Using Ratios To Design Gear Machines Lab

Name_____**Date**_____**Group**_____**Period**___

Objective: To design a gear machine with a specific total gear ratio you must first determine, which individual gear ratios to use and where to place them in order to make the gear machine have the total gear ratio needed.

Variables: By the time you finish this experiment ,you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

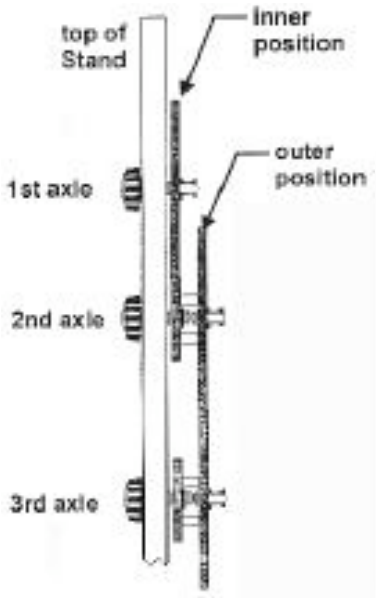
Independent Variables: Total gear ratio as assigned by teacher

Dependent Variables: _____

Controlled Variables: Same sizes of gears

Procedure:
1. Your teacher will assign your group a total gear ratio.
2. Determine which individual gear ratios to use, which when multiplied, will give you that total gear ratio.
3. Use your model gear ratios you cut out previously, to see how they should be positioned to get the total gear ratio. following the instructions on the gear ratio models page.
5. Have your teacher check that your setup is correct before actually assembling your gear machine.
6. Your first gear machine will require two single gear ratios, and your second gear machine will need three single gear ratios.

Use the table below to record your design. Each axle can have a gear in the inner position and/or the outer position. Use the table to write down the number of teeth in the gear you have put in each position. Put an X in spaces which have no gears. **Circle the meshing pairs of gears.(These must be in the same axle position !!!!!!)**



1st gear ratio = _____ = _____
fraction decimal

Axle #	Inner Position Record # of Teeth or "X"	Outer Position Record # of Teeth or "X"
1		
2		
3		
4		
5		
6		

Question 1. Rotate the gears in your machine keeping track of how many times each gear turns. Did the machine have the same gear ratio as you designed?

_____

Each place where the Gears mesh defines a gear ratio. Use the space below to write down the individual (single) gear ratios in your machine. Multiply the ratios to calculate the total gear ratio and write the total gear ratio in <u>simplest</u> form.

1st Gear Ratio

2nd gear ratio = _____ = _____
fraction decimal

Use the table below to record your design. Each axle can have a gear in the inner position and/or the outer position. Use the table to write down the number of teeth in the gear you have put in each position. Put an X in spaces which have no gears. **<u>Circle the meshing pairs of gears.(These must be in the same axle position !!!!!!)</u>**

Axle #	Inner Position Record # of Teeth or "X"	Outer Position Record # of Teeth or "X"
1		
2		
3		
4		
5		
6		

Each place where the Gears mesh defines a gear ratio. <u>Use the space below</u> to write down the individual (single) gear ratios in your machine.

Multiply the ratios to calculate the total gear ratio and write the total gear ratio in <u>simplest</u> form.

2nd Gear Ratio

Question 2. Determine which single gear ratios will give you the following total gear ratios, and write your answers below in the space provided. Use the simplest possible single gear ratios.

Total Gear Ratio: 1/12

Total Gear Ratio: 27/2

Sources of Error : Identify ***two*** things that people may have done incorrectly that would have caused them to get totally different answers from the rest of the class. These errors must be unique, in other words they have not been applicable in previous labs. They must be ***new*** sources of error. Be ***specific*** about what might have been done.

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