

Western Engineering Outreach

Lifting a Lion Grade Sk-2

Meet Today's ENG HERO!

Jeff Wood - Professor with Western Engineering



Jeff Wood is an Associate Professor in Mechanical & Materials Engineering and is currently serving as Associate Dean, Undergraduate Studies for the Faculty of Engineering. Since joining the Faculty of Engineering at Western in 1999, Dr. Wood's field of research has primarily been on Lightweight Structural Materials with a particular focus on process-structure-property relationships for die-cast magnesium alloys and polymer composite materials. To learn more about Dr.

Wood, please visit:

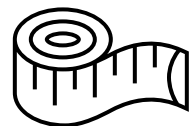
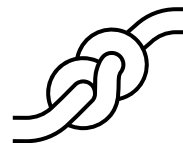
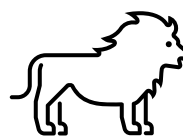
https://www.eng.uwo.ca/mechanical/faculty/wood_j/index.html

Learning Goals:

- Grade 1: 2.4 use technological problem-solving skills and knowledge acquired from previous investigations, to design, build, and test a structure for a specific purpose
- Grade 2: 2.3 investigate the structure and function of simple machines (e.g. by building a wheel and axle for a toy car; by exploring)

Materials:

- Plastic Lion or other toy animal / figure
- 2 bags popsicle sticks
- 1 roll masking tape
- 1 roll string
- 10 skewers, cut in half
- 40 beads (large centre holes)
- 8 straws, cut in thirds



Lifting a Lion

Engineering and Science Connections:

Background:

There are six types of simple machines:

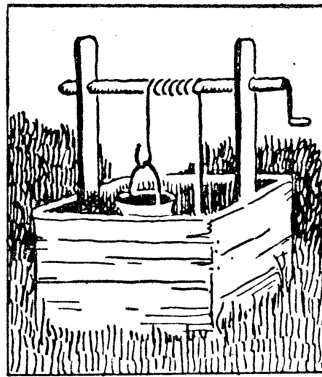
Lever: A lever is a bar used for raising or moving a weight. The weight is placed at one end and a force pushes down the other end. All levers have a turning point (fulcrum), a place where an object is moved, and an area where the force is applied. A hammer and crowbar are example of levers.

Wheel and Axle: When a wheel is turned, the axles (a bar attached to the centre of the wheel), turns as well. Everyday machines that utilize a wheel and axle include the doorknob, the pencil sharpener, and the automobile.

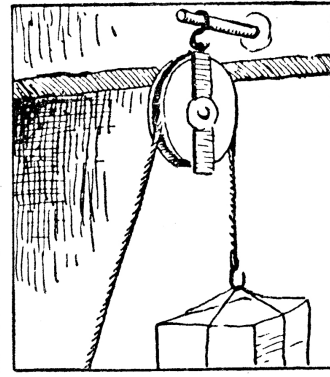
Pulley: A pulley is a simple machine with one or more grooved wheels connected by a rope. A pulley makes it easier to move objects up, down, and across a long distance. The more pulleys you combine, the less force you need to move an object.



Lever



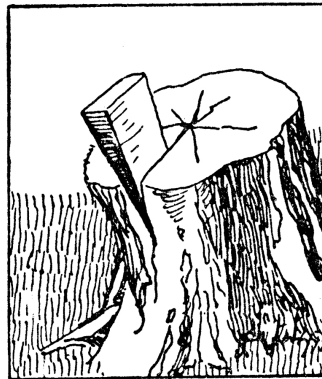
Wheel and axle



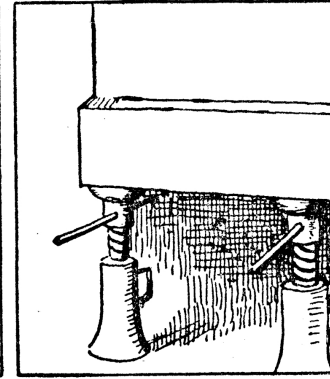
Pulley



Inclined plane



Wedge



Screw

Lifting a Lion

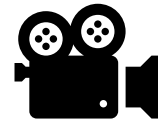
Inclined Plane: An inclined plane is a flat surface with one end raised higher than the other. It makes the work of moving things up and down easier.

