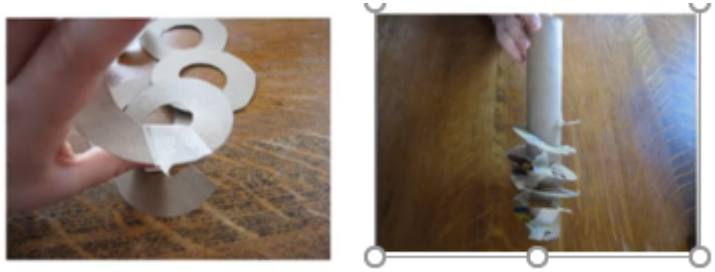
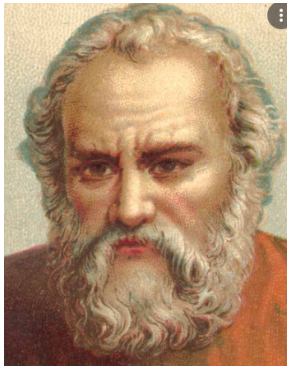
Subject: DT	Year Group: 5	Unit: Ancient Greeks
Key Question:		
First- hand experience:		

NC Objectives to be addressed:	Prior Learning required:
• Design • ♣ use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups • ♣ generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design • Make • ♣ select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately • ♣ select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities • Evaluate • ♣ investigate and analyse a range of existing products • ♣ evaluate their ideas and products against their own design criteria and consider the views of others to improve their work • ♣ understand how key events and individuals in design and technology have helped shape the world Technical knowledge • ♣ apply their understanding of how to strengthen, stiffen and reinforce more complex structures	**Yr1 – Brilliant badges** **Yr2 – Moving vehicles** **Yr4 – Shadufs**

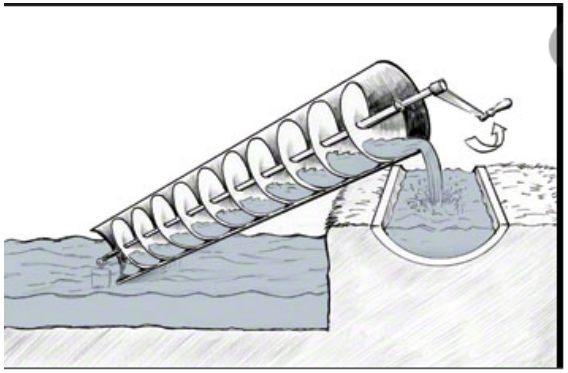
Key Vocabulary:	
Tier 2 **Tier 3 Archimedes, screw, diameter, compass, coil,**	
Sequence of learning:	
Knowledge to be taught (Declarative): ● **To know who Archimedes was and link to the jobs he would have now** https://www.bbc.co.uk/teach/class-clips-video/science-ks2-discovering-the-work-of-archimedes/z6gj382 ● **To know what the Archimedes screw was used for.** ● **To know how to make a circle using a compass.** **DESIGN BRIEF – TO DESIGN AND MAKE AN ARCHIMEDES SCREW TO TRANSPORT CEREAL FROM ONE CONTAINER TO ANOTHER.** **1 INVESTIGATE/TECHNICAL KNOWLEDGE –** show children the YouTube clips of Archimedes. https://www.bbc.co.uk/teach/class-clips-video/science-ks2-discovering-the-work-of-archimedes/z6gj382 Discuss the importance of his role in history. An image of Archimedes could be put in sketchbooks and information written around. Compare his inventions to how they are used today, (see key knowledge). Why was he known as the father of mathematics? Archimedes is considered the **father of mathematics** because of his notable inventions in **mathematics** and science. Provide the children with the design brief. Explain they are going to design and make their own Archimedes screw. The task is to be able to move the cereal from the container, up the screw to the new container. **2 DESIGN** – on a table, show children the resources they will need to make the Archimedes screw – see resources – material list.	**Skills to be developed (Procedural):**  ● **Can measure the diameter, (see key knowledge) of containers – see instructions.** ● **Can use a compass to make circles.** ● **Can cut around an outer circle and inner circle – see step 3 on instructions.**  ● **Can attach each circle together to form a coil using masking tape.**  ● **Can evaluate own screw and think about any changes which could be made to make it work better – see evaluation resource.**

