

# Reinventing the Wheel

## *Physical Science and Technology*

### Introduction:

The purpose of this activity is for you to demonstrate your ability to problem solve by designing and building a device *and* writing the results in a formal lab paper. Each section of this activity has multiple criteria; please finish as many criteria as you can in the time allowed. Some parts of this assignment are individual and some are to be done with a partner.

### Days 1 and 2 (90 mins. total work time)

#### → *Calculations (INDIVIDUAL)*

You will make two calculations to find a distance and a number of rotations. Here are the formulas you will use for your calculations:

First number (distance)

= (the number of letters in your last name + the number of letters in your first name) x 15

Second number (number of rotations)

= (the number of letters in your first name x the number of letters in your last name) / 4

**Round this number to the nearest *whole number*.**

The first number will represent a distance **in centimeters** and the second will represent a **number of rotations**. Your goal will be to build a wheel that will travel within 10% of the specified distance in exactly the specified number of rotations.

Finally, **determine** how big your wheel will need to be in order to travel the correct distance in the correct number of rotations.

Show your instructor *a)* the distance you've calculated, *b)* the number of rotations you've calculated, and *c)* how large your wheel needs to be. Once your instructor has approved your information, move on to the next step.

#### → *Design your wheel (PARTNERS)*

Find ONE other student in the class who is also done with the calculations and estimate. Choose either of your sets of calculations to use. Using Adobe Illustrator (as you will be shown in class), create a circle of the correct size. Make sure both of your names are typed into the circle. Save your work to a thumb drive.

### Day 2 (90 mins.)

#### → *Create the wheel and collect data (PARTNERS)*

Give your thumb drive to a teacher in order to create your wheel with the laser engraver. Once you have your wheel, collect 10 trials of data – for each trial, record the exact distance your wheel traveled in the specified number of rotations.

After you have collected your data, turn your wheel in along with the following information written on one side: Your name, the distance specified, the number of rotations specified, and the radius (or diameter) of the wheel you built. Also turn in the data that you collected using your wheel. You and your partner should both record data in case one of you is absent during the next class period.

→ *Write a lab report documenting your progress – save to your H: drive! (INDIVIDUAL)*

Work individually. You will use Microsoft Word on the computers in the computer labs. When you think you are done with the write-up, HAVE AN INSTRUCTOR REVIEW IT! **After it has been reviewed**, you can print your write-up and turn it in.

- Your lab report should have your name, the period, and the date in the upper right-hand corner
- Include a title centered and in bold
- Include an Introduction section consisting of 2 – 3 sentences describing what we asked you to do for this project
- Include a Methods section that describes how you calculated the distance and number of rotations and how you determined how big your wheel should be
- Include a data table, made from within Word, which has spaces for you to document 10 measurements of the distance traveled and number of rotations made by your wheel in each trial. Make sure the table is appropriately labeled and attractively formatted
- Include a Discussion section that addresses the following questions:
  1. How easy or difficult did you find this project? What were the most difficult parts?
  2. What types of things did you learn about working with a partner on this project? Describe how you and your partner made decisions when necessary.
  3. What aspects of science interest you the most?
  4. What aspects of technology interest you the most?