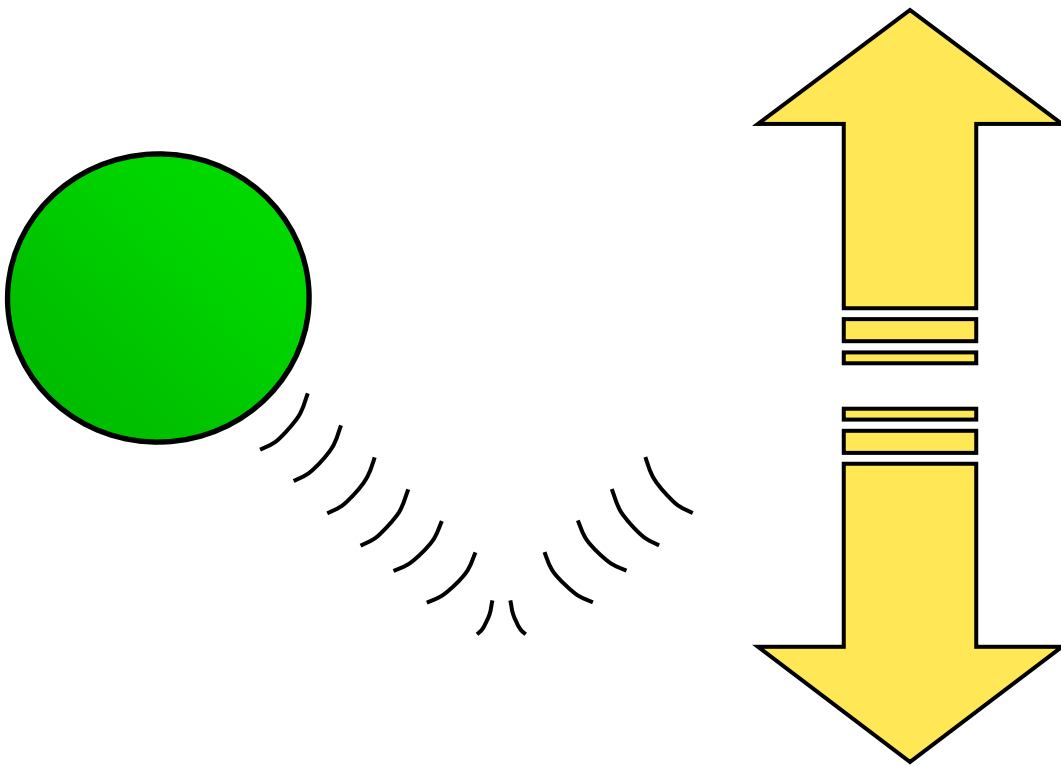


# Explore@Bristol

## Forces ▶▶ Trail

Forces make things move. Use this trail to take a trip around **Explore@Bristol**, find out how they work and see some forces in action.



