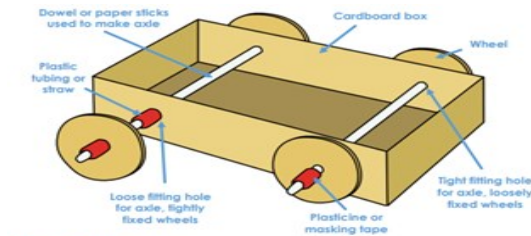




THE DESIGN CHALLENGE

Can you design and make a racer using recycled materials?

Axles and wheels



Types of wheels



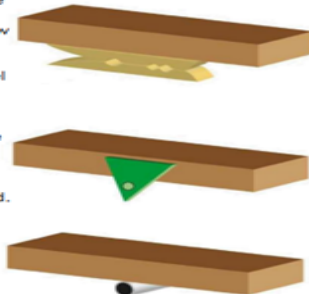
Ways of attaching axles

Ways to hold moving axles

Use **pairs of clothes pegs** glued with PVA to the underside of a box. Check the peg holes are large enough to allow axles to move freely. Make sure they are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.

Use **card triangles** with holes for the axle. Check the holes are large enough to allow the axle to move freely. Make sure opposite triangles are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.

Use **large paper/plastic straws** fixed with masking tape to the underside of a box. Check straws are positioned carefully so the vehicle will move in a straight line when the wheel and axle mechanisms are added. Make sure the straw hole is large enough to allow the axle to move freely. The wheels must be fixed tightly to the axle.



YouTube- Wheels and axles

The science behind wheels and axles



Bitesize- Rubbish and recycling

Further exploration of the issue with text and videos

Glossary

axle	A rod that goes right through the very centre of a wheel to help it move and stay in place
wheel	A circular component that rotates on an axle
rotating	To circle around a centre point.
mechanism	The parts by which a machine operates
recycled	Making rubbish into something new
reclaimed	To recover and reuse materials
sustainable	The idea that humans must interact with the environment in a way that ensures there will be enough resources left for future generations



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Computing

Can you program a robot to move through a maze?

Meet Dash



Dash

Drive - Dash can *drive forward*, *backward*, *turn left* (spin), and *turn right* (spin). There are two wheels beneath the left and right side of Dash's body. You can steer Dash by changing the speed and/or direction of either wheel.

Head Motion - Dash can look up (25 degrees), down (10 degrees), left (120 degrees), or right (120 degrees).

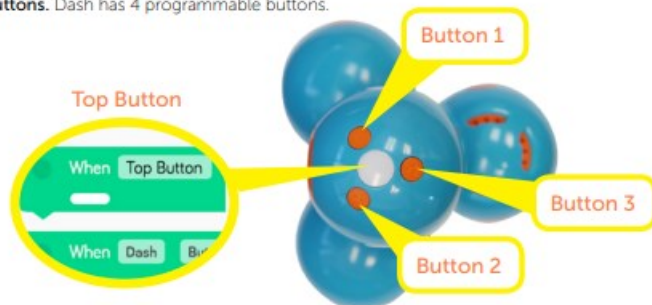
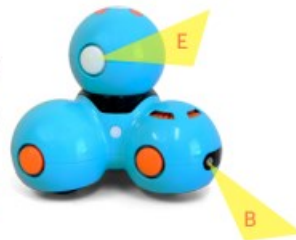
Lights - There are 12 LEDs in Dash's eye. In Dash's ears (E) and chest (C), there are RGB LEDs. In Dash's tail, there are 2 red LEDs.

Sounds - Includes a variety of pre-programmed sounds!

Microphone - Dash has 3 microphones, allowing Dash to *hear claps* and identify the *direction of your voice*.

Distance sensors - Dash 2 distance sensors in front (F) and 1 in back (B), allowing Dash to detect *obstacles in front* and *objects behind* with infrared lights.

Buttons. Dash has 4 programmable buttons.



YouTube- Dash controls

How to use the Wonder app to control Dash



BBC Bitesize

What is debugging?



Glossary

function	a "chunk" of code that you can use over and over again
coding	The process of writing a computer program
Debugging	The process of identifying and removing errors from computer hardware or software.
execute	The process by which a computer or virtual machine reads and acts on instructions
sequence	the name given to the specific order in which instructions are carried out in an algorithm
loops	A series of instructions that are continually repeated.
algorithm	A process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.



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