Knowledge Organiser

Year: 4 Subject: Design and Technology Unit: British Inventors

Overview

In this unit the children will learn about W B Wilkinson who invented reinforced concrete. They will look at how reinforced concrete has been used to build record-breaking buildings. They will then look at waterproof fabric and the invention of the mackintosh. They will reflect how inventions change people's lives and how they continue to be modified and improved as new technologies are invented.

What should I already know?

Design

- Can identify the features of existing products and use this information as a stimulus for their own design.
- Can create a detailed plan with relevant drawing and labels, including the materials they will use.
- Can identify the sequence of steps needed to make an item.

Make

- Can join different materials together – stitching, taping, gluing
- Can follow their design to make a product.

Working with tools

- Can measure in cm, cut and assemble accurately
- Can use a range of equipment and tools with increased accuracy and safety

Evaluate

- Can investigate and analyse a range of existing products as a source of ideas.
- Can explain what has gone well and how their product could be improved.
- Can identify problems faced and talk through how they were overcome.
- Can assess how well their product works in relation to the design criteria and the intended purpose:

Technical Knowledge

- A wide base makes free standing objects more stable.
- Paper and card can be strengthened by: -
  - Rolling to create poles. Short poles are stronger than long poles
  - Layering and gluing to the required thickness
  - Twisting into tight folds
- Folding repeatedly to make a strip.

What will I know by the end of the unit?

Vocabulary:

Invention	Something new that someone has designed/made
Concrete 	A hardened mixture of cement, sand, and water with gravel or broken stone used in construction.
Reinforce	Makes something stronger
Weakest	Not able to stand much strain
Strongest	Able to stand much force/strain.
Mackintosh	A raincoat made of a waterproof, rubberized cloth 
Waterproof	Not letting water through 
Absorbent	Able to draw in or soak up 
Light-weight	Having less than the usual or expected weight

Design

- Can talk about ways in which a material can be reinforced (e.g., by adding rods to it)
- Can identify the features of a waterproof coat that make it suitable for its purpose -
  - lightweight,
  - waterproof,
  - flexible etc.
- Are able to create design criteria and use these to evaluate existing products
- Can investigate ways of making paper more water resistant by adding something to paper: - wax crayons, oil pastels, sticky-back plastic, hair spray, poly[1]pockets, sellotape etc.
- Can design: -
  - a boat that is water resistant and floats.
  - a new creation intended to solve an everyday problem
- To know that invention and design have affected how people relate to one another and how cultures have expanded or ended. Technology impacts on how cities grow, where people live, and who owns what. Technologies are the reason that our lives are more comfortable than in the past, people are more social and that teaching and learning is changing.

Make

- Can combine materials to add water resistance to paper
- Can make a waterproof boat that: -
  - Floats
  - Is water resistant

Working with tools

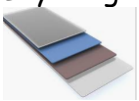
- Can measure in cm, cut and assemble accurately
- Can use equipment and tools with increased accuracy and safety e.g.: - scissors, wax crayons, oil pastels, sticky-back plastic, hair spray, polypockets, sellotape.

Evaluate

- Can devise a set of criteria for water resistant paper e.g., waterproof, flexible, foldable
- Can explain what has gone well and how their product could be improved.
- Can identify problems faced and talk through how they were overcome.
- Can assess how well their product works in relation to the design criteria and the intended purpose:
  - Does your boat float?
  - Is it water resistant?

Technical Knowledge

- Know that concrete is a very versatile material for building with. It is strong and can be shaped and moulded into lots of different shapes.
- Know that concrete has been used for thousands of years. The Roman Empire used it to make the Colosseum.
- Know that concrete can be in bricks, slabs or in special designs to make it stronger.

Comfortable	Feels good to wear
Flexible Modroc	Easily bent without breaking. Plaster impregnated bandage, for making sculptures 
Layering 	To arrange one thickness of something over another
Impact	Have a strong effect on something
Significant	Something large enough to be noticed
Influential	The power to change or affect someone or something
Innovative	A new idea, method, or device
Potential	An ability or quality that can lead to success or excellence
Success	Satisfactory completion of something

- W B Wilkinson noticed that concrete would crack under heavy pressure, weight or tension. In 1853 he invented reinforced concrete
- Know that reinforce means to make something stronger.
- Know that things can be reinforced by adding materials to support them, or strengthen them or by layering materials to be stronger
- Know that reinforced concrete has steel rods placed into the concrete before it dries.
- Know that reinforced concrete meant that new, bigger and more imaginative buildings could be built e.g., Sydney Opera House, Burj Khalifa, Millau Viaduct. Main Act
- Charles Macintosh invented waterproof fabric by layering fabric with natural rubber. This meant material was flexible enough to of, but made sure it was no longer absorbent
- Know some other British designers and their inventions:
    - James Dewar (vacuum flask),
    - Christopher Cockerell (hovercraft),
    - John Baird (television), Keith Campbell and Ian Wilmut (cloning Dolly the sheep).