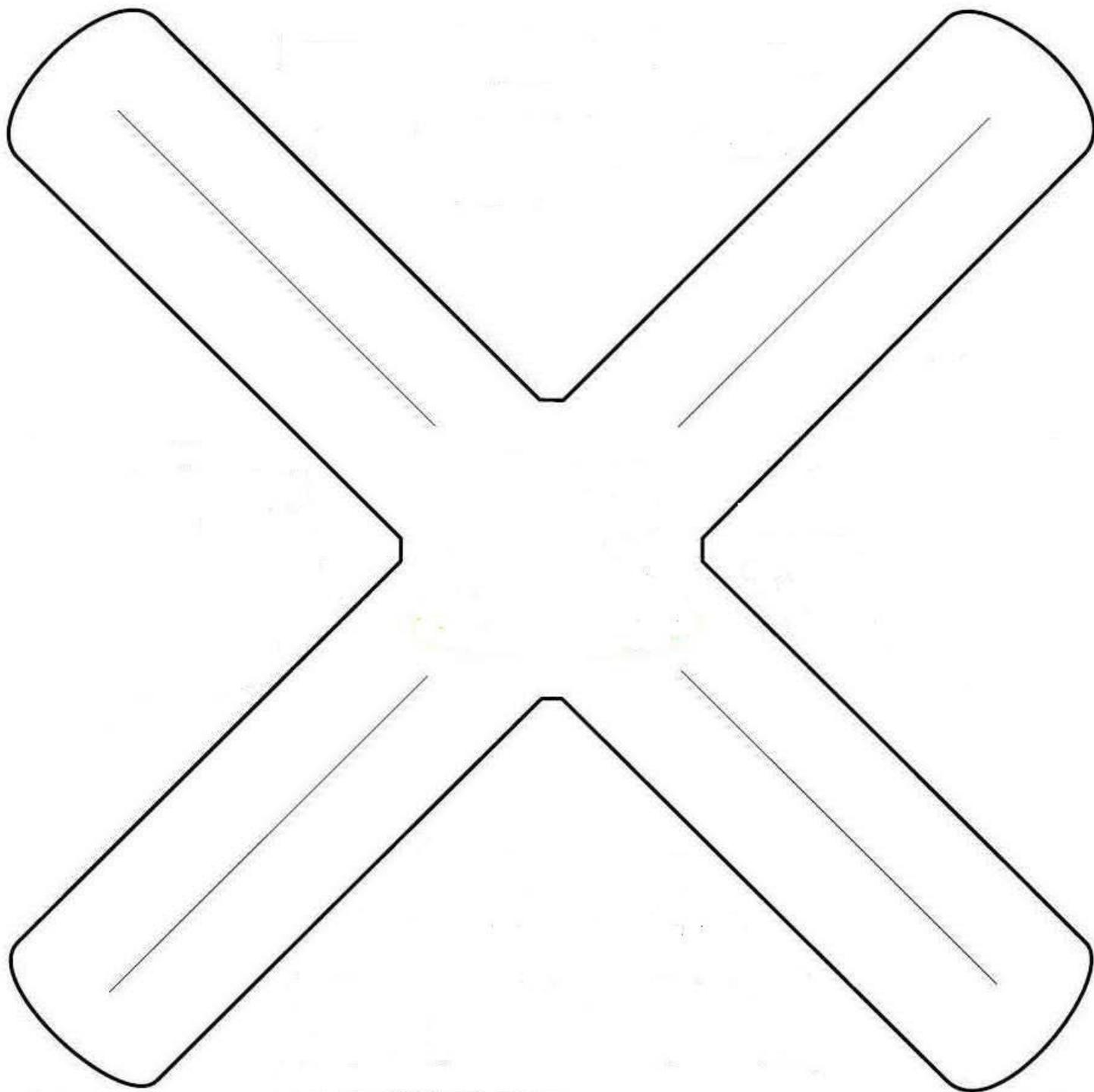


Grip your boomerang lightly by clasping between the thumb and the first joint of your index finger.

Throwing your boomerang is like snapping a whip. You don't need to "twist your wrist" to make it come back.



## Four-winged Boomerang Template



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## 2.5 Explore movement activity sheet

What direction does the vehicle move when you apply forces like push and pull?



Remember: We can use our five senses to observe. Senses are what we can see, feel, taste, smell or hear.

Don't forget to use full sentences when you write your answers.

### Observations:

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1. What forces are used to make the helicopter move?

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What direction does it move?

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2. What force is used to make the boat move?

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What direction does it move?

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3. What force is used to make the boomerang move?

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What direction does the boomerang move?

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4. How is the boomerang similar to the helicopter?

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How is it different?

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5. Which one did you enjoy making and testing? Why?

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## Day 3 Forces

Force makes an object move or stop moving.  
Pushes and pulls are forces.

Pushem and Pullem use push and pull forces to move their apple carts. The amount of force they use will help them to move their apples faster or slower.

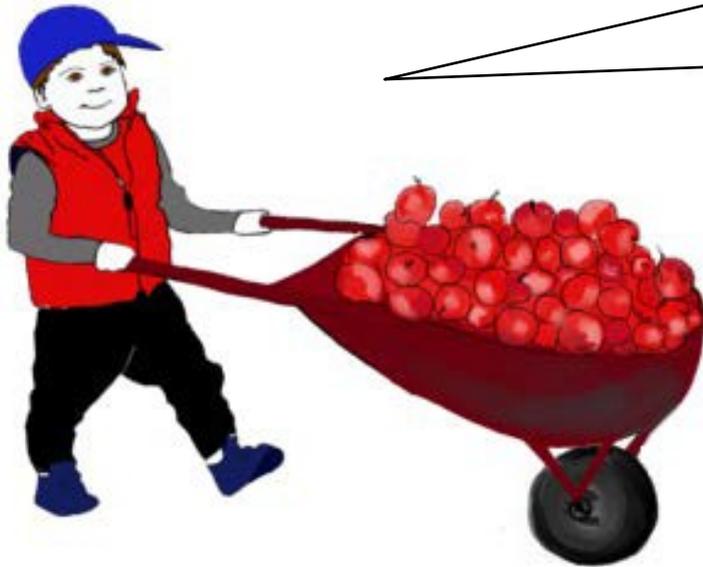


My apple cart is really full!  
I need to get it to market  
fast!

