Height Challenge Calendar (90 min block)

Week	Mon	Tues	Wed	Thur	Fri	
1	- Intro to week - Do Now: Measurement - Contracts/norms - Height Challenge Entry Doc - K/NTK/NS - Take data - height.py	- Do Now: Graphing - Finish taking data - Graph data - Workshop: Graphing Data - Workshop: Function from Data - Answer questions from Take data document	- Do Now: Slope - Finish answering questions from Take data document and test prediction for number 4 - Planning final answer and presentation - Twist*	- Do Now: Make answer public - Present: each pair will present to their counterpart in their group of four. - Test answer - Debrief/Reflect		*Twist: Put the linkbots away and tell them there is a twist, each team's robot actually has to go the combined height of your group of four.
2						
3						

Team Height Challenge:

Dear Students,

      You are in a lucky position to have access to these Linkbots. The only problem is you don't know how to program them to do what you want!
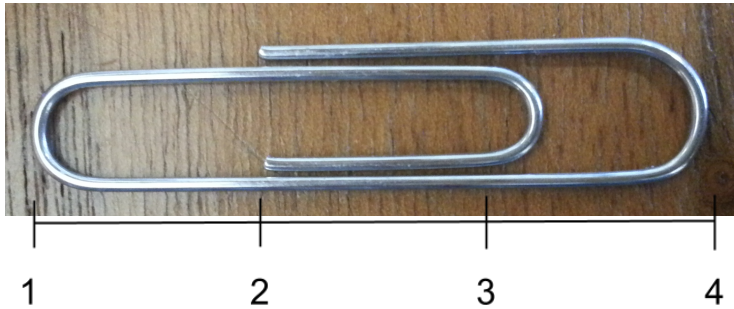
Can you make the robot travel exactly the combined height of your team?
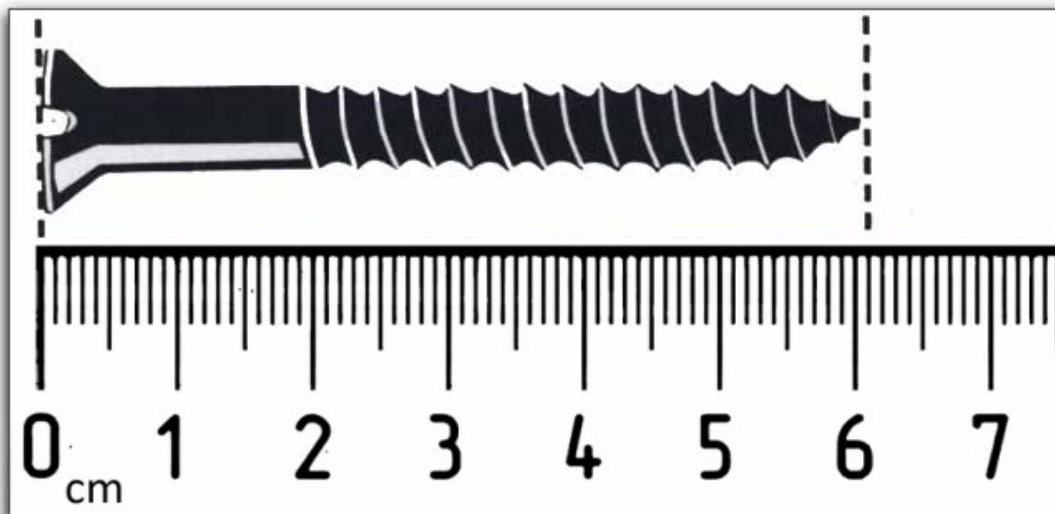
Know:	Need to Know:	Next Steps:

Warm-up: Find the Errors

A student made 2 mistakes below. Find and correct both mistakes.

1. The paperclip is 4 units long.


2. The screw is 6.0 cm long.

Team Height Challenge

Can you make the robot travel exactly the height of your team?

