

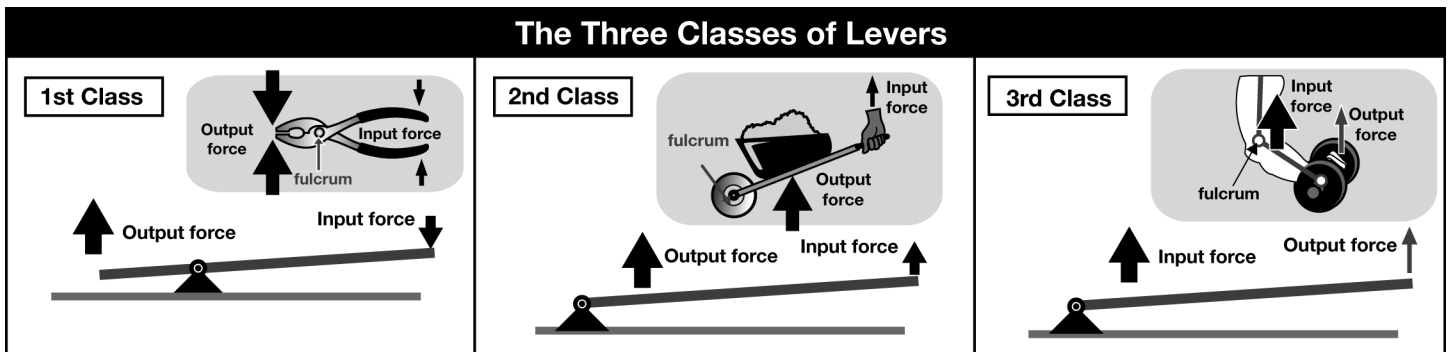


7.1 Types of Levers



A lever is a simple machine that can be used to multiply force, multiply distance, or change the direction of a force. All levers contain a stiff structure that rotates around a point called the **fulcrum**. The force applied to a lever is called the **input force**. The force applied to a load is called the **output force**.

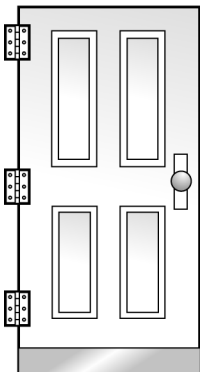
There are three types or classes of levers. The class of a lever depends on the location of the fulcrum and input and output forces. The picture below shows examples of the three classes of levers. Look at each lever carefully, noticing the location of the fulcrum, input force, and output force.



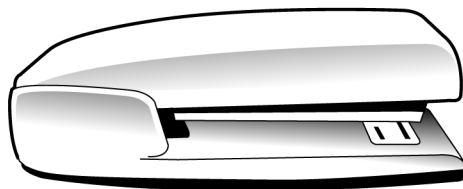
PRACTICE 1

1. In which class of lever is the output force between the fulcrum and input force?
2. In which class of lever is the fulcrum between the input force and output force?
3. In which class of lever is the fulcrum on one end and the output force on the other end?
4. Do the following for each of the levers shown below and at the top of the next page:
 - a. Label the fulcrum (F).
 - b. Label the location of the input force (I) and output force (O).
 - c. Classify the lever as first, second, or third class.

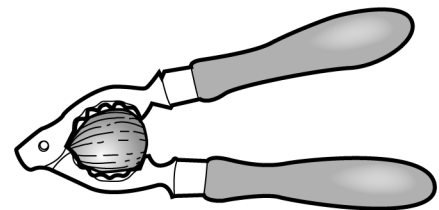
Door



Stapler

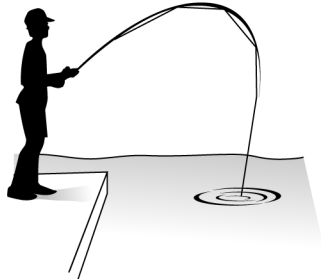


Nutcracker

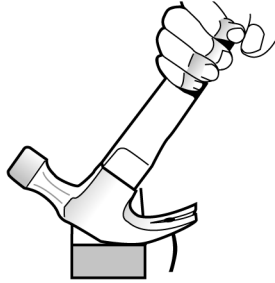




Fishing Rod



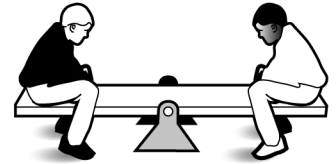
Hammer Claw



Oar

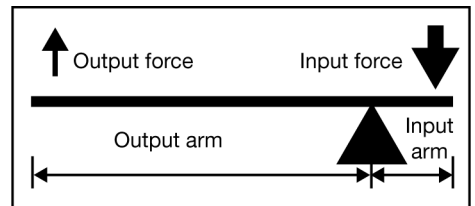
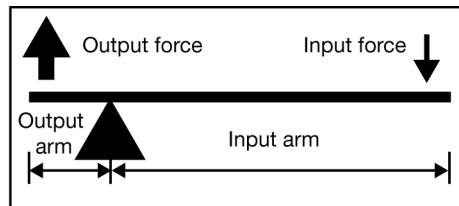
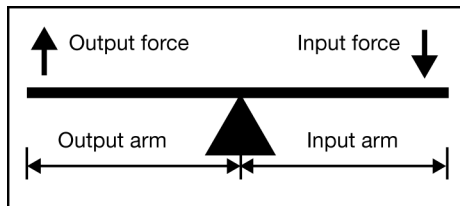


See-saw



The relationship between a lever's input force and output force depends on the length of the **input arm** and **output arm**. The input arm is the distance between the fulcrum and input force. The output arm is the distance between the fulcrum and output force.

If the input and output arms are the same length, the forces are equal. If the input arm is longer, the input force is less than the output force. If the input arm is shorter, the input force is greater than the output force.



PRACTICE 2

1. Label the input arm (IA) and output arm (OA) on each of the levers you labeled above and on the previous page.
2. In which of the levers is the input force greater than the output force?
3. In which of the levers is the output force greater than the input force?
4. In which of the levers are the input and output forces equal in strength?
5. Find two other examples of levers. Draw each lever and label the fulcrum, input force, output force, input arm, and output arm. State whether the input or output force is stronger.