



YIP RUBE GOLDBERG MACHINES



Lesson 2: Simple Machines

DEFINITIONS

Simple machines are machines with few or no moving parts that are used to make work easier.

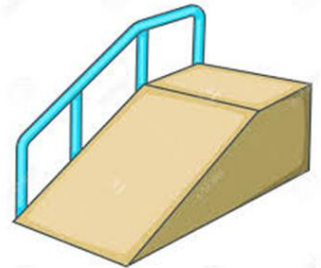
- Inclined Plane
- Lever
- Pulley
- Screw
- Wedge
- Wheel & Axle

6 TYPES OF SIMPLE MACHINES

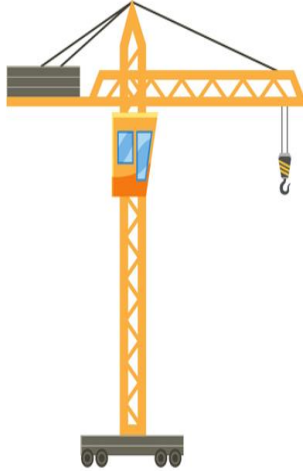
INCLINED PLANE

Makes it easier to move objects upward, but you have to go further horizontally.

Examples: highway on/off ramp, wheelchair ramp, stairs, playground slide

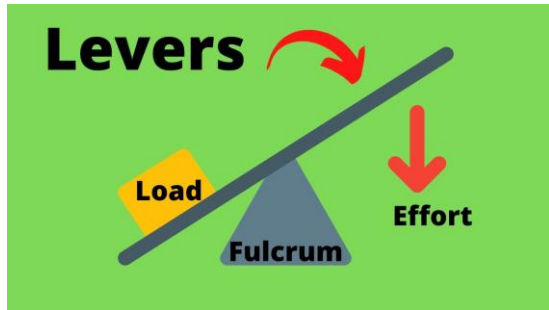


LEVER



Makes lifting weight easier by using a fulcrum to redirect force over a longer distance.

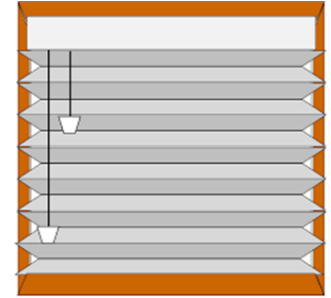
Examples: see-saw, dump truck, broom, crane arm, hammer claw, crow bar, fishing pole, screwdriver, bottle opener



PULLEY

Makes lifting things with a rope easier by redirecting force and the addition of additional pulleys.

Examples: flag pole, elevator, sails, fishing nets, clothes lines, cranes, window shades and blinds



SCREW

- Turns rotation into lengthwise movement
- Takes many twists to go a short distance
- Holds things together



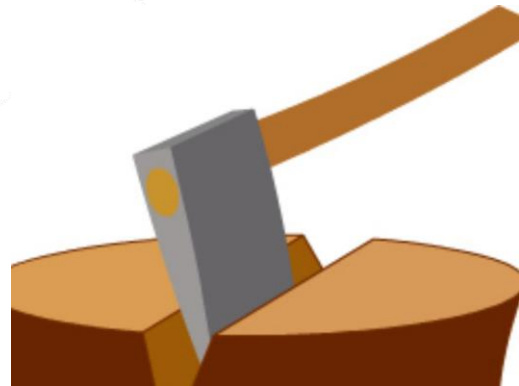
Examples: jar lids, spinning stools, light bulbs, faucet handles



WEDGE

Pushes materials apart, cuts things

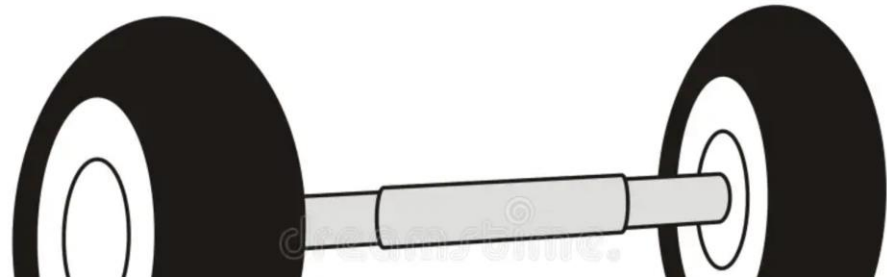
Examples: scissors, knife, doorstop, nail, saw, bulldozer, snow plow, zipper, airplane wing, bow of a boat or ship



