



# Race!

## LINKED CHALLENGE

To construct a balloon-powered vehicle

### ACTIVITY OVERVIEW

Give each child a balloon and ask them to blow it up and hold the end tight. Challenge them to release their balloons and then repeat, before explaining to their partner what they think is happening and why. Draw out the key facts around Newton's 3rd Law of motion (below) and encourage children to look for links between how much air they blow into the balloon and how far it travels. How does the air come out of the balloon? In which direction does the balloon travel?

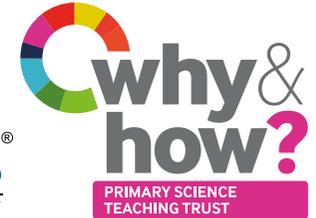
**Set the children a challenge:** Working in pairs, they are to design and build a balloon car that they will then enter into a race. They will do this using recycled materials to build a base to which they will attach their wheels and axles (skewers and cotton reels/bottle tops work particularly well for this). The cars will be powered by a balloon, using straws to attach it to the car. The 'racecourse' will be clearly marked on the floor and children have 4 practice runs to make sure their car passes the finish line.

After the children explore and create their designs, run a race where all cars race at the same time. Which car came first? Why did it win? What was it about its structure that made it successful? If there is time, encourage children to make minor adjustments to their cars (set a 5 minute time limit) and re-run the race. Did the same car win? Why/why not?

**Extension activity:** use the linked video to encourage children to recognise how forces power a rocket.

### KEY FACTS/SCIENCE

When the air fills a balloon, it causes the latex to stretch and this *stores energy* in the balloon (*elastic potential energy*). When the balloon neck is allowed to open, this energy is 'released' - it is changed into *kinetic (moving) energy*, creating a force to push the air out of the balloon in one direction and causing the balloon itself to move in the opposite direction. The force from the air moving backwards creates *thrust* on the balloon. The scientist Sir Isaac Newton realised that whenever there is a force in one direction, known as an *action*, an equal and opposite force is also created: a *reaction*. This is known as Newton's 3rd Law of motion. You can show the children this: ask someone to sit on a wheeled chair, facing a solid wall. Have them push against the wall (the force is towards the wall). Everyone will see that this force against the wall (action) causes the chair to move backwards away from the wall (reaction). Reaction force (thrust) is used to drive our balloon cars forward.



### RESOURCES

Paper straws	Bottle tops
Recycled materials: plastic bottles, trays, tubs, paper, card etc.	Cotton reels
Wooden barbecue skewers/cocktail sticks	Scissors
	Sticky-tape
	Balloons

### Health & Safety:

You should consider possible latex allergies before using balloons.

### QUESTIONS/FURTHER LEARNING

- How does a balloon car work?
- Which direction does it travel in?
- Are there any important features of a balloon car that will make it travel more quickly?
- Do any materials work better for building a balloon car than others?
- What would happen if you added more balloons to your car?

Online supporting video:

<https://tinyurl.com/wyehsek>

