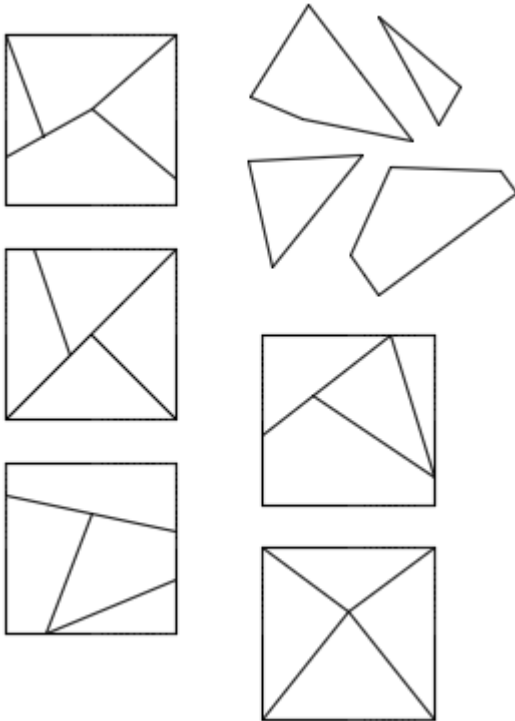


Sample Problems for Mechanical and Spatial Reasoning:

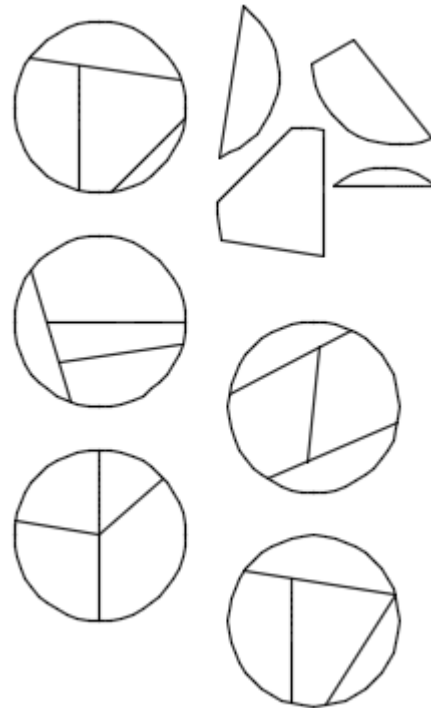
Here are some Samples of the skills that will be required for “reading” and “creating” 3-dimensional drawings and solid models in the CAD & Mechanical Design programs.

Part 1: Interpreting Shapes

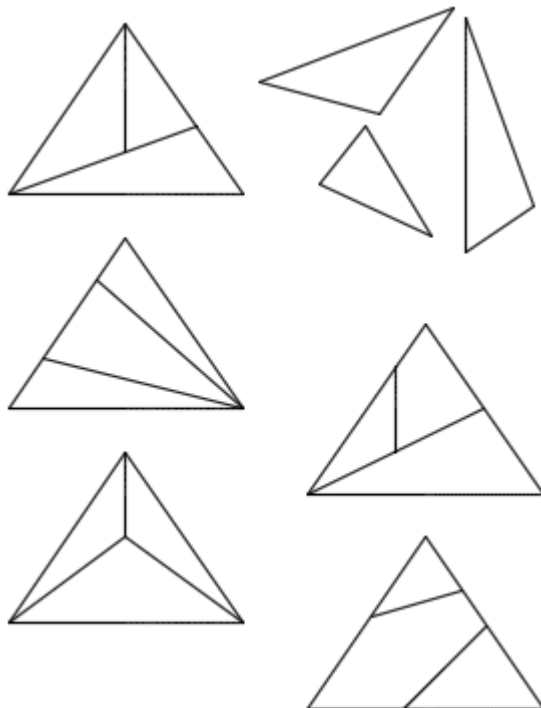
See how quickly you can determine which finished puzzle matches the disconnected shapes.



