

Preston Primary School Knowledge Organiser

Topic: Design and Technology

Term: Spring 2

Year: Unit 4

Duration: 5 Weeks

Electrical Systems and IT – To use computer-aided design to solve a practical, environmental problem [TinkerCAD – Flood Defences in our local area].

The Powerful Knowledge we will take away from this Learning Enquiry (what we will be learning):

- I can explain what computer-aided design is and its purpose.
- I can explore environmental or practical problems in our local area, and the UK.
- I can learn about existing inventors and inventions, which have been used to solve practical and environmental problems.
- I can create a design criteria, which relates to creating a solution for an environmental or practical problem.
- I can explore and investigate how to use computer-aided design.
- I can design, make, and evaluate a creative solution to a real-world problem.
- I can design, make, and evaluate a 2D or 3D model using computer-aided design.
- I can make a physical prototype based on my computer-aided design.
- I can evaluate my 2D/3D design and/or prototype against my design criteria.
- I can continuously critically evaluate the quality of design, manufacture, and fitness for purpose of my product during the design and make process and act upon this.

Our Key Vocabulary:

Word	Meaning
Design	Design is developing, planning, and communicating your ideas about what you intend to make.
Make	To work with tools, equipment, materials, ingredients, and components to make quality products and dishes.
Evaluate	To reflect on ideas and products against the design criteria.
Design Criteria	The specific and concise requirements that a product must achieve to be successful. This is used to evaluate a product.
Computer-Aided Design	Computer-aided design (CAD) is when a computer system is used to design a new product or to make changes to an existing one. The designs can be made into be 2D or 3D and they help the designer get an idea of what their finish product will look like when it is made. It helps designers see how their products would work in the real world.
Prototype	A model of a product.
Flood Defences	A system that is designed and made to reduce, or prevent, damage caused by flood water.
Environmental Issue	Where human activity and choices have a negative impact on Earth and can lead to issues such as climate change and global warming, which can then also lead to rising sea levels and then flooding.
2D	A two-dimensional or flat shape. They have two ways they can be measured – length and width.
3D	A three-dimensional or solid shape. They have three ways they can be measured – length, width, and depth.
Coastal Flooding	Coastal flooding usually happens during a storm in the UK. It is caused by storm surges and large waves moving towards the drier and usually low-level land. These surges travel overland, cause coastal areas to be flooded and can devastate the impacted areas.

What I already know:

Previously, the children would have learnt about the following bullet points. Have a discussion with your child about the following bullet points and what they could mean.

- Last year, the children who are currently in Year 5, designed and made lighthouses that were fitted with an electrical circuit.
- All children have learned to create electrical circuits in Science, using wires, batteries, bulbs, and other materials.
- All children in Unit 4 are confident with using IT (iPads and other technology), for Computing, where they also design, make and evaluate an outcome on an app or website.

What is computer-aided design?

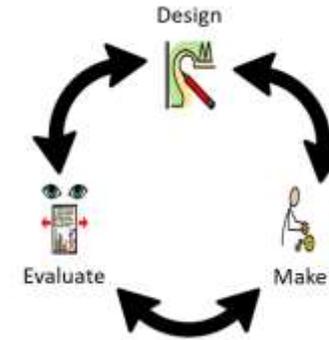
Computer aided design (CAD) is the use of computer software to design new products in 3D. This enables businesses, inventors or designers to visualise new designs in a variety of materials and send images around the world for collaboration and discussion. Once production is finalised, these designs can then be made with real materials.

What are the advantages and disadvantages of CAD?

Advantages of CAD	Disadvantages of CAD
Ideas can be drawn and developed quickly	Expensive to set up
Designs can be viewed from all angles and with a range of materials	Needs a skilled workforce
Some testing and consumer feedback can be done before costly production takes place	Difficult to keep up with constantly changing and improving technology
It becomes easier to design and test a range of ideas	Computers can fail

The Continuous Cycle of Design, Make and Evaluate in Design and Technology:

The children will continue to revisit the Design, Make and Evaluate continuous cycle of Design and Technology. This cycle demonstrates that when we are designing or making a product, we must constantly evaluate and adapt our design to improve its success against the design criteria. Children will also evaluate their product after they have made it; they will evaluate what challenges they faced, what they would improve next time and how they have met the design criteria. This encourages children to be reflective learners and critical thinkers.



What are the impacts of flooding in the UK?

- Economic**
 - 1) Roads are closed.
 - 2) Transport is blocked.
 - 3) Hard for people to get to work or travel.
 - 4) Insurance in increases (money to replace items).
- Environmental**
 - 5) Businesses can stop for a while.
 - 6) Soil becomes full of water and infertile.
 - 7) Water pollution (dirty water).
 - 8) Habitats can be destroyed.
- Social**
 - 9) Cars and houses can get washed away.
 - 10) People can become homeless.
 - 11) Loss of life.
 - 12) People can become injured.