In this lab we will figure out how to predict how far the robot will go using the command:

robot.move(*some number of degrees, 0, -some number of degrees*)

1. In the table below, record the "*some number of degrees*" in the first column and how far your robot went in the second column. Repeat this six times for six different rotations. **Download the Linkbot code here: http://tinyurl.com/heightChallenge-py**

Rotation (Degrees)	Distance ( )
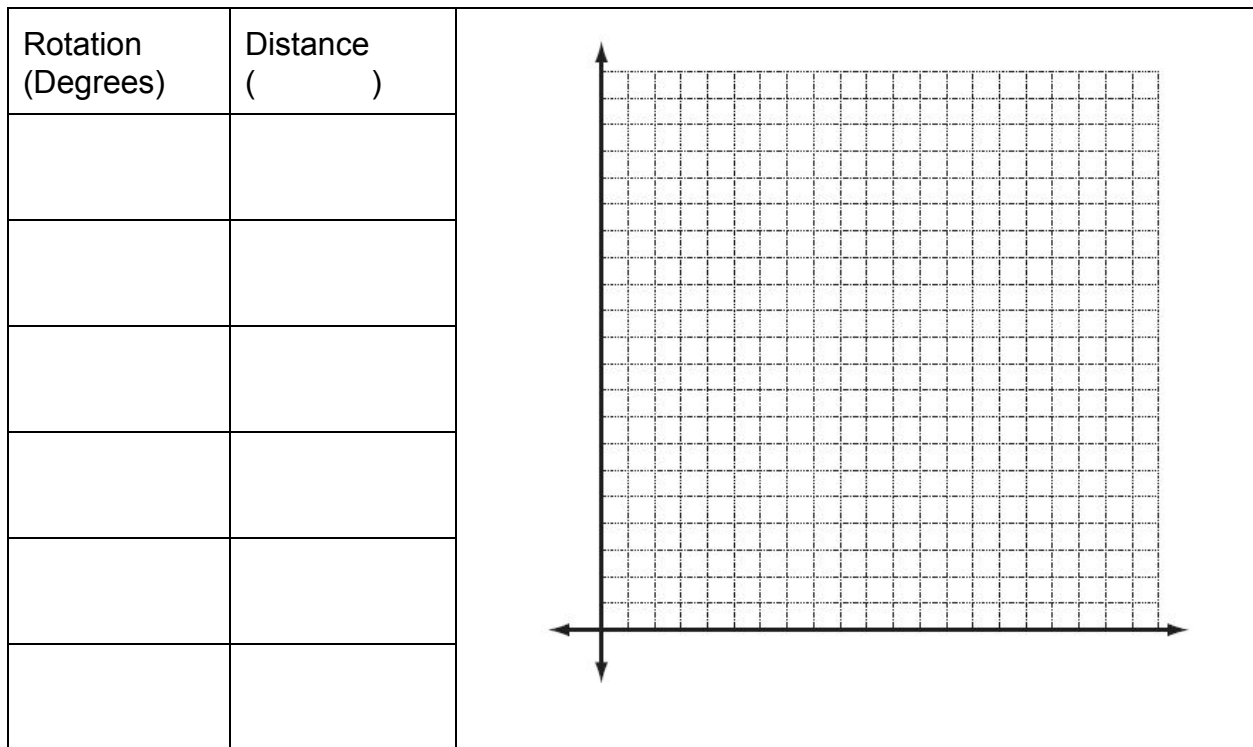
2. Next graph your points on the axis provided. What type of function is it? How do you know?

3. Find the function for your graph.

4. Use the function you found to predict how far the robot will go in 400 degrees.

5. Test to see if your prediction was correct, if not add this point to your graph and recalculate your function.

6. If your function is linear, what is the slope? What does the slope mean?

If your function is not linear, why does this make sense in terms of the robot traveling?

