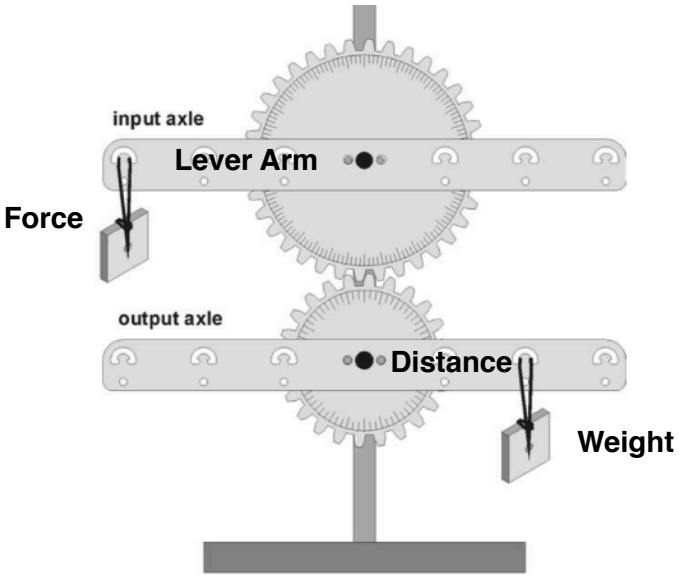
Simple Machines - Gears and Levers

Name _____ Date _____

Purpose:

Find the mechanical advantage and the efficiency of several different gear and lever systems.

Concepts:



Complete the following tables for 5 arrangements:

For each trial, you must use a different combination.

Two trials should use 2 pulleys.

Two trials should include a double gear.

One trial should include an idler gear.

Data:	
Weight Output	
Distance Output	
Force Input	
Lever Arm Input	

Draw the Gears

Calculations:	
Torque input **F x L**	
Torque output **W x D**	
Gear Ratio	

For each 10 clockwise turns of the input gear, how many turns, including direction, does the output gear complete?

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Force Input			Gear Ratio	
Lever Arm Input				

For each 10 clockwise turns of the input gear, how many turns, including direction, does the output gear complete?

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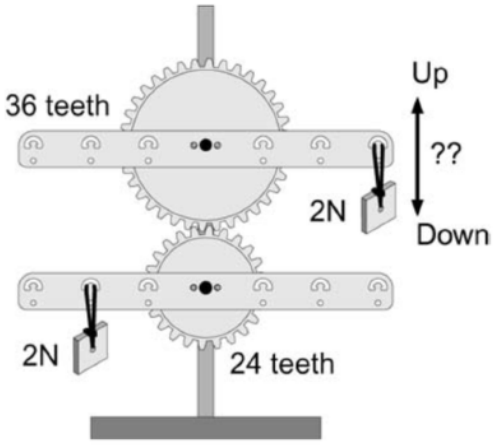
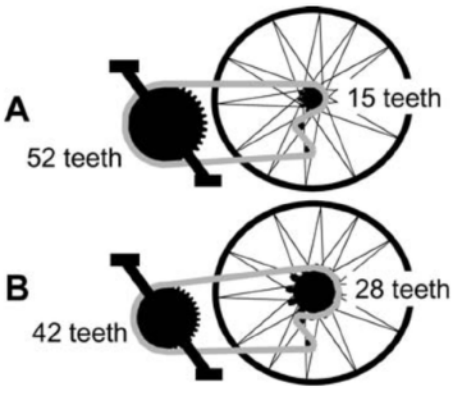
1. A machine is constructed as shown with a 36-tooth gear, a 24- tooth gear, two levers, and two 2-newton weights. When the top weight is hung in the location shown, will it go up or down? Why?



2. Where could you hang the top weight so that the machine would balance?

3. Which arrangement of gears on a ten-speed bicycle would be more useful for climbing hills? Explain.



4. If you were trying to go farther with fewer turns of the pedals, which arrangement of input and output gears would you want on your bicycle? Explain.