### 3.1 Car launch investigation

Pushem and Pullem use forces to move their apple carts.

The greater the force Pushem uses to push his cart, the faster the cart will go.



If I push my apple cart harder, will it go faster?

The greater the force Pullem uses to pull his cart the faster the cart will go.

If I pull my apple cart harder, will it go faster?



In this investigation, you will build a car launcher to test whether a harder push will make a car go further.

### Investigation question:

Will a big push make a car go further?

Write your prediction on the **Car launch investigation** activity sheet.

### Equipment:

- small toy car
- 4-5 large elastic bands
- ruler
- chair with four legs
- felt tipped pen or pencil
- masking tape
- flat, smooth surface
- camera



### Procedure:

Make your car launcher

1. Carefully attach the elastic bands to each other by looping or tying knots. This makes one long elastic band.
2. Carefully stretch the elastic band between two legs of a chair. This is your car launcher. Be careful not to overstretch the elastic as it may be dangerous if snapped.
3. Ask your home tutor to help you to use a ruler to mark a start line (0 cm) and then marks at 2 cm, 4 cm, 6 cm, 8 cm and 10 cm along the floor under the chair. You will use these lines to test different strengths of pull.

1. Practise using the launcher to shoot the cars along the floor.
2. Test the force needed to push the car.  
Do this by first using a little stretch (2 cm). Place a piece of masking tape where the car stops.
3. Take a photo (or draw a diagram on the activity sheet).
4. Test again by using more stretch (4 cm). Place a piece of masking tape where the car stopped.
5. Measure the distance and then record the information in the table on your activity sheet.
6. Continue to the 6cm, 8cm and 10cm of pull.

# Car Launch Investigation activity sheet

## Investigation question:

Will a **big** push make a car go **further**?

Try these words in your prediction: hard, soft, strong, further, closer.



## Prediction:

I predict that a \_\_\_\_\_ push will make the car go  
\_\_\_\_\_ than a \_\_\_\_\_ push.

## Observations:

Record your measurements here in the table.

Launching line	Distance the car travelled in cm
0 cm	0 cm
2 cm	
4 cm	
6 cm	
8 cm	
10 cm	

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Which launching line gave the most distance?

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Draw or insert a photo of your investigation.

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How did the amount of pull on the elastic affect the distance your car travelled?

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Was your prediction correct?

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## 3.2 More or less investigation

Air pressure is a force. In this investigation, you will test how the force of more or less air pressure makes your boat move.

### Investigation Question:

Does more air in a balloon make a boat go faster and further? Write your prediction on the work sheet.

### Materials:

Use the boat you made on Day 2 to test your investigation question. If you do not have a bathtub or wading pool to test your boat, use tape or adhesive putty to fix your toy car to the bottom of the boat.

Give your  
boat wheels.



### Procedure:

#### Part 1

1. Blow the balloon up about half way. You may need your home tutor's help to do this.
2. Once you balloon is blown up, place your finger on the end of the straw so that the air does not escape.
3. Carefully lower you boat onto the water (or onto the floor if you are using the car) and then let it go.
4. Watch and record what happens on the **More or less** activity sheet.

## Part 2

1. Blow up you balloon all of the way.
2. Don't let the air escape.
3. Place it on the water (or the floor if you have attached a car) and let it go.
4. Write your observations on your **More or less** activity sheet.

## More or Less activity sheet

### Investigation Question:

Does more air in a balloon make a boat go faster and further?

### My Prediction:

I think that

What happened when the balloon was half-filled with air?

What happened when the balloon was filled all the way with air?

# Day 4

## Toys from Cultures

Push and pull forces have been used for toys for many hundreds of years. They have been used by different cultures to make toys fun for children.

The most common pull toys are those on wheels which children pull or push. Do you have any push or pull toys in your toy box?



### 4.1 Push and pull toy list

Make a list of some of the toys you own which use push or pull forces.

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## 4.2 Making push and pull toys – Jumping Jack

In this activity, you will make a push and pull toy called the Jumping Jack toy.

This toy uses forces to make it move. It is a cross between a puppet and a paper doll and was first invented thousands of years ago in Ancient Egypt. The same type of toy can also be found in France and Germany and even some of these are hundreds of years old.

Pulling the strings is the force that make this toy move.

Gather your equipment.

### Equipment:

- Jumping Jack template
- crayons, paint or textas
- cereal box cardboard
- adhesive stick
- scissors
- hole punch
- 4 split pins (paper binders)
- string or wool.



