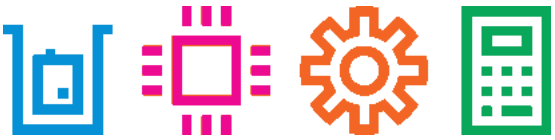
Dippy the Dinosaur 3D Printing Challenge



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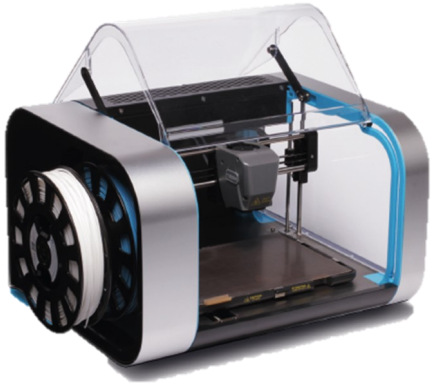
Challenge Overview

STEM Glasgow Dippy the Dinosaur 3D Printing Challenge

Dippy, the Natural History Museum's iconic Diplodocus dinosaur skeleton is coming to Glasgow!

As part of a road trip across the UK, Dippy is venturing out of London for the first time since 1905. He will visit Kelvingrove Art Gallery and Museum from 22 January—6 May 2019. Dippy is on a mission to inspire five million natural history adventures, encouraging families to explore the incredible natural history collections and biodiversity right on your doorstop in Glasgow.



Admission is FREE to the Dippy on Tour exhibition at Kelvingrove Museum.

What to do:

Pupils should design and model their own dinosaur that should be 3D Printed using the Robox 3D Printer. There are a suggested series of lessons to go along with this challenge but they do not have to be used. These include lessons on:

1. Carnivores, herbivores and omnivores
2. Sketching and design
3. Junk modelling
4. 3D CAD modelling

Celebration Event:

Your school will have the Robox 3D Printer until the 8th of March. Pupils will have until then to design, model and print their dinosaur. **Schools that complete this challenge will be invited to a celebration event at Kelvingrove Art Gallery and Museum on 30th April 2019.** Pupils will get to meet Dippy, get photographed with their model and take part in some of the Museum activities.

If you would like to come along to the celebration event then email stem@glasgow.gov.uk

What will this challenge cover?

All benchmarks and experiences and outcomes covered can be found on each task sheet.

Dippy the Dinosaur

Resources:

- Pens/pencils
- Paper

Competition Event Information

1. Discuss with pupils that they will be designing their own dinosaur to celebrate Dippy's visit to Glasgow.
2. Discuss the difference between carnivores, herbivores and omnivores.
3. Using the work sheets ask pupils to cut out the dinosaurs and sort them into the three different categories.
4. What are the common features dinosaurs have in their categories?
5. Consider the following; do they have; Tails, horns, 2/4 legs, carnivore, herbivore etc.

Experiences and Outcomes

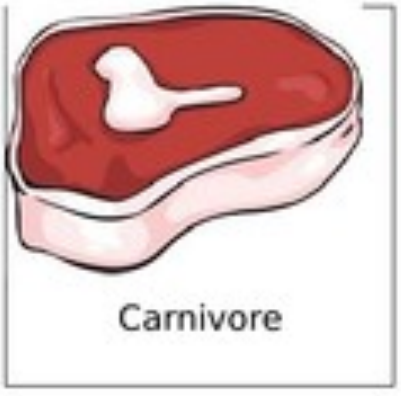
'I explore and discover different ways of representing ideas in imaginative ways.' **TCH 0-11a**

I can explore and experiment with sketching, manually or digitally to represent ideas in different learning contexts' TCH ***1-11a***

'I can use a range of graphic techniques, manually and digitally, to communicate ideas, concepts or products, experimenting with the use of shape, colour and texture to enhance my work.' ***TCH 2-11a***

I can apply a range of graphic techniques and standards when producing images using sketching, drawing and software' ***TCH 3-11a***

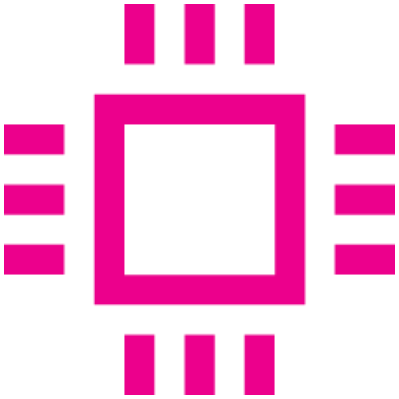
 T – Rex Eats: meat	 Stegosaurus Eats: plants	 Triceratops Eats: plants
 Spinosaurus Eats: meat	 Brachiosaurus Eats: plants	 Diplodocus Eats: plants
 Allosaurus Eats: meat	 Dilophosaurus Eats: meat	 Ankylosaurus Eats: plants



Resources:

- Pens/pencils
- Paper

Design-a-saurus



What to do:

1. Revise the different features dinosaurs had with pupils.
2. Instruct pupils that they are going to design their own dinosaur.
3. Using the features discussed in the previous lesson pupils should combine these to create a new dinosaur.
4. Pupils should sketch these design and add annotation to justify their decisions.