7. Calculate the circumference of your wheel (Remember C=pi*d). How does the circumference relate to your slope? Why?

8. If your wheels were replaced with 4" diameter wheels, how would that change your slope?
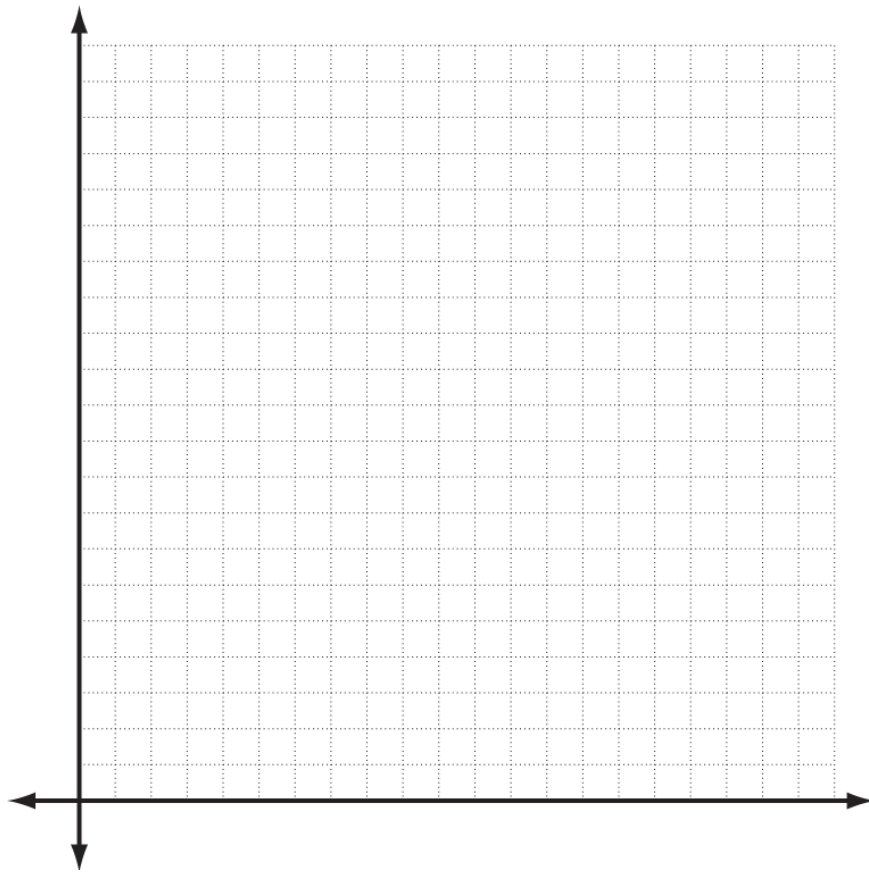
Warm-up: Find the Errors

A student made several mistakes when setting up their graph below. Find and correct each mistake.
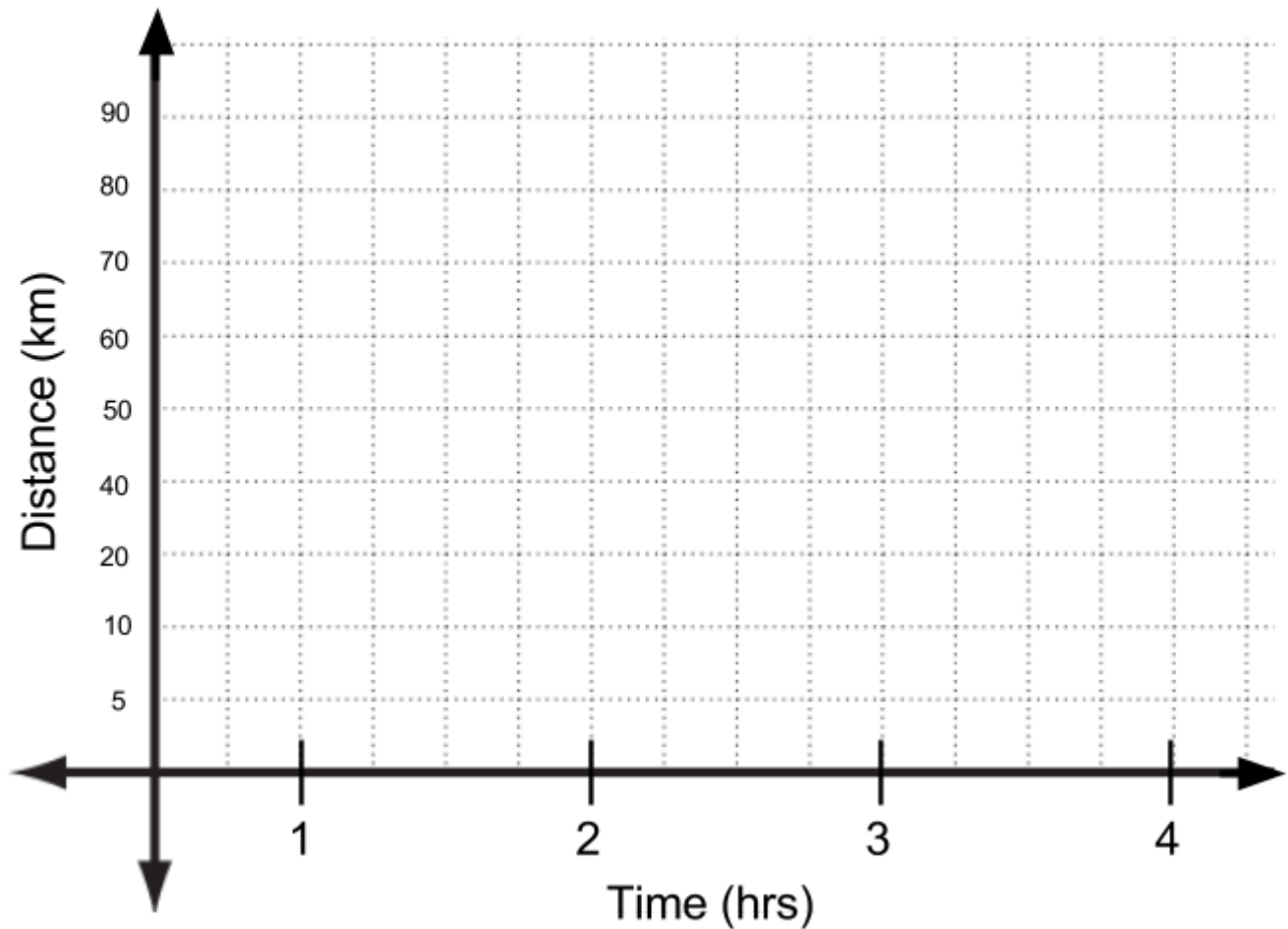
Workshop A: Graphing Data

The table shows data for a cyclist's drive from home during a four hour ride.
a. Make a scatter plot of the data.

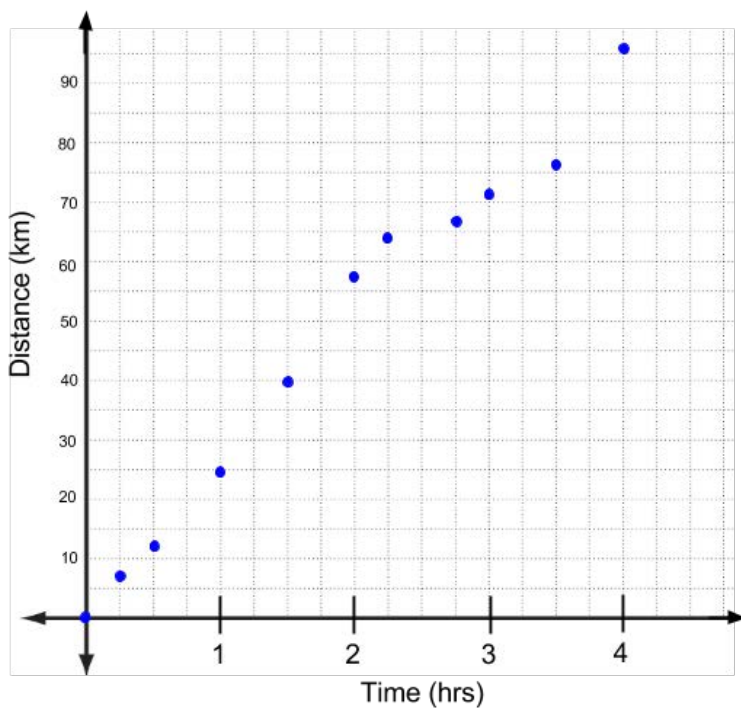| Time (hours)	Distance (km)
0	0
0.25	6.4
0.5	12.8
1	24
1.5	40
2	57.6
2.25	64
2.75	65.6
3	70.4
3.5	76.8
4	96

Workshop B: Writing Function from Data

The table shows data for a cyclist's drive from home during a four hour ride.

b. Find the cyclist's average speed.

c. Find an equation that models the data and graph it on the scatter plot.

