FLINN SCIENTIFIC

Name_____

Name: _____

Investigating Gears Worksheet

Part I. Gear Specifications Data Table

Gear Size	No. of Teeth	Radius (cm)
Small		
Medium		
Large		

Post-Lab Questions

1. What is the relationship between number of teeth and the radius of the gears?

Part II. Gearing Direction

1. Draw a sketch of a two-gear system with a driver and follower gear. Indicate the direction (CW/CCW) that each gear turns relative to the other gear.

2. Draw a sketch of a three-gear system with a driver, idler, and follower gear. Indicate the direction (CW/CCW) that each gear turns relative to the others

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Part III. Gearing Speed/Distance

1. Observe the larger driver gear as it drives the small follower gear.
   a. What happens to the speed of the follower gear compared to the driver gear?

   b. How many times does the follower gear rotate for each complete rotation of the driver gear?

2. When the smaller gear is driving the larger gear, what happens to the speed of the follower compared to the driver?

3. Examine the gear specification in the data table on Part I of this worksheet. How does the number of teeth on the gears compare to the distance traveled and speed of the gears?

Part IV. Gearing Up/Down

Weight of hanging mass _____ N

1. Record the amount of force required to lift the 100-g mass on the small gear with the medium gear. _____ N
2. Consider the two-gear arrangement described in question 1.
   a. How does the ratio of the radii of the small to medium gears compare to the ratio of the weight lifted and the force required?

   b. Are the ratios the same? Why or why not?

   c. What is the mechanical advantage of the gear arrangement?

3. Record the amount of force required to lift a 100-g mass on the medium gear with the small gear. _____ N
4. What is the mechanical advantage of the gear arrangement described in question 3?

5. Consider the mechanical advantage of each gear arrangement from questions 2*c* and 4.
   a. When might a mechanical advantage greater than 1 be useful?

   b. When might a mechanical advantage less than 1 be useful?