Experiences and Outcomes

'I explore and discover different ways of representing ideas in imaginative ways.' **TCH 0-11a**

I can explore and experiment with sketching, manually or digitally to represent ideas in different learning contexts' TCH ***1-11a***

'*I can use a range of graphic techniques, manually and digitally, to communicate ideas, concepts or products, experimenting with the use of shape, colour and texture to enhance my work.' **TCH 2-11a***

*I can apply a range of graphic techniques and standards when producing images using sketching, drawing and software' **TCH 3-11a***

3D Printing Dinosaur Challenge

Using the boxes provided below design 2 dinosaurs with any combination of features listed.

Dinosaur Features:

Carnivore

1. Meat eater
2. Sharpe teeth
3. Sharp Claws
4. Most stand on two lets to allow them to run fast

Herbivore

1. Plant eater
2. Some have long necks to reach trees
3. Mostly walk on 4 legs
4. Horns, bony frills
5. Plates, spike clubs
6. Long tails
7. Horns

Omnivores

1. Eats both meat and plants
2. Armour

Design 1

Design 2

Resources:

- Cardboard
- Tinfoil and other modelling materials
- Scissors
- Glue
- Sellotape

Construct-a-saurus Junk Modelling

What to do:

1. Revise what pupils learned about the different features dinosaurs have (covered in the first lesson).
2. Hand out any design or sketches that pupils have already made.
3. Create a junk modelling station where pupils can experiment and explore a variety of materials.
4. Tell pupils to junk model their dinosaur design with the materials.
5. Use these junk models when 3D CAD modelling the dinosaurs in TinkerCAD

Experiences and Outcomes

'I explore ways to design and construct models.' ***TCH 0-09a***

'*I explore everyday materials in the creation of pictures/models/concepts.****'*** ***TCH 0-10a***

'I can recognise a variety of materials and suggest an appropriate material for specific use.' ***TCH 1-10a***

'I can recognise basic properties and uses for a variety of materials and can discuss which ones are most suitable for a given task.' ***TCH 2-10a***

Resources:

- Design worksheet
- Research page
- Pens/pencils
- Modelling materials

TinkerCAD 3D Modelling

What to do:

1. Using the junk models pupils should use 3D modelling software (such as TinkerCAD) to create a computer model of their design.
2. Teachers can create a class code for TinkerCAD in the 'teach' tab at the top of the browser.
3. When complete pupils should export their models as .stl files and send these to the 3D printer.
4. These designs should be 3D printed and brought to the celebration event I April.

Note: A help sheet for TinkerCAD has been included.

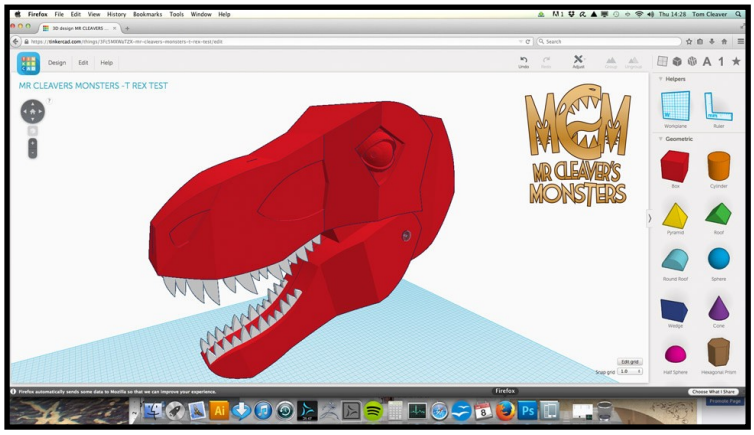
Experiences and Outcomes

'I explore ways to design and construct models.' ***TCH 0-09a***

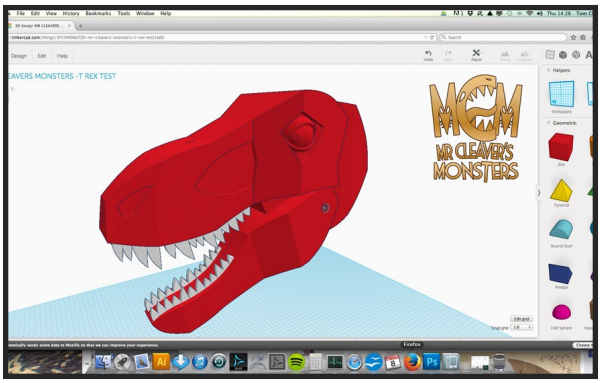
'I can design and construct models and explain my solutions.' ***TCH 1-09a***

'I can create solutions in 3D and 2D and can justify the construction/graphic methods and the design features' ***TCH 2-09a***