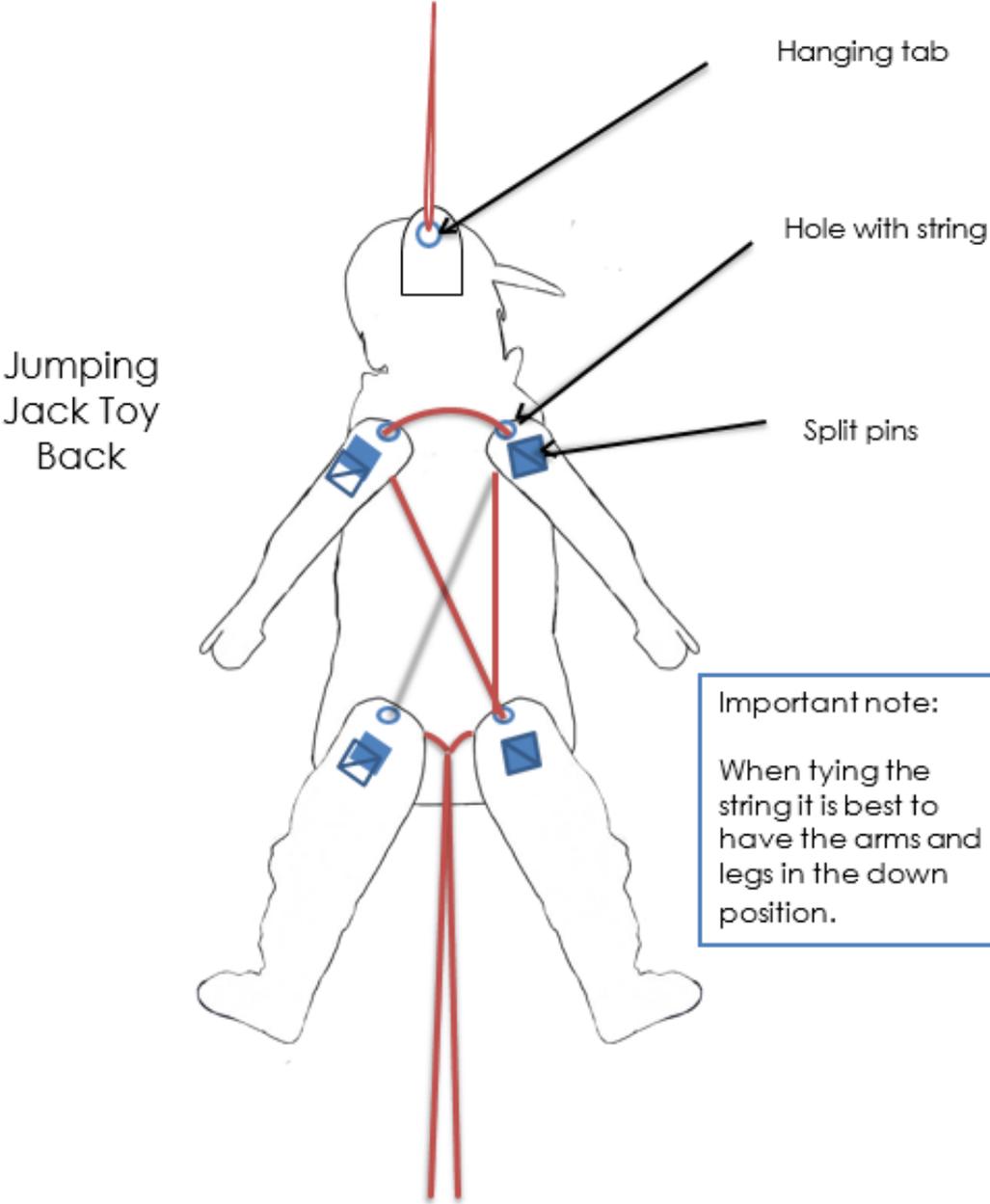
Follow these directions to make a Jumping Jack Toy.

**Procedure:**

1. Colour the template on the following page.
2. Glue the template to the cardboard.
3. Leave to dry.
4. Cut out the template.
5. Using the hole punch, punch holes where you see the black dots. (Home tutor help.)
6. Connect the arms and legs to the body by using the split pins. Twist ties can also be used.
7. Tie a string to the top of the head.
8. With the arms and legs hanging down, thread your string as shown in the diagram on the next page. This is the **pull** string that makes the arms and legs move.
9. Take a photo of the toy to show your teacher.

