Achievement Course: Machinery
Recommended Ages: 10-18 years of age
Approximate Completion Time Frame: 3-6 months

Saint Eligius, pray for us!

Saint Eligius is the patron saint of mechanics. He was born near Limoges, France around 590. He was a prominent metalsmith and was the master of the mint under the king. He was very generous with his wealth by ransoming slaves, aiding the poor, building churches, a monastery, and a convent. When he was about 50 years of age, he became a priest and then a bishop. He helped many people to know God and many people converted to the Christian faith.

Objective: To develop a deeper knowledge for a variety of machines.

The main purpose of a machine is to do some kind of work. When you think of machinery, you may think of things like a car, a farm tractor, or maybe even factory machinery. These are all good examples of complex machinery. However, most of these machines can be broken into very simple machines. When all the simple machines are put together, it is possible to get a lot of work done with very little effort.

1. Requirements
    a. Explore and identify the 6 simple machines.
    b. Memorize the 6 simple machines and their use.
    c. Make a list of 3 examples of each of the 6 simple machines.
    d. Use each of the 6 simple machines in a real world setting and explain how they helped you complete your task.
    e. Pick one of the 6 simple machines, make a project with your fellow cadets or father/male guardian, and demonstrate for your troop how the use of this simple machine made the task easier.
    f. Bicycle Repair
        i. Learn how a bicycle works.
        ii. Learn how to inspect your bicycle to keep it running safe and reliably.
        iii. Learn about the basic parts of a bicycle.
        iv. Learn how to patch and change a bicycle tire.
        v. Learn how to adjust, lube and, replace a bicycle chain.
        vi. Lean how to replace a bent or broken wheel spoke.
        vii. Learn how to tune up your brakes.
    g. Metal Workmanship
        i. Learn about the safety precautions you should take when working with metal.
        ii. Learn about different types of metals and their strengths and weaknesses.
        iii. Learn what kinds of tools can be used for working with metal.
        iv. Make a machine out of scrap metal (catapult, pulley system, gravity kart, etc.).
    h. Vehicles and Engines
        i. Learn why maintenance is very important with machinery (cars, lawnmowers, bicycles, etc.).
        ii. Learn how to pick the correct oil for your engines.
        iii. Learn how to do a basic oil change and lube job on a car or other engine.
        iv. Learn the difference between gasoline, diesel, and electric vehicles.
        v. Learn the difference between a 4-Cycle and 2-Cycle internal combustion engine.
        vi. Know the basic parts of an engine and how they work. Have your father/male guardian or troop leadership test your knowledge.