WHEEL & AXLE

Makes it easy to move things by rolling them, and reducing friction

Examples: cars, bicycle, office chair, wheelbarrow, shopping cart, hand truck, roller skates

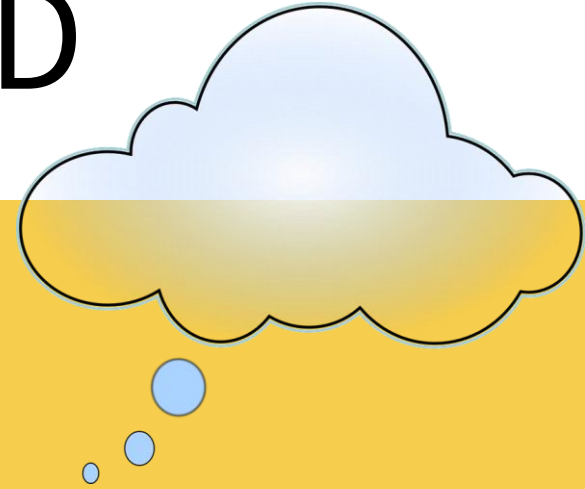




How to Open Your Refrigerator - Rube Goldberg Machine

Can you identify all the simple machines used?
(**Hint:** all 6 are included in this machine!)

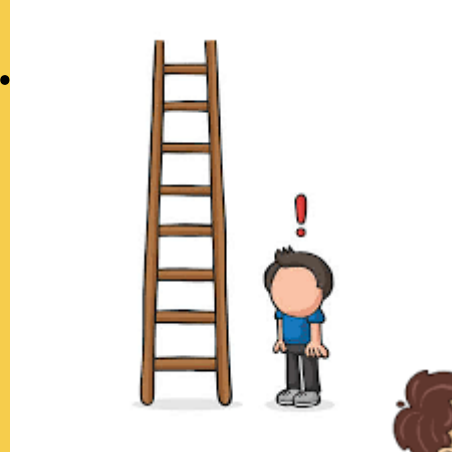
THINK ALOUD



Why do we use simple machines?

THINK ALOUD

For the **mechanical advantage**...
Making something easier to do,
but it takes a little longer to do it



For example, going up a longer
flight of stairs instead of going
straight up a ladder

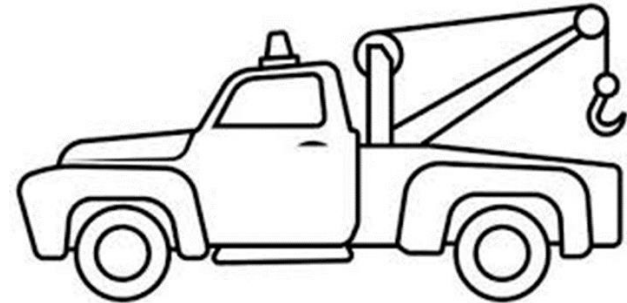








COMPLEX INVENTIONS

Combining two or more simple machines to work together

Examples:

- Car jack combines wedge and screw
- Tow truck combines lever and pulley
- Wheel barrow combines wheel and axle with a lever



| <u>Simple Machine</u> | <u>How it works</u> |
|---|--|
| Inclined Plane  | Makes it easier to move objects upward; a longer path, but easier lifting |
| Lever  | Helps lift heavy weights using longer distances |
| Pulley  | Makes lifting heavy weights easier by redirecting force |
| Screw  | Turns rotation into lengthwise movement |
| Wedge  | Pushes material apart, cuts |
| Wheel & Axle  | Makes it easy to move things by rolling them, and reducing friction |