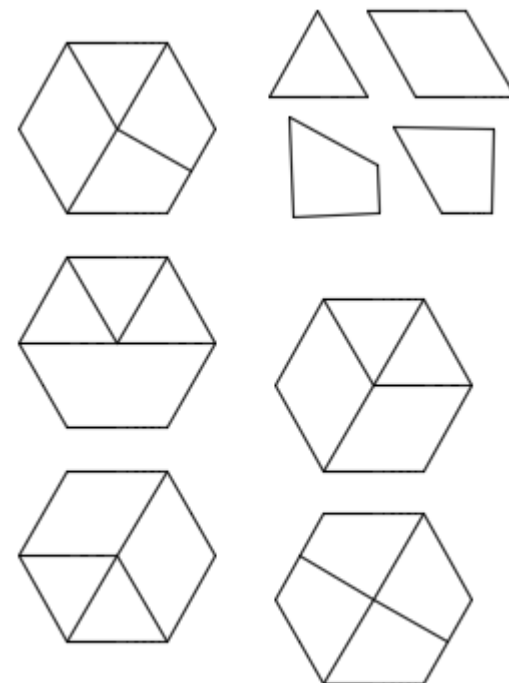
Puzzle 1



Puzzle 2



Puzzle 3



Puzzle 4

List the proper name of the geometric outline shape in the four puzzle shapes above when they are assembled as shown:

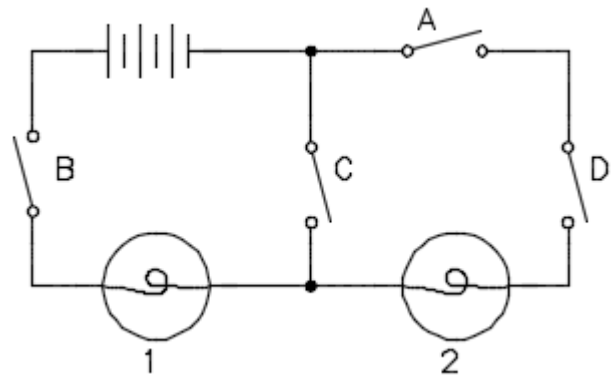
- Puzzle 1: Square
- Puzzle 2: _____
- Puzzle 3: _____
- Puzzle 4: _____

Part 2: Circuit Logic

Answer the circuit design question for each sample below:

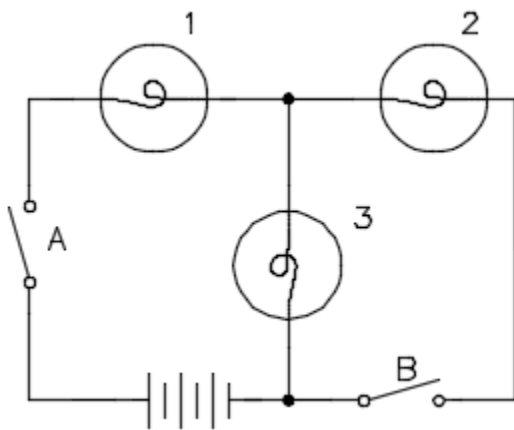
Sketch 1:

1. What is the least number of switches that would need to be closed for both lights to turn on?
2. Which switches would need to be closed to have only one light turn on?



Sketch 2:

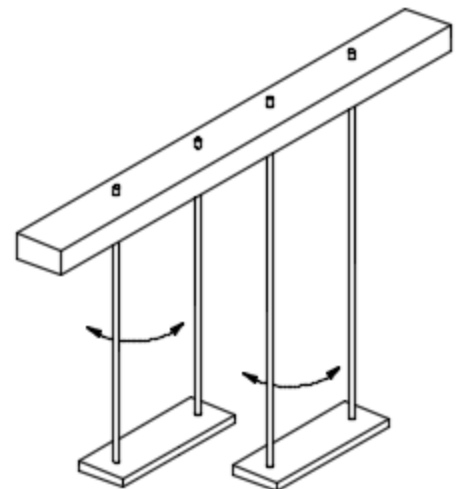
3. Which lamps will turn on if only Switch A is closed?
4. Which lamps will turn on if only Switch B is closed?
5. Which lamps will turn on if both switches are closed?