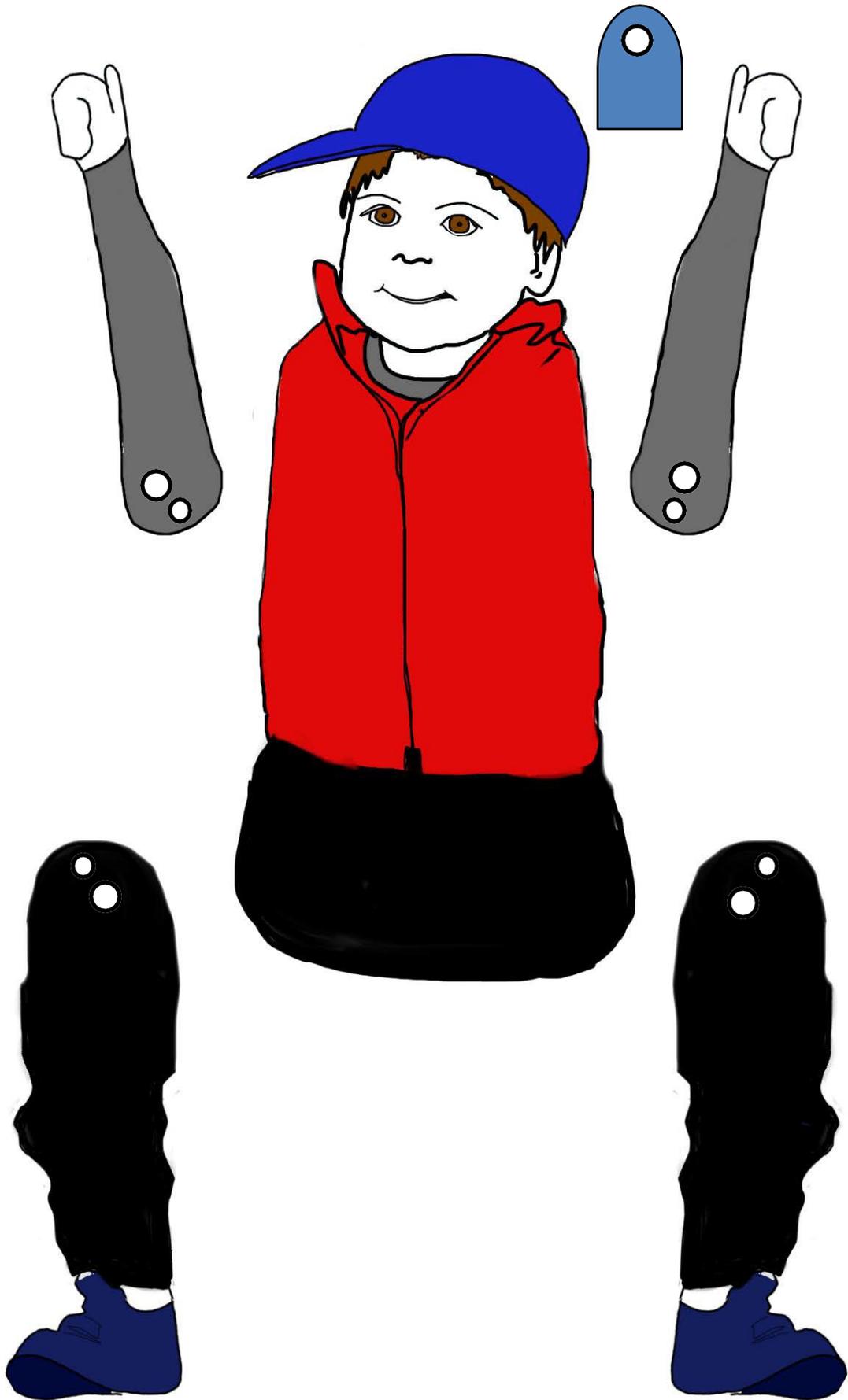
### Diagram of string attachment

#### Diagram of string attachment



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# Jumping Jack Toy Template



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### 4.3 Push and pull climbing toy

Climbing toys also use pushing and pulling to make them move. Make the climbing toy and test the forces of push and pull on it.

#### Equipment:

- climbing toy template
- paints and markers
- tape
- adhesive stick
- scissors
- 1 straw
- cereal box cardboard
- 2 metres of string
- wooden beads or bull clips

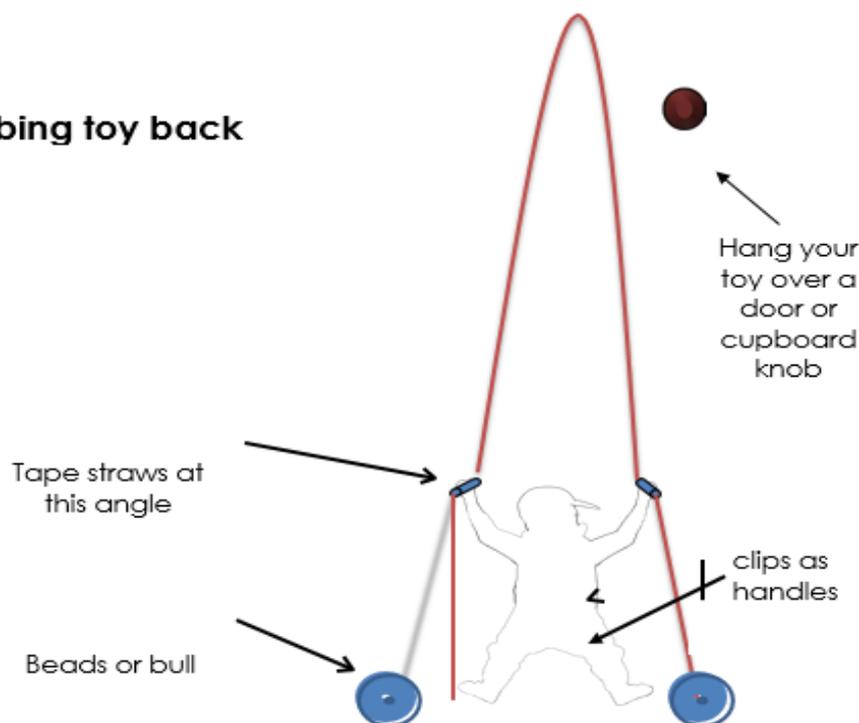
#### Procedure:

1. Cut out the template.
2. Glue the template pieces to the cardboard.
3. Leave to dry.
4. Carefully cut out the climbing toy.
5. Glue the straw pieces on the back of the climbing toy with the straws pointing up and down as shown in the diagram on the next page.
6. Cut a long piece of string, and then fold it in half.
7. Thread the string through the two straws as shown in the diagram.

8. Attach the wooden beads or bull clips to the end of the strings (as handles).
9. Attach a 10 cent coin on the in the middle of the back of the toy using tape.
10. Hang the climber from a door knob or a high cupboard knob.
11. Pull the right string and then the left string alternatively. The forces of pushing, pulling and friction will make the toy climb.
12. To release the toy, let go of the strings and the force of gravity will make the toy fall to the bottom again.
13. Take a photo of the toy if you are not posting it to your teacher.

### Diagram of climbing toy back

Note:  
Students should hold the string slightly apart. To make the toy climb you must pull the right string and then the left string alternatively.



# Climbing Toy Template



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## Day 5 Gravity

Pushem and Pullem were collecting apples from the apple orchard. After working away all afternoon, Pullem was tired so he sat under the tree to rest.

Some of the apples were way up high in the tree. Pushem jumped and jumped but he just couldn't reach the apples up high. Each time he jumped the Earth would pull him back down.



Pullem laughed at Pushem and said, "You are working way too hard! Why don't you rest under the tree like me?"

At that moment, an apple fell out of the tree and hit Pullem on the top of his head. Pushem laughed at Pullem

"It can be dangerous sitting under an apple tree!"



"Why do apples always fall down instead of up?" asked Pullem.

They thought about this for a minute. Pullem knew this must be a force – the force called **gravity**!

Pushem and Pullem started to sing.

## 5.1 Gravity song

Help Pushem and Pullem with their song by printing these words into the lines.

<b>working</b>	<b>push</b>	<b>high</b>	<b>groove</b>	<b>gravity</b>
----------------	-------------	-------------	---------------	----------------

Push, push \_\_\_\_\_ my cat,  
Gently through the trees.  
Pick up apples, one by one,  
\_\_\_\_\_ just like me.

Pull, pull, my cart  
I'll fill as I go.  
Apples, apples, won't be long  
Picking \_\_\_\_\_ and low.  
Sit, sit, sit and rest,  
Underneath the tree.  
An apple falls upon my head,  
The force of \_\_\_\_\_.

Push and pull, we're in the \_\_\_\_\_  
You'll know it when you see.  
The forces help our carts move.  
As well as you and me.

## 5.2 Racing to the Earth

In this activity, you will race different objects each with a different mass. This time the race is toward the Earth! Which will hit the ground first?