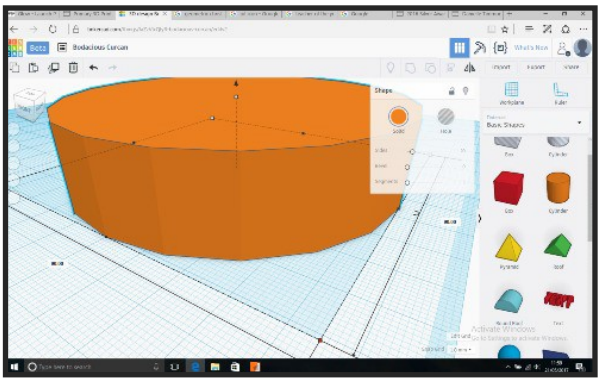
'I can create solutions in 3D and 2D and can justify the construction/graphic methods and the design features.' ***TCH 3-09a***



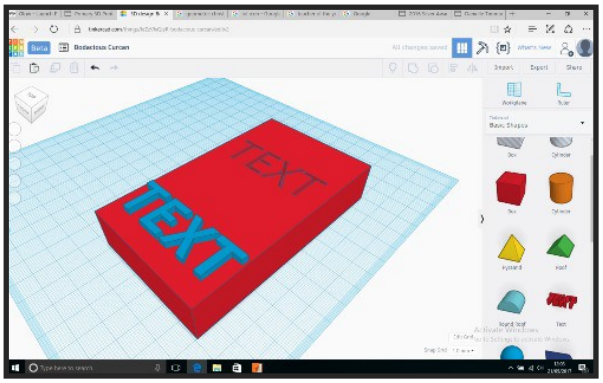
STEM Glasgow Dippy the Dinosaur 3D Printer Challenge



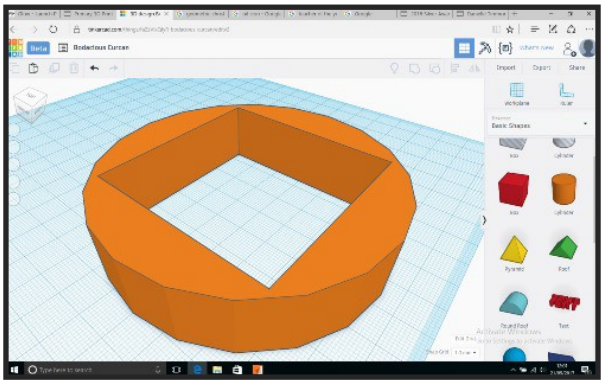
Your dinosaur should be made of a combination of different features found on a variety of dinosaurs i.e. Tails, armour, sharp teeth, horns, 2/4 legs, carnivore, herbivore etc.



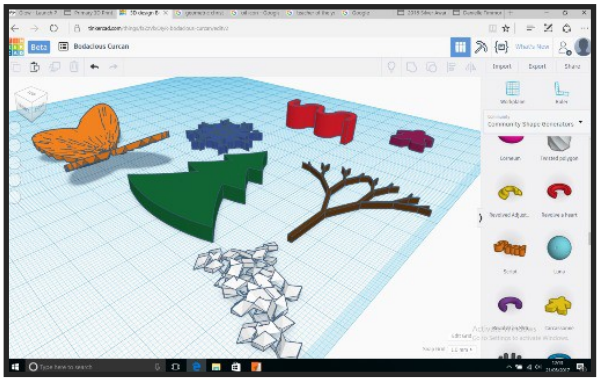
To ensure that the dinosaur is not too large for the printer the maximum height of the dinosaur should be ***90mm.*** *Designs can be smaller than this but if it exceeds this size it may not print.*



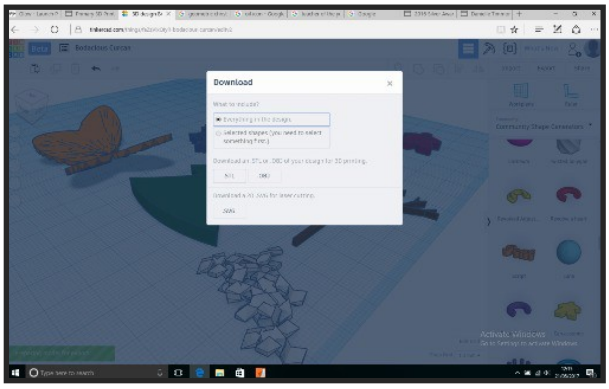
If the dinosaur is to be mounted on a plate text can be added to cut in or stick out. If this is the case it must be at least 3mm deep. It can be larger but if any smaller the printer will not manage to do this to a high quality finish.



Hollow parts of your design mean the printer has less to print and will therefore complete the job faster.



In the right hand shape panel there is an option to look at community shapes. This could help with the more complex parts of the dinosaur.



Once your finished export your dinosaur as an **STL**.

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