INVENTIONS AND INNOVATIONS OF THE D-DAY LANDINGS

Context

- History — Commemoration of the D-Day landings recognising the logistical difficulties and solutions;
- Geography — The location and terrain of the Normandy beaches;
- Design Technology — Problem solving and design;
- Science — Storage and use of energy.

Objectives

- Understanding the connections between local, regional, national and international history; between cultural, economic, military, political, religious and social history;
- Use maps, atlases, globes and digital/computer mapping to locate countries and describe features;
- Research, design, make and evaluate mechanisms;
- Recognising that energy can be stored and impart a force.

Input

Supported by a PowerPoint presentation of images.

The invasion of Normandy in June 1944 presented lots of difficulties which needed to be overcome. Sailing ships filled with thousands of soldiers across a temperamental sea, landing them on a beach instead of a port, along with heavy weapons, machinery and equipment, and having to do that quickly whilst under fire from enemy troops, created massive problems. Situations like these led to great efforts being put into finding solutions to problems, which also aided the development of scientific knowledge and technological understanding. Many clever and often strange solutions were developed by ingenious people.

Thirty years earlier, during the First World War, the British Army tried to find ways of attacking the enemy across land which was covered in great big ditches, called trenches, and craters made by bombs. The tank was invented to solve this problem. It was a vehicle which was armour plated, so the people inside were protected, and it was built in such a way that it was able to drive almost anywhere.

Tasks: Look at pictures of First World War Tanks. Look at how they were similar and different to the tanks used in the Second World War and today.

https://www.iwm.org.uk/history/how-britain-invented-the-tank-in-the-first-world-war

Make a model of a tank using a cotton bobbin, elastic band, piece of candle and 2 cocktail sticks. (Instructions included).

During the Second World War the use of tanks was developed, and many of the inventions used in the D-Day landings were solutions to either overcome the problems of getting tanks on to the beaches and into battle, battle in the specific circumstances set up by the landings on the Normandy beaches, or to use tanks to make things possible for other equipment.

Many of these innovations were called **Hobart's Funnies** because they were developed by the **Royal Engineers** under the commander of **Major General Percy Hobart.**

They included tanks that were modified to all sorts of jobs such as:

- 'Swim';
- Lay tracks for other vehicles to drive on (**Carpet layer)**;
- Drop into trenches and create a platform for other vehicles to drive over (**ARK)**;
- Safely explode enemy mines (**Crab Flail)**.

Other inventions included:

Mulberry Harbours, floating platforms that could be linked together to create a port – once the beachhead had been secured a big one was created at **Arromanche-les-Bains** where ships could be unloaded and vehicles drive on and off.
Pluto, a machine to lay pipeline on the sea bed.
Landing Craft, specially designed boats which opened at the front to unload men and machines.
Horsa Gliders, used for delivering heavy equipment.

All of these pieces of equipment are illustrated in the PowerPoint and can be further researched using the copyright reference on The Imperial war Museum website: https://www.iwm.org.uk

Task: Find out more about these machines.

Wartime inventions often lead to new technology being used for other things later on. You might like to research how the exploration of space in the 1950's, 60's and 70's was built on technology developed by German weapons scientists during the war.

Task: Discuss how some of the D-Day inventions, and other wartime developments e.g. RADAR, could be used for other things after the war.

You might think about the construction industry, transport, bridge building, communications, world travel, exploration.

MAIN ACTIVITIES

Please select activities from these ideas. It might be helpful to start with number 1, perhaps as a teacher demonstration before moving on to one or more of the others.

1. **Cotton Bobbin Tank –** following the video instructions: https://www.youtube.com/watch?v=k8yZwrEaXiw

   Perhaps simply use this as a teacher demonstration, as an opportunity to discuss forces and energy storage. The wound elastic stores energy. Releasing this energy transfers movement into the mechanism making it move. This principle can be used in mechanisms to move propellers or wind axles: See Activity 4.

2. **Create a tank body-** Design a simple card tank shape to sit over the cotton bobbin mechanism. Creates opportunity to discuss the weight of materials and generate a link with 3D shapes in mathematics – more able children may be able to make their own shape nets for their tank.

Included is a template for a simple box net, which you can print onto card, cut, fold and stick. This can be decorated, perhaps with gun turrets, caterpillar tracks etc. Pop it over the bobbin mechanism and it will be carried around looking like a tank.

The following link will give you printed templates for a tank body as well as several other vehicles:

https://www.pinterest.co.uk/pin/278941770646856422/

3. **Problem solving task –** Design a ramp to get the tank (or any other vehicle you like) from a boat onto the beach. This can simply be bridging any gap you like using pieces of card or art straws. You can set a range of criteria and restrictions e.g.

   i. Limiting the number of pieces e.g. 2 pieces of card, or 6 art straws;
   ii. Limiting the means of fixing e.g. – a set length of tape, or no tape but a length of cotton, or no fixing except folds in the cards;
   iii. Only using tape for specific purposes e.g. to join pieces but not to anchor OR to anchor but not join.

   You could make this more challenging by incorporating a floating platform in a water tray.

4. **Elastic propulsion –** explore elastic propulsion by making vehicles driven by elastic power. This is a 2 stage process.

   Step 1 is exploring energy storage in stretched and wound elastic – catapults, model planes etc (cheap models are available to be used as examples);

   Step 2 is to make a simple vehicle to attach a drive to.

There are many simple vehicles that can be made using junk materials. They can be a wooden frame, and flat piece of wood or a cardboard box. The important thing to remember is you need axles which allow the wheels to turn. This can be achieved quite easily by passing the axle through a plastic tube such as a pen barrel or through holes lined up in cardboard bearers. You will also need propellers and elastic bands. Many commercially available kits are available from school suppliers e.g.

https://www.ebay.co.uk/itm/Gift-Rubber-Band-Powered-Glider-Flying-Plane-Airplane-Model-DIY-Assembly-Toy-Kid/282621848113?hash=item41cd932a31:m:mfgdoueAb_XIoE8DACGjIYQ&var=581810312088

However, you will get a more creative approach if you use the equipment to generate your own vehicle designs. Another approach is for all students to make a chassis from the same design and use this as a framework for experimenting with drive systems and vehicle designs. There are lots of examples online. Simply type Elastic band propulsion into You Tube or Pinterest e.g.

https://www.youtube.com/watch?v=6wWPGABoAKM

https://www.youtube.com/watch?v=8PzKWzVUz8U

5. **What about other propulsion methods? -** Electric motors, wind powered, pressure powered (Bottle rockets using Coke and Mentos or a bicycle pump for example) all great DT/Science investigation opportunities.

   https://www.wikihow.com/Make-a-Simple-One%E2%80%90Direction-Electric-Toy-Car

   https://www.wikihow.com/Make-a-Diet-Coke-and-Mentos-Rocket