**Investigation question:** When I drop two objects will they hit the ground at the same time?

### Materials:

- 1 tennis ball
- 1 soccer or basketball
- 2 pieces of paper



### Part 1 Dropping Things of Different Weights

#### Procedure:

1. Scrunch the paper into a ball.
2. Hold the paper ball and the tennis ball at the same height.
3. Drop them at the same time. Record your results on the **Racing to the Earth** activity sheet.
4. Hold the tennis ball and the soccer ball at the same height and drop them at the same time. Which hits the ground first? Record your observations on the **Racing to the Earth** activity sheet

5. Hold the scrunched piece of paper and the soccer ball at the same height and drop them at the same time. Which will hit the ground first?
6. Complete the **Racing to the Earth** activity sheet.

## Part 2 Same Weights and Different Shape

### Procedure:

1. Take two pieces of paper.
2. Roll one into a ball and leave the other one flat.  
These two pieces of paper have the same weight.  
Do you think they will fall at the same speed?
3. Drop them from the same height at the same time.  
What happened this time?
4. Record your observations on the **Racing to the Earth** activity sheet.

## Racing to the Earth activity sheet

**Investigation question:** When I drop two objects will they hit the ground at the same time?

**Prediction:**

I think

**Observations:**

In the table, show which object hit the ground by writing the objects name or 'both' if it is a tie.

Race	The winner is...
1. Paper ball vs tennis ball	
2. Paper ball vs large ball	
3. Paper ball vs flat paper	

Why do you think race 1 and 2 had these results?

Did you know that gravity makes all things gather speed equally?



Perform to same test using the scrunched paper and the flat paper.

Test two scrunched pieces of paper.

The two tests will have different results. Why?

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The flat piece of paper is like a parachute. It floats while the ball drops.

What difference would this make to the speed it is falling?

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Was my prediction correct?

Yes

No

## 5.3 Investigating a pulley

Gravity pulls objects to the ground. Sometimes it makes objects that are heavy, hard to lift. Pulleys can help up move things. In this activity, you will be exploring the pull movement by making and testing a pulley.

Turn to the **Pulley activity sheet 1** and read your investigation question.

Discuss your prediction about the answer and print it on the activity sheet.



Remember:  
We can use our five senses to observe. Senses are what we can see, feel, taste, smell or hear.

### Materials:

- broom handle string
- 2L plastic milk container with a handle (filled with water, milk or juice)
- Home tutor
- Pulley activity sheets 1 and 2



### Procedure:

1. Lift the full container with one hand.
2. Lift the full container with two hands.
3. Record your observations on **Pulley activity sheet 2**.

## Part 1 Making your Pulley:

1. Tie the string to the handle of the container.
2. Ask your Home tutor to hold the broom horizontally between their two hands at shoulder level.
3. Place the container on the floor directly under the broom.
4. Loop the string over the broom handle.

## Part 2 Testing your Pulley:

1. Test your pulley by pulling down on the string with one hand.
2. Test your pulley by pulling down on the string with two hands.
3. Complete the **Pulley activity sheet 2** with your observations.
4. Write the five steps for the investigation procedure onto **Pulley activity sheet 1**.

# Pulley activity sheet 1

## Investigation question

Does using a pulley make it easier or harder to lift a heavy object?

## My prediction

I think that

## Procedure: How did you test your prediction?

1

2

3

4

5



Which method of lifting was the easiest?

Pulley or no pulley?

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Explain why you think it was easiest.

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Was my prediction correct?	Yes	No
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## Student Reflection

Tick the box you feel best describes your work in this set.

☺ = I had a lot of help.

☺☺ = I had a little help.

☺☺☺ = I did it by myself!

	☺	☺☺	☺☺☺
<b>Science Understandings</b>			
I can describe directions like up, down, backward and forward.			
I understand that push and pull are forces.			
I can describe the force of gravity.			

<b>Science as a Human Endeavour</b>			
I understand that it is important to ask questions and make observations when working in science.			

<b>Science Inquiry Skills</b>			
I was able to make a prediction in most of my investigations.			
I followed the steps to a procedure in my investigation.			
I recorded my observations (what I saw) in my investigations.			
I presented my research as drawings, photos and words.			

Which was your favourite activity and why?

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## Home Tutor Reflection

Tick the box you feel best describes your student's work in this set.

😊 = With a lot of help

😊😊 = With some help

😊😊😊 = On their own

	😊	😊😊	😊😊😊
<b>Science Understandings</b>			
My student can describe directions such as up, down, backward and forward.			
My student understands that push and pull are forces.			
My student understands that gravity pulls objects toward the Earth.			
<b>Science as A Human Endeavour</b>			
My student understands that it is important to ask questions and make observations when working in science.			
<b>Science Inquiry Skills</b>			
My student was able to make a prediction about what would happen in their investigation.			
My student understood what observations to record when doing their investigations.			
My student discussed their predictions and observations of their investigation with me.			

### Other comments:

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You have learned about push and pull and that they are types of forces.

Now that you have finished, send all activity sheets to your teacher. Remember to include any photos you have taken.

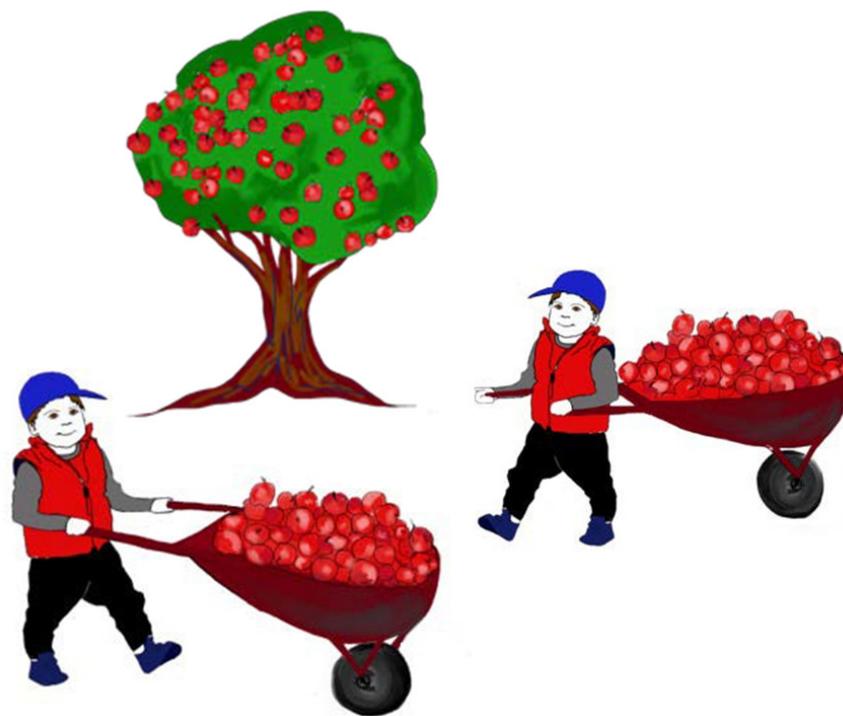
Check this list to make sure all of your work is complete:

- 1.1 Push and Pull
- 1.2 Let's Get Moving
- 1.3 Push or Pull
- 1.4 A Trip to the Market
- 1.5 Which Way Should I Go?
- 2.2 Helicopter (photo)
- 2.3 Balloon Powered Boat(photo)
- 2.4 Boomerang (photo)
- 2.5 Explore Movement
- 3.1 Pulley Investigation
- 3.1 Car Launch Investigation
- 3.2 More or Less Investigation
- 4.1 Push pull toy list
- 4.2 Jumping Jack toy (photo)
- 4.3 Climbing Toy (photo)
- 5.1 Gravity Song
- 5.2 Racing to the Earth
- 5.3 Investigating a Pulley
- Student Reflection Sheet
- Home Tutor Reflection Sheet

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# Home tutor Notes

## Push and pull



Year 2  
Science  
5 Day Print Course



### Getting started:

This science course should take approximately five days to complete. Home tutors should read the notes and prepare the equipment prior to each day.

*Background information* on the science behind the investigations is for the purpose of the home tutor and not mandatory for the student's understanding. Students may need help with reading and understanding the tasks. This should be completed together with their home tutors.

Terms such as *investigate, predict, follow a procedure, observe, and record* should be used by the home tutor when working with the student in science. It is important that students become familiar with these terms.

Home tutors should mark the students work with a tick, written encouragement and stamps and stickers at the end of each day. Remind students to write their answers using full sentences. They should be encouraged to use scientific words where they can.

### Safety:

There is supervision needed in all activities for the purpose of safety. Investigation around water and sharp objects such as scissors are used in some investigations. A warning sign is used to indicate where this is most necessary.



### Equipment:

Equipment used for this science course can be found in most households or can be purchased at the local supermarket. Collecting the equipment and ticking off the list together can be the first activity to do with your student in preparation for this course.

# Home Tutor Notes: Day 1

## Day 1.1

Read the story of Pushem and Pullem with your student. Discuss the images.

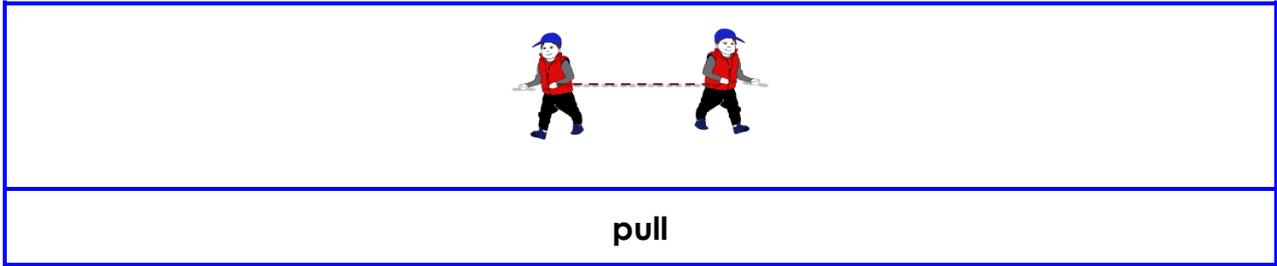
**Background information:** Push and pull are the most common type of force and apply to most movement. Students need to understand that to push something we move it away from us. To pull something we bring it towards us. Students should be able show the push and pull motions with their hands.

## Day 1.2 – Let's Get Moving

Students print the word push or pull next to the images. Discuss this with the student.

	
push	pull
	
push	pull
	
pull	push

	
pull	push
	
push	pull



### Day 1.3 – Push or Pull

Students show examples of push and pull through images they glue to their worksheet.

These can be cut out from magazines, drawn by hand or images taken with a camera.

### Day 1.4 - A Trip to the Market

Help your student understand the task by discussing it with them.

Look at the image and discuss where the apple orchard and the market are and the relationship of where Pushem and Pullem are on the hill.

Pushem and Pullem went **up** the hill with their apple carts. It was not easy because the hill was very steep.

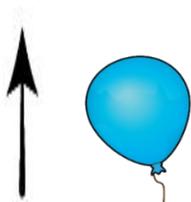
Pullem tried to pull his cart **backward** up the hill. It was very difficult.

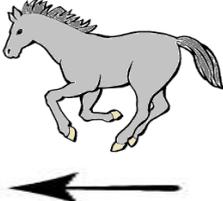
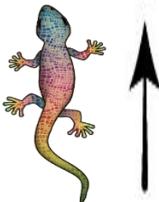
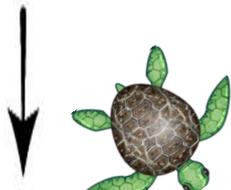
Pushem laughed at Pullem. "It is much easier to go **forward** like me," he said.

Once they both got to the top of the hill, they could see the market and needed to go **down** the hill to get there. They were glad because both of them were tired.

### Day 1.5 – Which way should I go?

Read the instructions with your student and show them the example of the balloon making sure that they understand the task.

<p>The balloon is flying <b>up</b>.</p> 	<p>The car is <b>backing up</b>.</p> 
-----------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------

<p>The horse is galloping <b>forwards</b>.</p> 	<p>The apple is falling <b>down</b>.</p> 
<p>The gecko is climbing <b>up</b>.</p> 	<p>The boy is riding <b>forward</b>.</p> 
<p>The baby is crawling <b>backwards</b>.</p> 	<p>The turtle is diving <b>down</b>.</p> 

## Home Tutor Notes: Day 2 Explore Movement

### Day 2.1

Read and discuss the information on these pages with your student.