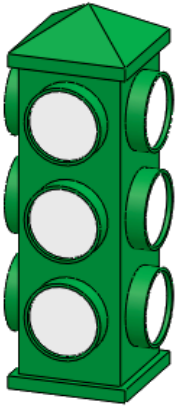


Part 3: Logic and Physics

Swings:

1. Which swing shown here will swing back and forth quicker?
2. If both swings had the same person using them, which swing would be harder to stop?

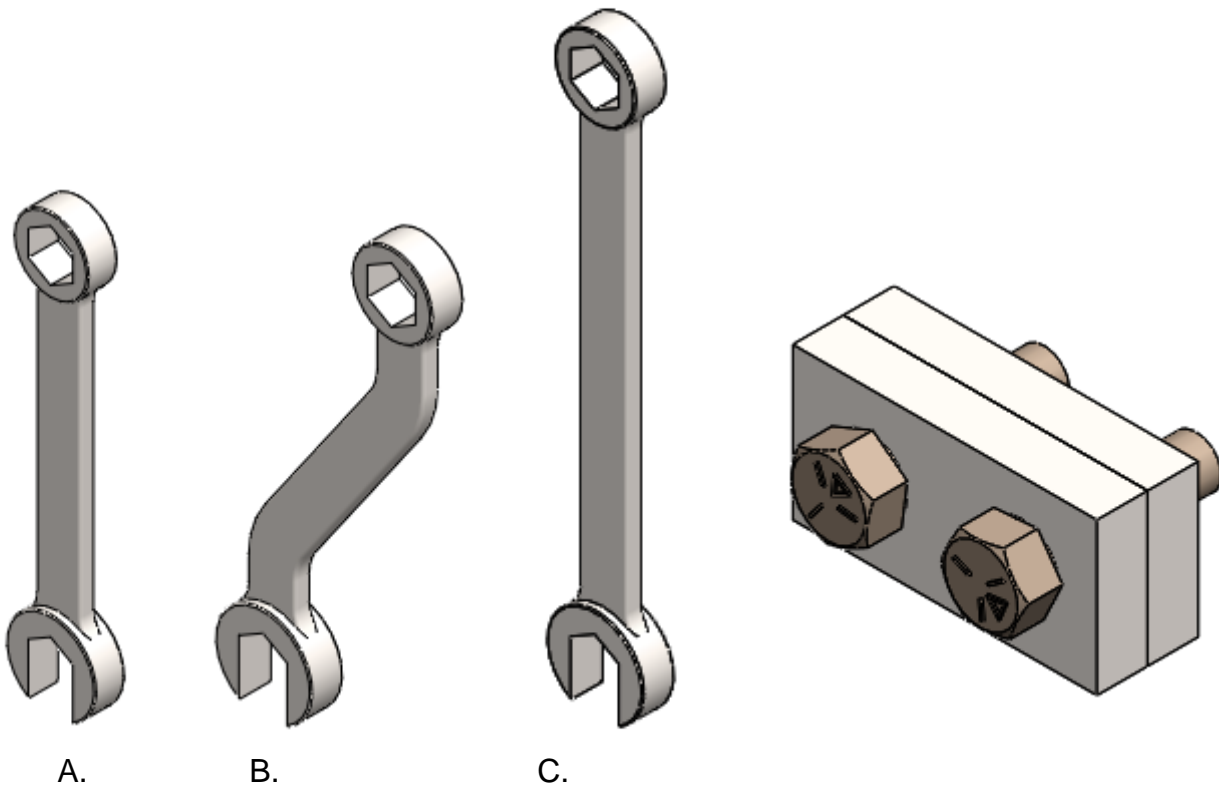




Stoplight:

1. Which of the three lights is always the Red light?
2. Can you come up with a couple of reasons why the red light is always in this position for a stoplight at an intersection?