Draw, using HUE, the design of the Archimedes screw, labelling the materials needed. Children design own Archimedes screw, including materials list of what they will need. Demonstrate how to use a compass to draw circles. Children practise drawing different size circles in sketchbook. **3 MAKE** – Provide children with a table of resources – see resource list in instructions. T model how to measure the diameter of the 2 containers and then how to transfer the measurements onto cardboard – making sure they are slightly smaller. Children draw around at least 6 circles, all the same size – see instruction resource step 2. Next model how to draw the smaller circle inside the original circle from the centre of the first circle – see instruction resource step 3. Children follow instruction with their circles. Ensure children have examples of circles in sketchbook and add measurements to their circles as this will demonstrate how designs are create and can be used again as the measurements are recorded. **Adding the plastic container. This next stage will need to be completed prior to the lesson by an adult as it is cutting plastic. Follow instructions step 5.** **4 MAKE** – Model how to attach the coils. Tape on end of each circle together to form a coil – see instruction resource step 4. Insert the paper towel roll and add the other coils. Make sure to make a gentle slope. Children follow instructions of adding coils. Model how to insert the screw into the plastic container. Children repeat instruction. Provide children with a larger container filled with Cheerios or something similar and allow them to test their screw to see if it works. **5 EVALUATE –** Complete the evaluation sheet – Evaluation of Archimedes Screw.	

DT designs/images Archimedes



Archimedes screw



Assessment:

Image of Archimedes with information.

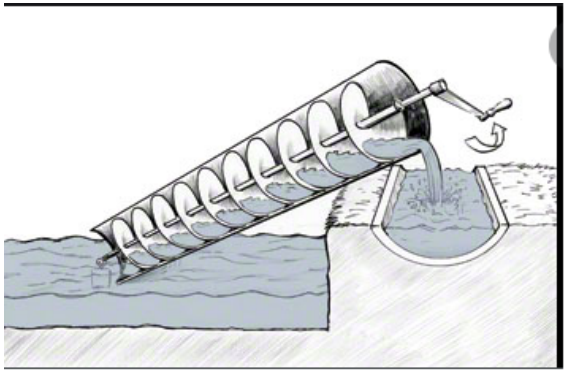
Examples of circles in sketchbook with measurements.

Archimedes screw evaluation in sketchbook.

Key Knowledge:

Also an engineer, inventor and astronomer, Archimedes was best known throughout most of history for his military innovations like his siege engines and mirrors to harness and focus the power of the sun, as well as levers, pulleys and pumps (including the famous screw pump known as Archimedes' Screw, which is still used today in some parts of the world for irrigation).

Archimedes screw, machine for raising water, allegedly **invented** by the ancient Greek scientist **Archimedes** for removing water from the hold of a large ship.



	262 BC It is believed that Archimedes discovered his water buoyancy theory and the Archimedes Screw.  **STEM – Archimedes screw** **https://www.youtube.com/watch?v=PszGCm1PqSo** **STEAM - https://www.youtube.com/watch?v=VLOCiz-HtJk** In geometry, the **diameter** of a circle is a line from one side directly to the opposite side through the centre. It can also be defined as the longest chord of a circle. The same explanations can be also used to describe the diameter in a sphere.

Let Knowledge drive your philosophy	Knowledge is empowering and provides a foundation for achieving success, reaching deeper understanding and being creative. The more children know, the more they can learn.
Consider a broad range of knowledge forms	Identify the types of knowledge that are necessary for the children to know. Declarative – What are the key facts all children should know? Procedural – What are the things that all children should be able to do (skills) Experiential – What knowledge can only be gained first hand or by experiencing or doing certain activities.
Specifiy the knowledge in detail	Identify the key knowledge that you want to include and the level of detail appropriate for their stage of learning.
Sequence and map the knowledge coherently	Sequence the knowledge content into a coherent flow. Ensure there are deliberate step by step stages to the learning.
Teach knowledge to be remembered	Ensure that knowledge and learning are regularly returned to to support the accumulation of knowledge over time and not creating over-load.
Identify prior-knowledge necessary	Ensure that where prior-knowledge is required it has been taught and is known. Build upon this carefully.
Identify next steps	Identify the most basic steps first. What might pupils struggle with? This may be vocabulary or a specific operation.
Design instructional input	For each stage of the planning identify how the content will be explained and modelled.
Design practical tasks	Plan opportunities for practice and retrieval to support pupil's fluency and understanding.
Identify core concepts and key questions	Express your curriculum through a set of big questions and fundamental concepts that underpin it.

Map the big picture, go deeper and make authentic connections	Identify the main areas of learning that will provide the structure for your knowledge, organise this into a sequence and identify areas where you can, 'Pitch it up' so that challenge is appropriate for all. Make links across subjects where appropriate.
Consider where first hand experience is necessary	Review the content of the curriculum to identify where pupils will need first-hand experiences to access the knowledge and learning more fully. This could be resources within the classroom such as cuisenaire rods, visits to specific places or practical activities.
Consider where conceptual understanding is necessary	This could be learning terminology, watching a televised version of a book before reading it etc.
Provide opportunities for deeper learning	Give pupils opportunities to explore a variety of problems within the topic ● Ask for deeper levels of analysis or more sophisticated writing ● Applying knowledge to unfamiliar scenarios ● Insist upon the correct use of terminology in both oral and written outcomes ● Select more challenging texts and support access to them ● Consider always – are children having to 'think hard'