**Background information:** Air pressure is all around us. It is a force.

Bird's wings are shaped so that they use air pressure to keep them afloat. Helicopters and aeroplanes use a similar shape to their blades and wings. When the helicopter falls due to gravity, air pushes up the blades to make it float.

### Day 2.2 - Helicopter

Help your student to follow the directions to make the paper helicopter. Supervision is needed when the student is cutting out the helicopter template.

### Day 2.3 Balloon Powered Boat

Help your student to follow the directions to make the balloon powered boat. Home tutor to use sharp scissors to cut out the hole in the boat.

### Day 2.4 – Boomerangs

Help your student to follow the directions to make the paper boomerang. Supervision is needed when the student is cutting out the boomerang and the card. Extra research may be completed to investigate boomerang painting and design.

The four-blade boomerang template is used in this set as real boomerangs have weight and need to be balanced correctly. This is difficult to achieve with a paper boomerang. Throwing a boomerang takes a lot of practice. This should be done outside and away from others.

**Explore Movement activity sheet:** Students complete the Explore Movement activity sheet to compare the movements of the three different objects.

Students should be able to indicate the forces used in simple terms such as push or pull. They should also be able to talk about the direction of the movement that they observed.

Encourage students to write in full sentences and use descriptive words where they can.

**Answers will vary, eg**

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What forces are used to make the helicopter move? **Air pushing up on the blades make it twirl down.**

---

What direction does it move? **It moves downwards.**

---

What force is used to make the boat move? **The air pushing out of the balloon and pushing to boat along.**

---

What direction does it move? **The boat moves forwards.**

---

What force is used to make the boomerang move? **The force is my hand throwing the boomerang and the air getting pushed out of the way as it flies.**

---

What direction does the boomerang move? **It moves up and then down.**

---

How is the boomerang similar to the helicopter? **They both move up and the air pushes against them; they both have blades for the air to push against.**

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How is it different? **The boomerang move fast and the helicopter floats.**

---

Which one did you enjoy making and testing? Why? **Answers will vary.**

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## Home Tutor Notes: Day 3 Forces

### Day 3 .1 - Car Launch Investigation

Help your student to follow the directions to make the car launcher.

Supervision is needed when the student is looping the elastic bands together and stretching them.

## Year 2: Physical Science: Push and Pull

Students may not be skilled at using a ruler for measurement. This is a new concept. Explain that we need to use a unit of measurement that never changes like a centimetre.

Home tutors may want to demonstrate how to start the measurement of the start line (0cm) and the various lines of intervals from 2cm to 10cm with a ruler. These will act as launcher lines. A measurement is also needed as to where the car stops.

**Caution:** When using elastics have students take care not to overstretch them resulting in them snapping and causing injury.

---

Which launching line gave the most distance? **Answers will vary, eg 10cm line**

---

Draw or insert a photo of your investigation.

---

How did the amount of pull on the elastic affect the distance your car travelled? **Answers will vary, eg the more I pulled back the further the car travelled.**

---

Was your prediction correct? **Answers will vary.**

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### Day 3.2 - More or Less Investigations

Student will investigate the forces of air pressure in this activity. They will use the balloon powered boat they made on Day 2.

The test needs to be conducted on a small body of water like a wading pool or bathtub. **Home tutor supervision is needed.** The boat will not work on carpet or a table surface because of the forces of friction. This can be discussed with the student but students do not need to understand this concept.

To test the force of air pressure, students will blow the balloon up half way and let it go. They will compare this to blowing up the balloon all of the way.

Students should recognise that more air in the balloon gives more force through greater air pressure.

**Answers on the activity sheet will vary.**

## Home Tutor Notes: Day 4 Push and Pull Toys

Students will investigate and make push pull toys from different cultures.

### Day 4.1 – Push and Pull Toys

Students make a list of their own push pull toys or those belonging to their family. Home tutors may guide this by encouraging students to go through their toys and find these.

**Answers will vary.**

### Day 4.2 - Making Push and Pull Toys – Jumping Jack

Read the information about the origin of Jumping Jack toys and discuss this with your student.

Help your student to follow the directions to make the Jumping Jack toy. Home tutor help may be needed when the student is cutting out the holes in the template for the split pins as well as attaching the strings.

### Day 4.3 - Push and Pull Climbing Toy

Help your student to follow the directions to make the Push and Pull Climbing Toy. Home tutor help may be needed when the student is cutting out the template after it is glued to the cereal box cardboard.

**Note it is important to position the straw pieces as on the angle in the diagram.**

To make the toy climb hang it over a door knob or cupboard knob, the higher the better. The string must move over the knob freely. Students need to pull gently but alternately on the left and right string. Pulling and friction forces help the toy to climb.

## Home Tutor Notes: Day 5 Gravity

Students will learn about gravity in these activities.

Read and discuss the story of Pushem and Pullem with your student.

**Background information:** Gravity can be explained as a force which pulls objects toward the centre of the Earth. It is like the Earth pulling on you and keeping you on the ground. Every object that has mass gives a gravitational pull (force) on every other mass. The size of the pull depends on the size of the mass. Gravity is what holds the planets in orbit around the Sun.

Gravity song: Remind students that this song rhymes in order to help them choose some of the missing words.

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Push, push **push** my cat,  
Gently through the trees.  
Pick up apples, one by one,  
**working** just like me.

Pull, pull, my cart  
I'll fill as I go.  
Apples, apples, won't be long  
Picking **high** and low.

Sit, sit, sit and rest,  
Underneath the tree.  
An apple falls upon my head,  
The force of **gravity**.

Push and pull, we're in the **groove**  
You'll know it when you see.  
The forces help our carts move.  
As well as you and me.

### Day 5.2 – Racing to the Earth

Have students read the investigation question and write their prediction on their worksheet before experimenting. Remind students to explain why they think their prediction would be true. (because...)