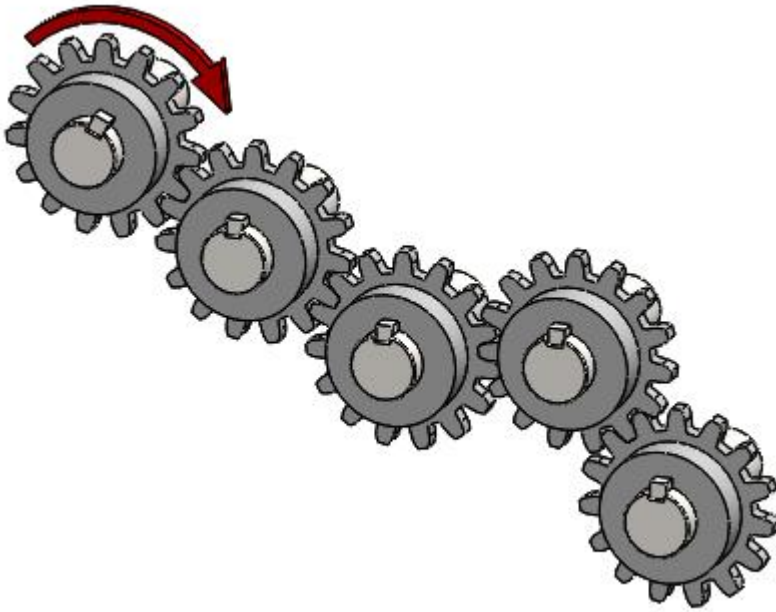
Wrenches, Mechanical Advantage, and Torque:



1. Which wrench shown above would provide the most torque to help remove a stuck bolt?

Gear Drives, Belt Drives, and Ratios:

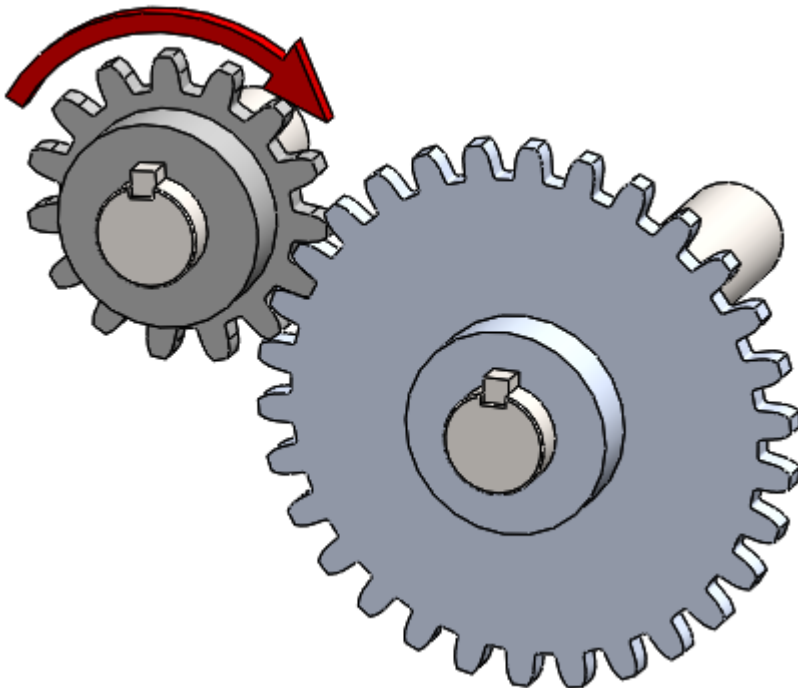
1. Determine which direction the final gear on the right will be turning in this Gear Train:
___ Clockwise ___ Counterclockwise



2. In the Gear Set below which Gear will make the shaft turn faster when they run together?

Smaller Larger

3. How many times faster will it turn? _____ Times (Ratio of ___:1)



4. Which direction will the gear on the right will be turning in this Gear Train:

Clockwise Counterclockwise

Folding the Box:

1. Identify which "Flat Pattern" matches the original folded box:

