**3D printing materials**

**Teacher notes**

**Resources:**

* Teacher powerpoint
* PLA filament/ABS filament
* Can of corn
* Empty plastic water bottle
* Youtube access

**Pre-preparation**

* Print out the student worksheets
* Print out the same model twice, once in PLA and once in ABS, using the same layer height.

**Learning Objectives**

* To understand the main materials for 3D printing and their impact on the environment.

**Starter question – 5 minutes**

* What’s the most common plastic in the world? The answer is any one from the follow;
* Polyethylene terephthalate (PET or PETE)
* High-density polyethylene (HDPE)
* Polyvinyl chloride (PVC)
* Low-density polyethylene (LDPE)
* Polypropylene (PP)
* Polystyrene (PS)

Explain to the class that even though these are the most common, unless they are recycled responsibility, they can be very harmful for the environment as they use finite resources and take years to degrade. Is disposed of unsafely these plastics can harm sea creatures and natural habitats.

**Objective 1 – To understand the main materials for 3D printing and their impact on the environment**

**Task 1 – 20 minutes**

* Explain to the class that there are two main materials that are used in 3D printing, PLA and ABS. They both look the same but have different outcomes and are used for different applications.
* Use a roll of filament as an example during the talk.
* Play the 5 minute youtube video from makerbot highlighting the differences in the materials.
* Whilst the video is playing or afterwards, students need to complete task one on the student worksheet.

**Task two**

* Talk through slides 5,6 and 7 and ensure that students fully understand the lifecycle of plastic products.
* Show the youtube link on the life cycle of a plastic bottle. Highlight how ABS plastic and standard plastics bottles both follow the same journey and that unless recycled they are very harmful to the environment.
* Explain slide 8 on cornstarch and 3D printing and emphasis the sustainable aspect of using vegetables as a replacement for oil in plastic. Refer to the can or corn.
* Show students the flow chart slide and ask them to sketch out the lifecycle of a plastic product or they could draw a block diagram or flow chart and complete question 3 on the worksheet.

**Task three**

* Prompt the class with the discussion question and initiate the consequences of stopping the production of oil-based plastics. Refer to everything around us and how the majority of objects that include plastic comes from oil-based sources. What would life be like if oil was never discovered as a use for plastics?

**5 minute Plenary**

* What does PLA stand for?
* Is it better to use PLA or ABS that has been recycled?