


Key Vocabulary	John Boyd Dunlop
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Material	The matter from which a thing is or can be made.
Properties	A feature of an object, such as elastic, flexible, waterproof, rigid.
Absorbent	Able to soak up liquid easily.
Waterproof	Materials that do not let water through.
Bend	A curve or angle put into an object by shaping or applying force to it.
Rigid	Materials that are stiff and hard to bend.
Brittle	Hard but likely to break easily.
Change	Made or becoming different.
Flexible	Materials that can bend easily.
Concrete	A building material made from a mixture of broken stone or gravel, sand, cement and water. Concrete can be spread or poured and looks like stone when it is dry.
Dull	Lacking in brightness, vividness or sheen.
Elastic	Able to stretch and then return back to their original shape.
Fabric	Cloth produced by weaving or knitting textile fibres.
Glass	A hard, brittle substance (usually transparent or translucent) made by fusing sand with soda lime and cooling rapidly.
Hard	Solid, firm and rigid; not easily broken, bent or pierced.
Made materials	Materials that come from natural materials but have been changed
Natural materials	Materials that come from animals, plants or rocks.
Metal	A shiny material which transfers (conducts) heat well and is usually a solid (at room temperature).
Opaque	Not able to see through (not transparent).
Transparent	A material allowing light to pass through so that objects behind can be seen clearly.
Paper	Material manufactured in thin sheets from the pulp of wood or other fibrous substances.
Recycle	To make use of an object or material multiple times.
Rough	An uneven or irregular surface; not smooth or level.
Texture	The feel, appearance or consistency of a surface or a substance
John Boyd Dunlop	A Scottish veterinary surgeon who developed the design of pneumatic tyres commonly used on many motorised vehicles today.
Pneumatic	Containing or operated by air or gas under pressure.




John Boyd Dunlop was a Scottish veterinary surgeon, born 1840. In 1867 (when he was 27) he moved to Belfast.

20 years after moving to Belfast, John invented a new design for pneumatic tyres to go on his son's tricycle wheels.


Lots of people started making tyres in factories in 1890, just in time for the development of motor vehicles.

The features of pneumatic tyres are a tube filled with air on the inside. Covering this tube is a layer of fabric. Over this layer of fabric is a layer of rubber. This is the part where tread patterns are added.

Tractor tyres have enormous tread, so they can move easier on slippery mud.



How the tyres look depends on what they are needed for. Formula One racing have specially designed tyres for different temperatures and conditions.



Pneumatic tyre, they can all be broken by a puncture. A puncture is a hole in the tyre letting the air from the inside out. These tyres do not work properly with punctures.

Some vehicles using pneumatic tyres today are:

- Tractors
- Lorries
- Buses
- Aeroplanes
- Bicycles
- Cars
- Formula one cars.

Made materials	Natural materials	Elastic materials	Waterproof materials	Let's think like scientists	So Silly – materials NOT suited for their purpose										
paper plastic iron bronze ceramic rubber glass	wood gold diamond coal leather cotton stone wool wax	rubber elastic bands spring	rubber plastic wax metal	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">Material</th> <th style="width: 15%;">Waterproof (✓ or X)</th> </tr> <tr><td>glass</td><td></td></tr> <tr><td>paper</td><td></td></tr> <tr><td>plastic</td><td></td></tr> <tr><td>rubber</td><td></td></tr> </table> <p>How would you find out if a material is waterproof? – What would you do?</p> <ol style="list-style-type: none"> 1 – Collect a variety of materials and list them in my results table. 2- Predict which materials I think will be waterproof 3 – Testing one material at a time, add the same number of water drops from a pipette onto the materials. 4 – Record data into results table – waterproof materials do not absorb water, non-waterproof materials will absorb the water into them. 5 – Use my results to say for certain which materials are waterproof – try to explain why they are waterproof, or how I know this. 6 – Suggest improvements or changes to my investigation, or what to investigate next. 	Material	Waterproof (✓ or X)	glass		paper		plastic		rubber		<p>A chocolate tea pot – Not suitable because tea pots need to hold hot water, and chocolate melts much lower temperatures than hot water!</p> <p>Newspaper wellies – Not suitable because wellies are used to keep our feet dry. Newspaper is absorbent, so will make our feet wet!</p> <p>Jelly chair – Not suitable because a chair needs to be rigid, but jelly is soft and too flexible. Think of your own examples of so silly materials.</p>
Material	Waterproof (✓ or X)														
glass															
paper															
plastic															
rubber															

Quiz

Which of the following is not a waterproof material?

- A. Metal
- B. Wax
- C. Paper
- D. Plastic

Which of the following was invented by John Boyd Dunlop?

- A. Tractor
- B. Racing car
- C. Pneumatic tyres
- D. Tricycle

Which of the following are all natural materials?

- A. Wool, bone, stone, metal
- B. Wool, bone, steel, plastic
- C. Wood, stone, cotton, wax
- D. Wood, stone, paper, wax

Complete this sentence: Pneumatic means...

- A. Containing or operated by air or gas under pressure
- B. an uneven or irregular surface or substance.
- C. a material that does not let water through.
- D. A material that comes from natural materials but have been changed.

Which of the following is a made material?

- A. Stone
- B. Leather
- C. Cotton
- D. glass

Which of the following is not a good material to use for a teapot?

- A. Metal
- B. Plastic
- C. Chocolate
- D. Glass

Which of the following materials **can be** flexible, elastic, waterproof and man-made?

- A. Paper
- B. Glass
- C. Fabric
- D. rubber

Which of the following is a hard, transparent, naturally made object often used in jewellery?

- A. Gold
- B. Wood
- C. Diamond
- D. Leather