

3D Modeling Project #17a

MY OWN HARDWARE STORE

As you saw in Section 17, spirals can be used to create all kinds of cool fasteners: nuts, bolts, screws, and more. Take a trip to your local hardware store. You will be amazed how many types there are.

You can design and 3D print screws and bolts to fasten parts together. Be your own hardware store!

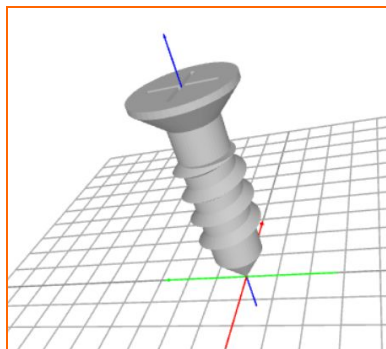
Before You Start

Go to the [Creative Suite](#), open a new [PLaSM project](#), and save it as [Project-17](#) in the folder [course-3D-projects/](#).

Project Goal

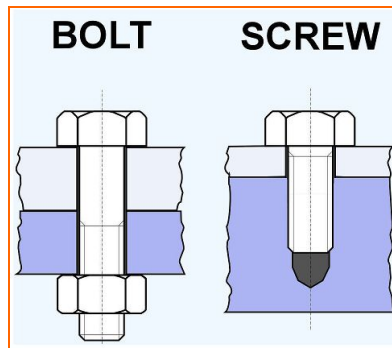
Part A: create a [screw](#) or a [bolt](#). There are many to choose from!

Part B (optional): create a set of fasteners consisting of at least [two parts](#), for example [a nut and bolt](#), or a [machine screw and threaded plate](#).



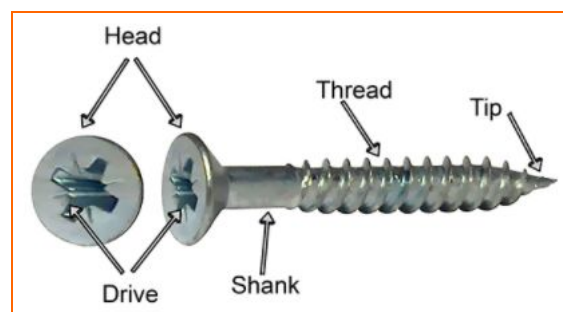
About Screws and Bolts

Bolts and screws are pretty similar. The main difference is that a bolt goes **through** material and threads into a nut, whereas a screw can be driven directly **into** a piece of material or a pre-formed opening in the material.



In either case, there are three or four parts to the screw or bolt:

1. The **head** (top). The style of head determines which tightening tool will be used. We also choose the head type based on factors such as **torque** or **security**.
2. The **shank** (top middle). This is the smooth section between the head and the thread. It may be long, short, or even absent.
3. The **thread** (bottom middle). This is the threaded section which fastens the screw or bolt to the material or nut. Threads are spirals, and can have different spacing (widely spaced for drywall, tightly spaced for machine screws).
4. The **tip** (bottom). Some screws and bolts have **pointed** or **self-tapping** tips.



Screws and bolts come in many sizes and shapes, and are made out of many types of material, including plastic, which you can print on a 3D printer!

Here are some examples:



Research fasteners on the Internet before you start. You will be amazed at how many types of screws, bolts, and other fasteners there are!

Size, Precision, and Rapid Prototyping

Each part of real, working screw or bolt has precise dimensions. Study the base shape, number of turns, and elevation when you are designing the thread spiral.

If you want to **test your model in the real world**, export the STL file and **print it on a 3D printer**. Try assembling your screw and threaded base plate, or bolt and nut.

Based on your experience, you can **go back and adjust your design** as needed.

You have now entered the world of **rapid prototyping!**

Be Patient!

Curved surfaces and spirals take time to compute.

Project Checklist

Your project will be finished when:

1. You have finished your 3D model that includes a screw or a bolt (Part A). Add a nut or receiving plate to test your fastener (optional Part B).
2. Your program is saved as Project-17 in folder course-3D-projects/.