

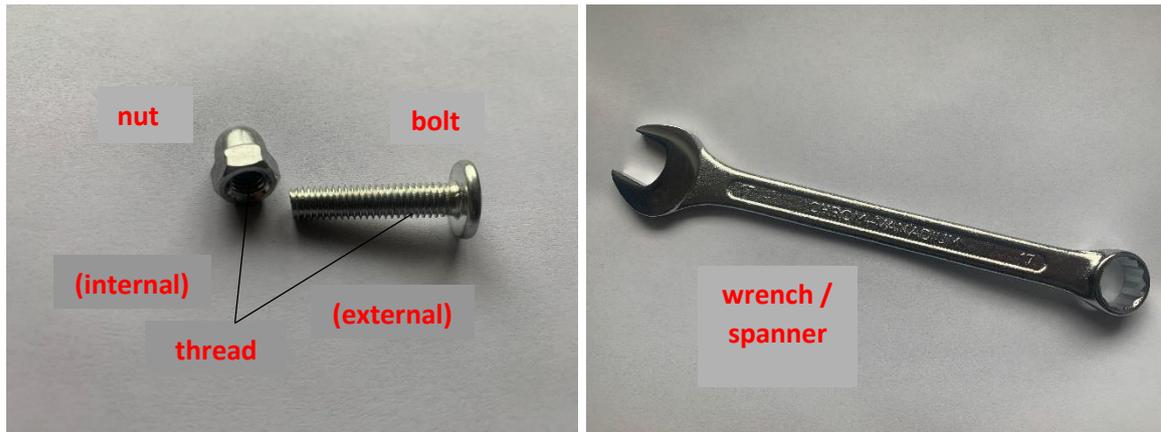
Englisch Metall

Step 3 – Explain assembly processes

Learning Job 3.1 – Check basic vocabulary on mechanical joining

Mechanical joining with bolts and nuts

In the pictures below you can see a **bolt** and a **nut**, commonly used for mechanical joints. Bolts have external **threads** – these are grooves on the outside of the shaft (or shank), running down around it. They allow a **nut**, which has an internal thread, to be screwed onto the bolt. For this turning motion you use a **wrench** (or **spanner**).



In order to **tighten** a bolt, you need to apply turning force, or **torque**. By increasing the tension (stretching force) in the shaft, you make the bolt grip tightly, and the components being **bolted together** are pressed towards one another. This pressing force is called **preload**. The right amount of preload will prevent the components from sliding apart in different directions. Too much of this sliding may cause the bolt to break as a result from **shear force** (scissoring force) which is exerted on the sides of the bolt. You can use a **torque wrench** to indicate how much torque you are applying when tightening or **loosening** a bolt. Thus, you make sure that the amount of torque applied is neither too high nor too low and the bolt is tightened enough, yet not **over-tightened**. With a torque wrench you can also check that bolted joints do not **work loose** over time.