Name \_\_\_\_\_ Date \_\_\_\_\_

✓ Tick box



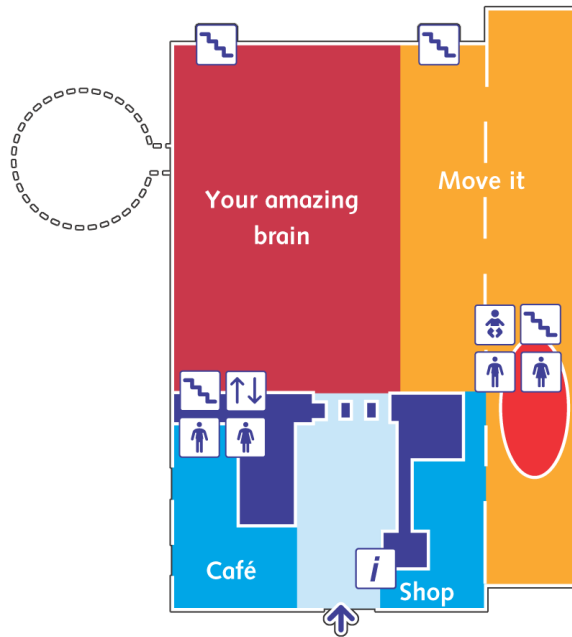
Write or Draw



Discuss

# Explore Map

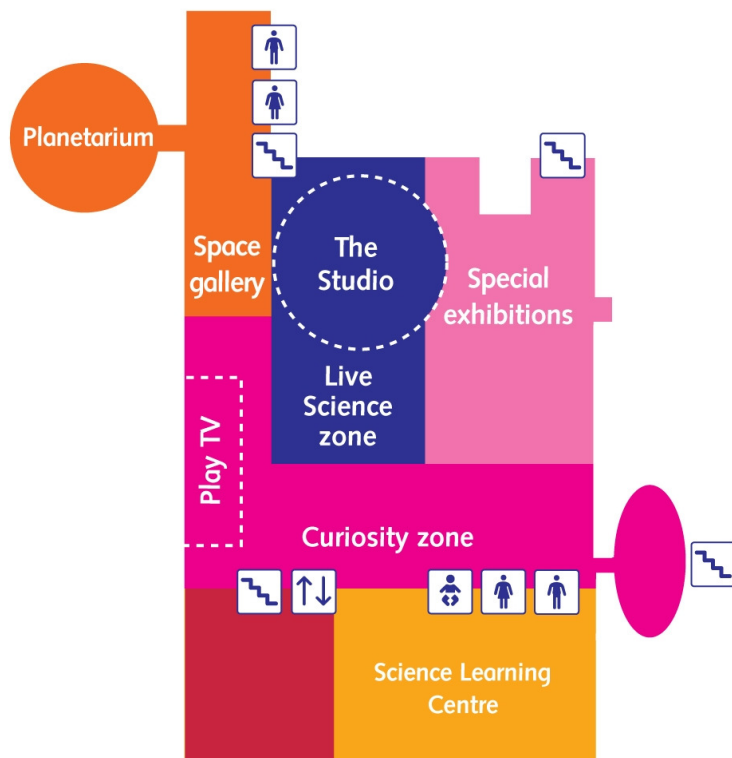
Follow the trail around the exhibitions within **Explore**.  
These are the exhibits you'll need to find on your journey.



