

3D Modeling

Estimated Time: 60 minutes

SUMMARY

In this activity, students will explore the steps necessary to model an object. Scientists and engineers use 3D models during the engineering design process to communicate the design, test the design, and improve the design before constructing full-scale objects. Models can be created by 3D printers, by hand, or digitally. Students will create a model out of any household object (or otherwise!) using clay.

WHAT YOU'LL LEARN

- Creating a 3D model during the engineering design process helps engineers refine their designs.
- Models require integration of skills such as scaling and following a plan.

Materials Used	Resources Used
<ul style="list-style-type: none"> • Modeling clay (check out homemade recipes if you do not have any on hand!) • Ruler and/or measuring tape • Pencil and paper 	<ul style="list-style-type: none"> • https://www.cadcrowd.com/blog/how-mechanical-engineers-are-using-3d-modeling/

WHAT TO DO

1. Decide on an object to model. Consider things around the house from your refrigerator to a pencil cup, or even some furry friends (your own or from photos). Begin gathering the necessary information to model it, such as its dimensions and shape- and even color! Depending on the size of the object, some appropriate scales could be 10:1, 4:1, or 3:1, meaning that 10 inches or centimeters on the actual object represent 1 unit of measure on the model.
2. It may be helpful to draw a sketch of the object in 2D before beginning to model it with your hands. This is a helpful time to evaluate which scale to use. How big is the object you are modeling? How big would you like the model to be?
3. Now it is time to begin crafting! Enjoy the opportunity to use your hands as you continuously compare the full-sized object to your clay model.
4. As the student is creating a model, it is likely that there will be moments when the student starts over a part of the model. Be patient and use it as an opportunity to relate it to the engineering design process, which is fluid and welcomes mistakes as learning opportunities!
5. When the model is complete, evaluate the process with the student. What were the steps of the process? Were there times when it was necessary to reevaluate, including the scale of the model? Why do you think builders and engineers create models first? What are the benefits of creating a model? Check out some online models and consider the same questions as well!

TIPS

- If your student would like to create a model of an object from a photo, try searching for the average size of the object or living creature.