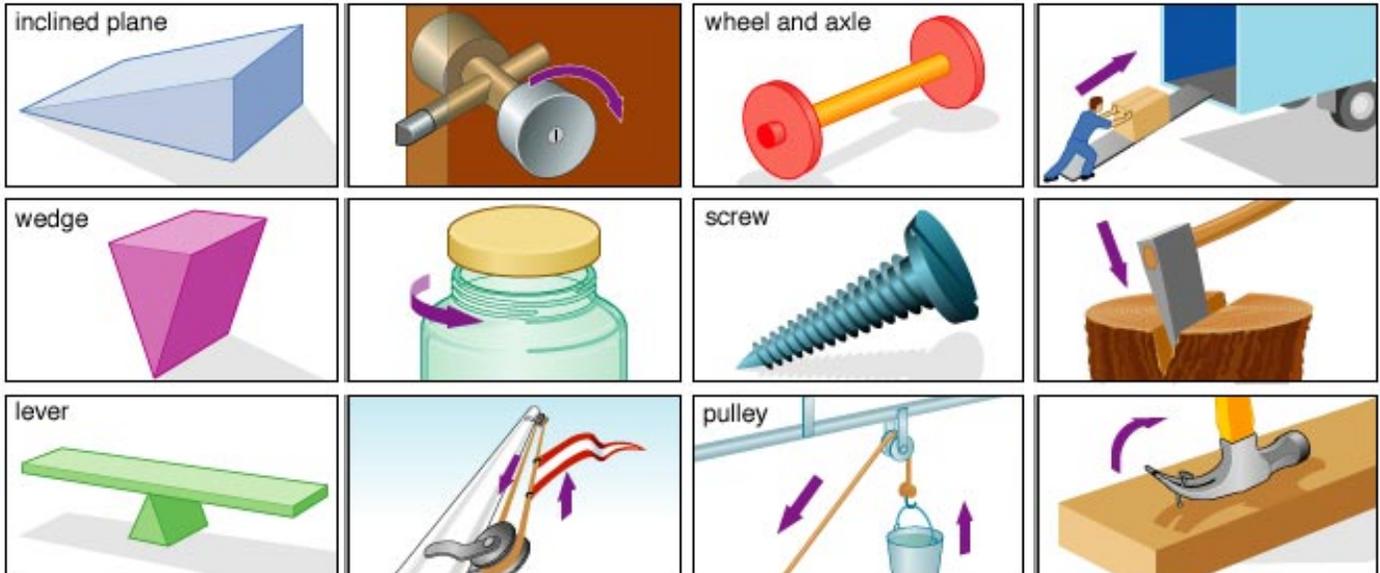# Simple Machines
Pulleys & Simple Machines

Simple Machines change the strength or direction of a force, such as a push or a pull. There are 6 types of simple machines. Can you match each type to its example?

inclined plane		wheel and axle	
wedge		screw	
lever		pulley	

The Pulley

Materials:
- Stiff Wire
- Empty Wooden Spool
- String
- Weight
- Pliers

Instructions:

1. Cut a piece of wire, and thread it through the spool. Bend the wire ends up and make a loop so the spool can't fall off.

2. Fasten the loop to a hook and feed the end of a string over the spook. Attach a weight to one end of the string, and hold the other in your hand.

Exploring Pulleys

1. Lift the object. Does it feel lighter or heavier?

2. What advantage is there for using a pulley?

3. Why are pulleys useful in real life?

Gears & Simple Machines

Gears are often also considered a simple machine, because they change the direction of a force. If you turn a gear one way, the adjacent gears turn the opposite way. If you turn the yellow gear clockwise, what direction does the blue gear turn in both images?

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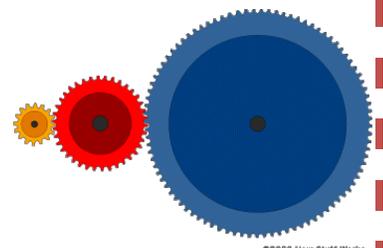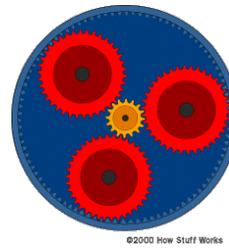
What Gears Do

Materials:
- 3 Ridged Bottle Caps (with holes)
- 3 Small Nails
- Wooden Board
- Hammer

Instructions:

1. Place a cap with sharp edges down on the board, and nail in place through the centre hole. Make sure you don't hammer to far, otherwise the caps won't spin.

2. Place and nail another cap beside the first, making sure they are close enough to turn one another.

3. Add the third cap next to the second in a similar manner. Make sure when you turn one cap, the other 2 caps turn as well.

What Do You Think?

Look at the section of a bike shown. Do you think this is an example of a pulley or a gear system? Discuss your answer with a neighbour before sharing with the class.

Follow-Up:

1. What do you notice about the spinning direction of the caps?

2. What do the edges of the cap do for this system?

3. What is the advantage of gears in terms of direction of forces?

4. What do you think would happen if you used a large gear with a small one?