**Activity sheet answers will vary.**

**Background information:** Objects with the same shape should hit the ground at the same time. There is only one force and that is gravity pulling them toward the Earth. All things accelerate at 9.8 meters per second squared due to the pull of gravity.

Objects of a different shape will hit the ground at different times. There is more surface area on the flat paper which works against gravity. An opposite force of air pressure slows it down similar to a parachute.

### Day 5.3 investigating a Pulley

**Background information:** Gravity can work against us as it can make heavy things even harder to pick up. A pulley is a simple machine which is useful for lifting things. It reduces the effort required to raise a load. It usually consists of a wheel with a groove through which a string or rope runs. Ask students to think of place where they may have seen a pulley (e.g. crane or wishing well). The rope has a load on one end and someone or something pulling at the other end. It is easier to pull down than to lift up. Pulling down on the rope uses the force of gravity combined with the force of the pull.

Guide your student to complete the tasks and activity sheet.  
Ask the student to tell you the main steps he/she completed for the investigation before asking them to write the procedure.

When testing the pulley, make sure that the container is directly under the horizontal broom handle.

**My prediction**

I think that **Answers will vary.**

**Procedure:** How did you test your prediction?

**1** I lifted the bottle using one hand.

**2** I lifted the bottle using two hands.

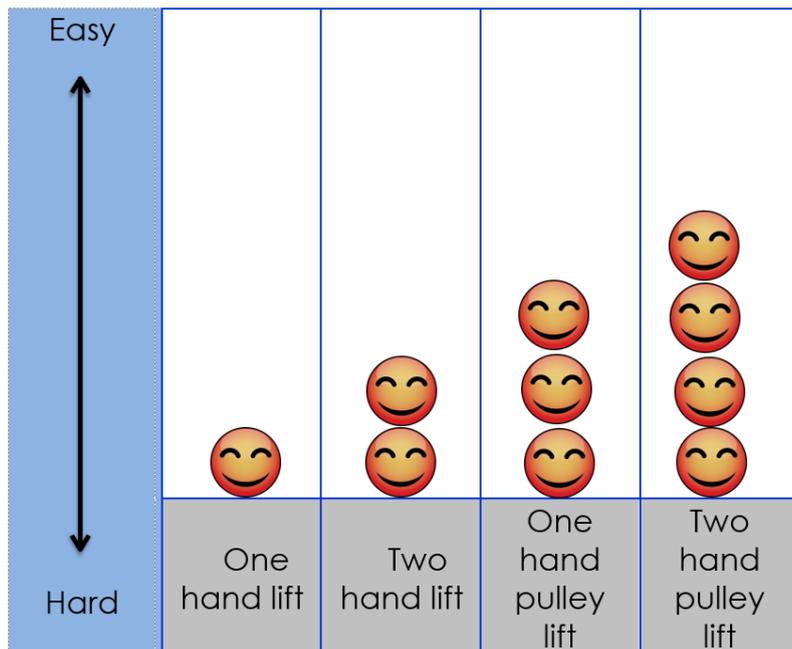
**3** I made a pulley using string and a broom handle.

**4** I used the pulley to lift the bottle by pulling on the string with one hand.

**5** I used the pulley to lift the bottle by pulling on the string with two hands.

**Scale of difficulty**

Answers will vary.



Which method of lifting was the easiest?

Pulley or no pulley? **Using the pulley**

Explain why you think it was easiest. **The pulley helped me lift by taking the weight of the bottle. It is easier to use the pulley than try to lift the bottle myself.**

## **Student and Home tutor reflections:**

Help the student read and complete the Reflection.

Please complete the Home tutor reflection and add any information to assist the teacher in understanding how your student performed in this set.

Please return the reflections with the set work.

## Overview

### Year 2: Push and Pull

#### Western Australian Curriculum

#### Year 2 Science

Content strands	
Science Understanding	
Science as a Human Endeavour	
Science Inquiry Skills	

Content Descriptions	
Science Understanding	
Biological Sciences	
Living things grow, change and have offspring similar to themselves ( <a href="#">ACSSU030</a> )	
Chemical Sciences	
Different materials can be combined for a particular purpose ( <a href="#">ACSSU031</a> )	
Earth and Space Sciences	
Earth's resources are used in a variety of ways ( <a href="#">ACSSU032</a> )	
Physical Sciences	
A push or a pull affects how an object moves or changes shape ( <a href="#">ACSSU033</a> )	
Science as a Human Endeavour	
Nature and Development of Science	
Science involves observing, asking questions about, and describing changes in, objects and events ( <a href="#">ACSHE034</a> )	
Use and Influence of Science	
People use science in their daily lives, including when caring for their environment and living things ( <a href="#">ACSHE035</a> )	

<b>Science Inquiry Skills</b>	
<b>Questioning and Predicting</b>	
Pose and respond to questions, and make predictions about familiar objects and events ( <a href="#">AC SIS037</a> )	
<b>Planning and Conducting</b>	
Participate in guided investigations to explore and answer questions ( <a href="#">AC SIS038</a> )	
Use informal measurements to collect and record observations, using digital technologies as appropriate ( <a href="#">AC SIS039</a> )	
<b>Processing and Analysing Data and Information</b>	
Use a range of methods to sort information, including drawings and provided tables and through discussion, compare observations with predictions ( <a href="#">AC SIS040</a> )	
<b>Evaluating</b>	
Compare observations with those of others ( <a href="#">AC SIS041</a> )	
<b>Communicating</b>	
Represent and communicate observations and ideas in a variety of ways ( <a href="#">AC SIS042</a> )	

### General Capabilities and Cross Curriculum Priorities

<b>General capabilities</b>	
Literacy	
Numeracy	
Information and communication technology (ICT) capability	
Critical and creative thinking	
Personal and social capability	
Ethical understanding	
Intercultural understanding	

<b>Cross-curriculum priorities</b>	
Aboriginal and Torres Strait Islander histories and cultures	
Asia and Australia's engagement with Asia	
Sustainability	

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Department of  
Education

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Revised 2020

Year 2

**PHYSICAL SCIENCE**

Push and Pull