Name: _____

Wheels & Levers

Date: _____

What Advantage Do You Get From Using a Lever?

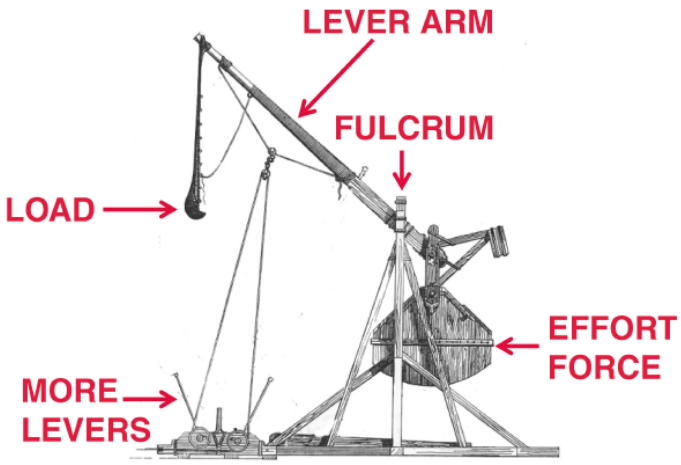
OBSERVE

Observe: Making a Lever Work For You

Question

How do I adjust a lever to get it to move a load the way I want?

A wonderful example of a lever is the **trebuchet**.



Load:	Fulcrum:	Effort Force:	Lever Arm:	More Levers:
Load: The load is the object the trebuchet throws. In the old days, it was usually something very heavy. A large rock could do a lot of damage when it hit a castle!	Fulcrum: This is where the lever of the trebuchet pivots. Because the fulcrum is in the middle, a trebuchet is a class 1 lever. Notice that the fulcrum is very close to the effort force. When this lever works, the long part of the lever arm attached to the load moves a long way, and the load must move very fast.	Effort Force: This is what makes the trebuchet lever move. The effort force is a very, very heavy weight that drops. Before the trebuchet can work, this weight must be raised high into the air.	Lever Arm: The trebuchet has a lever arm that is uneven. The side attached to the load is much longer than the side attached to the effort force. A load is placed in a sling, which makes the lever arm even longer. When this lever works, the load side of the lever moves a long way in a short time. This gives the trebuchet a big speed advantage.	More Levers: The effort force weight must be lifted high in the air before the trebuchet can work. This is done with ropes attached to small levers that pull the load side of the lever down, which can raise the effort force weight high in the air. The trebuchet then is ready to fire!

Resources

Access the website links from the online course.

- Building kit such as K'nex, or similar household materials such as wooden sticks (popsicle sticks or chopsticks), cardboard, pipe cleaners, straws, tape, and rubber bands
- ADLC Video: Using Levers
- Wonderville Website: Medieval Levers
- Digital camera
- BrainPop Video: Levers (website)
  - Username: 0099
  - Password: students

Instructions

1 Watch the BrainPop Video: **Levers**. See login information listed above. Listen and watch carefully. Your goal is to learn how levers work.

2 Watch the ADLC Video: **Using Levers**. Listen and watch carefully. Your goal is to learn how levers can be used for force and speed advantages.

3 Visit the **Wonderville Medieval Levers** website. Listen carefully to the presentation, and then follow the instructions in the medieval lever activity to construct a trebuchet that attacks the castle successfully.

4 You have learned that a trebuchet is a lever that has a speed advantage. Use a building kit or simple household materials to build your own lever that has a speed advantage. Start by making a triangle-shaped fulcrum; then, attach a lever arm to the top of the fulcrum. Your lever might look something like this:

SKILL BUILDER

Skill Builder

How to build with K'nex.

If you need to use this Skill Builder, access it from the online course.