Screw: The screw is a specialized inclined plane that is used to raised and lower things and also to hold things together. It is an inclined plane wrapped around a central pole.

Wedge: A wedge is also a type of inclined plane. It is wide at one end and tapers to a point at the other end. Wedges separate things by cutting, piercing, or splitting

Activity:

To learn more about levers watch the video down below!



Video recommendation: <https://www.youtube.com/watch?v=lueqE0IxLyc>

Activity:

- To lift up your lion (or other animal), you are going to design three simple machines
- You can also time yourself! Each challenge will be 15-20 minutes long. Make sure to stay on track so that each challenge is completed on time!

Challenge 1: Design a simple machine to lift the lion!

- First, guess which simple machine the picture down below would be..... it's a pulley!
- The lion will be the load that needs to be lifted



Lifting a Lion

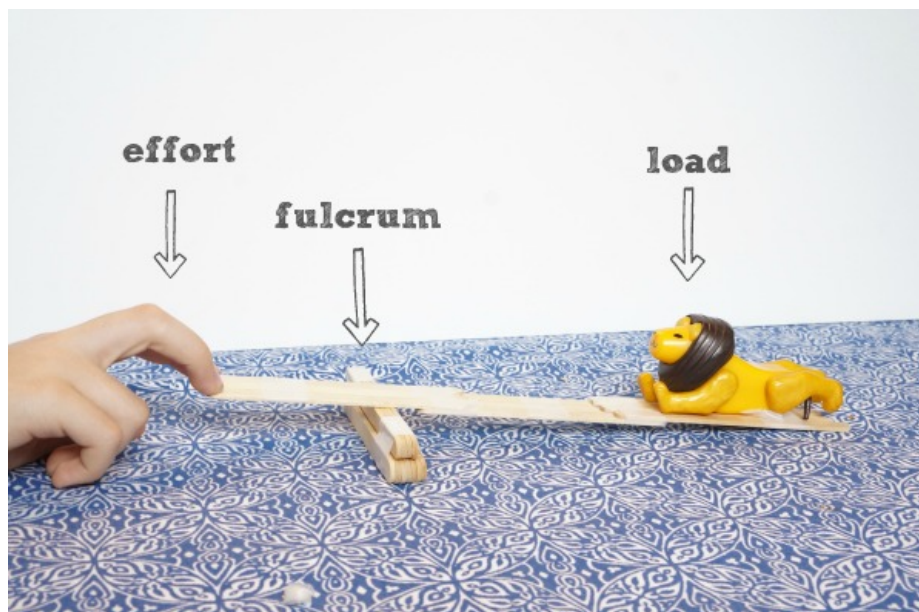
Challenge 2: Design a simple machine to move the lion across the table!

- What simple machine is pictured below?
- Answer: A cart, using a *wheel and axle*
- The easiest way to design a wheel and axle is to glue/tape a piece of a straw to the car platform. Slide the skewer through the straw, and attach beads on both ends of the skewer



Challenge 3: Design a toy for the lion using a simple machine!

- This one is trickier to figure out. A common playground toy you could build is a teeter-totter! A teeter-totter is really just a lever.



What Did You Learn?



- We learned about the Six Simple Machines: Lever, Wheel and Axle, Pulley, Inclined Plane, Screw, Wedge
- We also came up with three solutions for how to lift a lion using those simple machines

Future Learning



- Try making designs using the three simple machines you have not yet used and have them lift the lion as well
- Watch the other videos by SciShow about the other five simple machines

Share your creations!

We would love to see what you made. Email us at discover@uwo.ca or tag us on social media.

Instagram: @westernueng

Twitter: @westernueng

Facebook: @westernueng

Thanks for discovering with us!