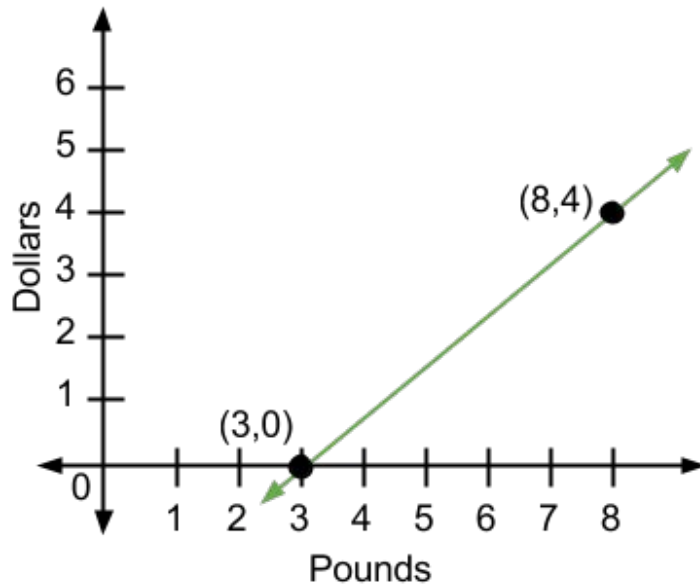d. At what times might the cyclist be coasting downhill or riding uphill? Explain.

Time (hours)	Distance (km)
0	0
0.25	6.4
0.5	12.8
1	24
1.5	40
2	57.6
2.25	64
2.75	65.6
3	70.4
3.5	76.8
4	96

Warm-up: Find the Errors

A student made 2 mistakes below. Identify and correct each mistake.

1.

Dollars (y-axis), Pounds (x-axis)

Points: (8,4), (3,0)

$4 - 0 = 4$

$8 - 3 = 5$

slope $= \dfrac{5 \text{ Dollars}}{4 \text{ Pounds}}$

2.

Miles (y-axis), Hours (x-axis)

Points: (2,4), (6,1)
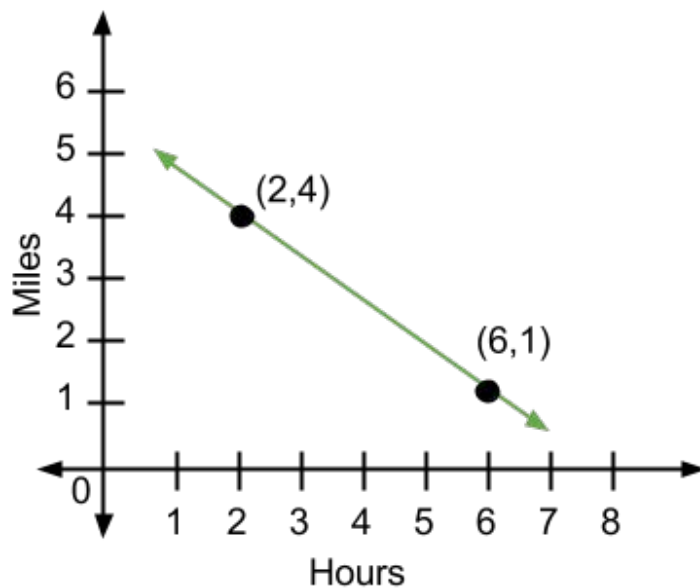
$4 - 1 = 3$

$6 - 2 = 4$

slope $= \dfrac{3 \text{ Miles}}{4 \text{ Hours}}$

Team Height Challenge: Planning

How far does your Linkbot go every degree?
How tall is your team altogether?
How many degrees does your Linkbot have to go to travel over the entire height of your team?

Space to plan for your presentation:

Team Names	Slope of Line	Total Height	Total Degrees