## Ground Floor

### Move it

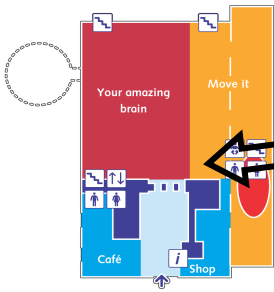
- Waterwheel
- Digger arm
- Launch it



## First Floor

### Curiosity zone

- Leaning lounge
- Dancing magnets



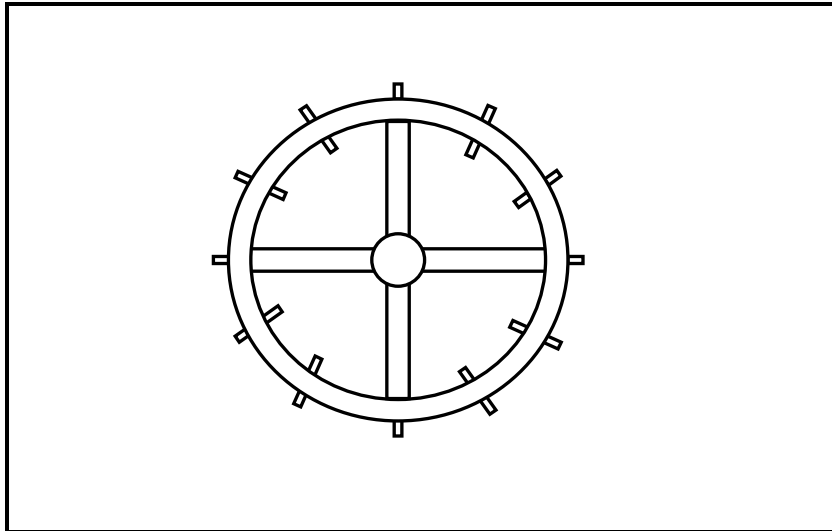
Go to **Move it**

1

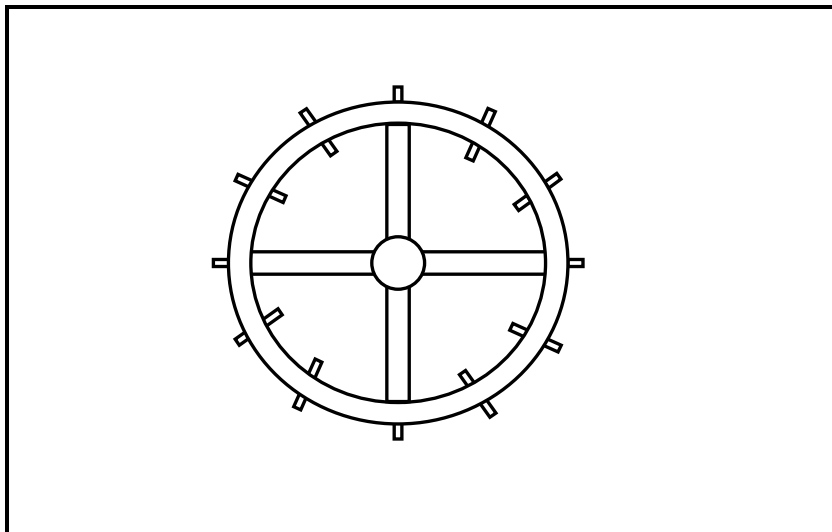
## Waterwheel

*Turn the handle to change where the water hits the wheel.*

Move the wheel to find where it spins most quickly. Finish the picture and draw the position of the water when the wheel is moving most quickly. Draw arrows to show which way the water is flowing and which way the wheel is turning.



Can you make the waterwheel spin in the opposite direction? Draw the water on this picture when the wheel is moving in the opposite direction. Draw arrows to show how it is moving.



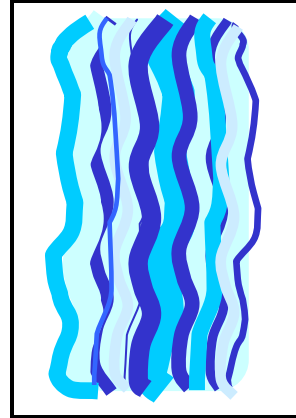


Describe what is happening. Why does the waterwheel spin?

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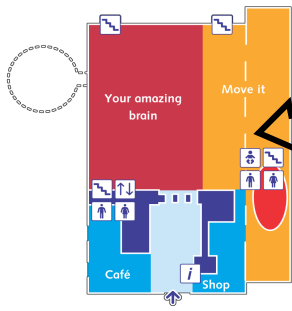
Can you name the force that makes the water fall from the small tank down into the large tank? Circle an answer.

- Friction**                      **Gravity**                      **Electricity**  
**Chemical energy**                      **Magnetism**                      **Mass**



Discuss with your group what you could do or change to make the wheel spin faster? Tick the changes you think would make it faster.

- Increase the amount of water flowing.
- Use water that is flowing faster.
- Make the waterwheel narrower.
- Decrease the amount of water flowing.
- Use water that is flowing more slowly.



Stay in **Move it**

2

## Digger arm

*Use the levers to control the digger arm.*



How many balls can you pick up with the digger arm?



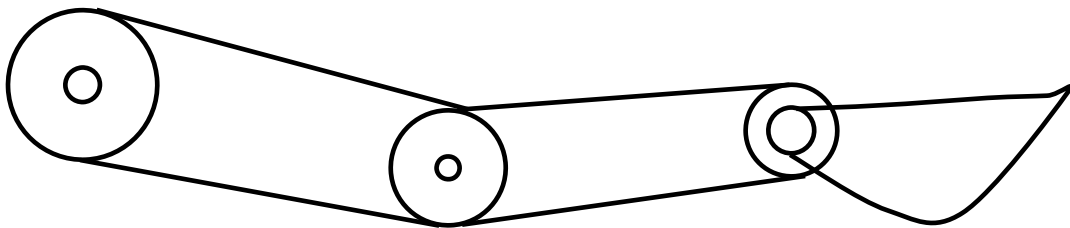
How many joints does the digger arm have?



How many movable sections is it made from?

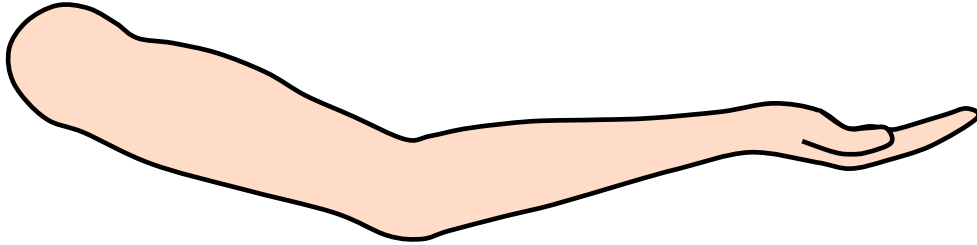


Draw arrows to show the directions the different sections of the digger arm can move.





Think about how your own arms compare to the digger arm. Draw arrows to show which directions your arm can move.



What differences can you think of between the way your human arm moves and the way a digger arm moves?

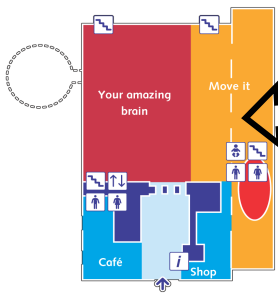
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Which type of arm do you think is best? List the advantages of both types of arm.

Advantages of digger arm	Advantages of human arm



# Go to Launch it

## 5

### Launch it

*Choose a rocket. Remove any wings that are attached to your rocket.*

Wind your rocket up to the ceiling and watch it drop.

What is the name of the force that is pulling the rockets down to the ground?

**Gravity**

**Electricity**

**Friction**

**Magnetism**

**Mass**

**Chemical energy**

Add some wings to the rocket body and launch it again.

What changes do you notice in how it flies? Tick any boxes.

*Hint: scientists sometimes repeat their experiments*

it is faster

it is slower

it spins around

it drops in a straight line

Now add a parachute to your rocket. How does it fly compared to without a parachute?

it is faster

it is slower

it spins around

it drops in a straight line



Why does the parachute slow down the flight of the rocket?  
Discuss this with your group.

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Imagine you could make your own rockets to use with Launch it. Design a rocket that will be fast and then design a rocket that will be slow.

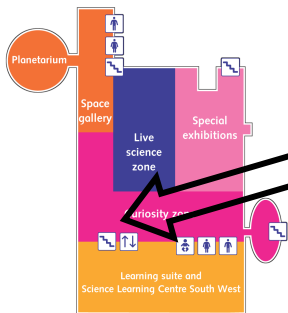
Talk to others in your group about your ideas.



Design of a fast rocket	Design of a slow rocket



I think this rocket will be fast because _____ _____	I think this rocket will be slow because _____ _____
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Go upstairs to **Curiosity zone**

3

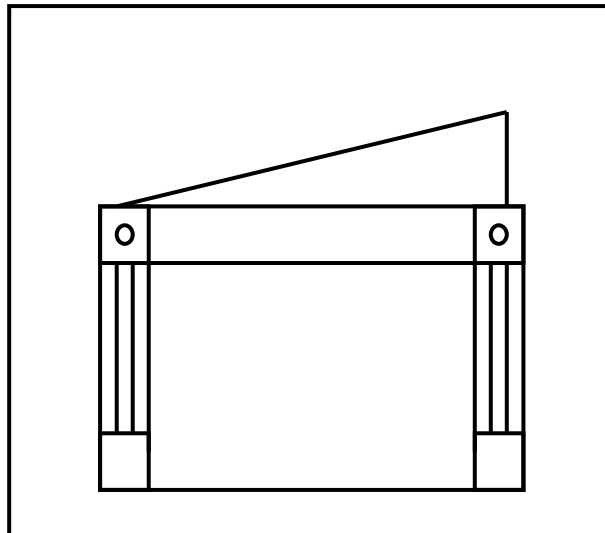
## Leaning lounge

*Walk into the Leaning lounge. You might feel a bit strange when you are in this room!*



Go to the fireplace. Try rolling the ball up the slope. Where does it stop?

Add a drawing of the ball to the diagram below showing where the ball stops.



Why does a ball normally roll to the bottom of a slope?

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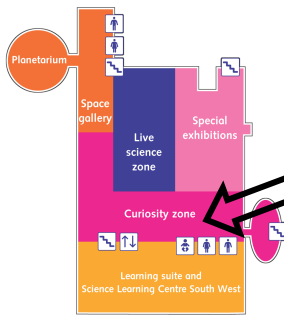
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Discuss what is special about the Leaning lounge to make this trick work.

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Stay in **Curiosity zone**

4

## Dancing magnets

*Gently spin one magnet and watch what happens to other magnets around it.*

Each magnet has a north pole at one end and a south pole at the other end.

Look at the yellow and black spots to help you.

Choose two magnets next to each other. Spin the magnets until two opposite poles, a black and a yellow, are facing each other. What force can you feel between the magnets?



They are pushing apart – repulsion

They are pulling together – attraction

Now spin the magnets so that two poles that are the same are facing each other. What force can you feel?



They are pushing apart – repulsion

They are pulling together - attraction

Which will make more magnets spin: starting at the top of the tower, starting in the middle, or starting at the bottom of the tower?



Make a prediction. Circle one:    Top    Middle    Bottom

Test your prediction and complete the sentence below.



To make the greatest number of magnets spin it is best to spin a magnet from the \_\_\_\_\_ of the tower.