Name _____ Date _____
SI Physics Lab #7H (100 pts)
Period _____ Mrs. Nadworny

Partners: Due Date _____

Constant Speed

NO Lab Write-Up Required
attach conclusion

Purpose

- To determine your and your partner's average maximum speeds while walking/running.

Research Question

- What is the relationship between the distance a person travels and the time needed to travel that distance?

Variables

- Independent variable (2 pts) –
- Dependent variable (2 pts) –
- Constants/Controls (2 pts) –

Mathematical Model (2 pts)

Expected Graph (5 pts)

Significance of Slope:

Expected y-intercept:

Hypothesis (2 pts)

_____

_____

Procedure

- Materials: (3 pts)
  Create a bullet list of all materials that you expect to use.
- Diagram of setup: (3 pts)
  Draw and label a diagram with all equipment and measurable values.

- Procedure: (7 pts)
    1. Begin by unraveling _____ and marking set distances every _____ with _____. Record distances in data table to every tenth of a meter.
    2. The first member of the group will start at the _____ mark and walk/run at a _____ to _____.
    3. The other partner(s) will measure and record the _____ it takes using a _____.
    4. Repeat steps 2 – 3 for the remaining _____ trials.
    5. Repeat steps 2 – 4 for all remaining group members.
    6. Create a graph of _____ vs _____.

Have your teacher check all previous work before you begin collecting data!

Data Collection (20 pts)

Name			Name		
	± _____	± _____		± _____	± _____

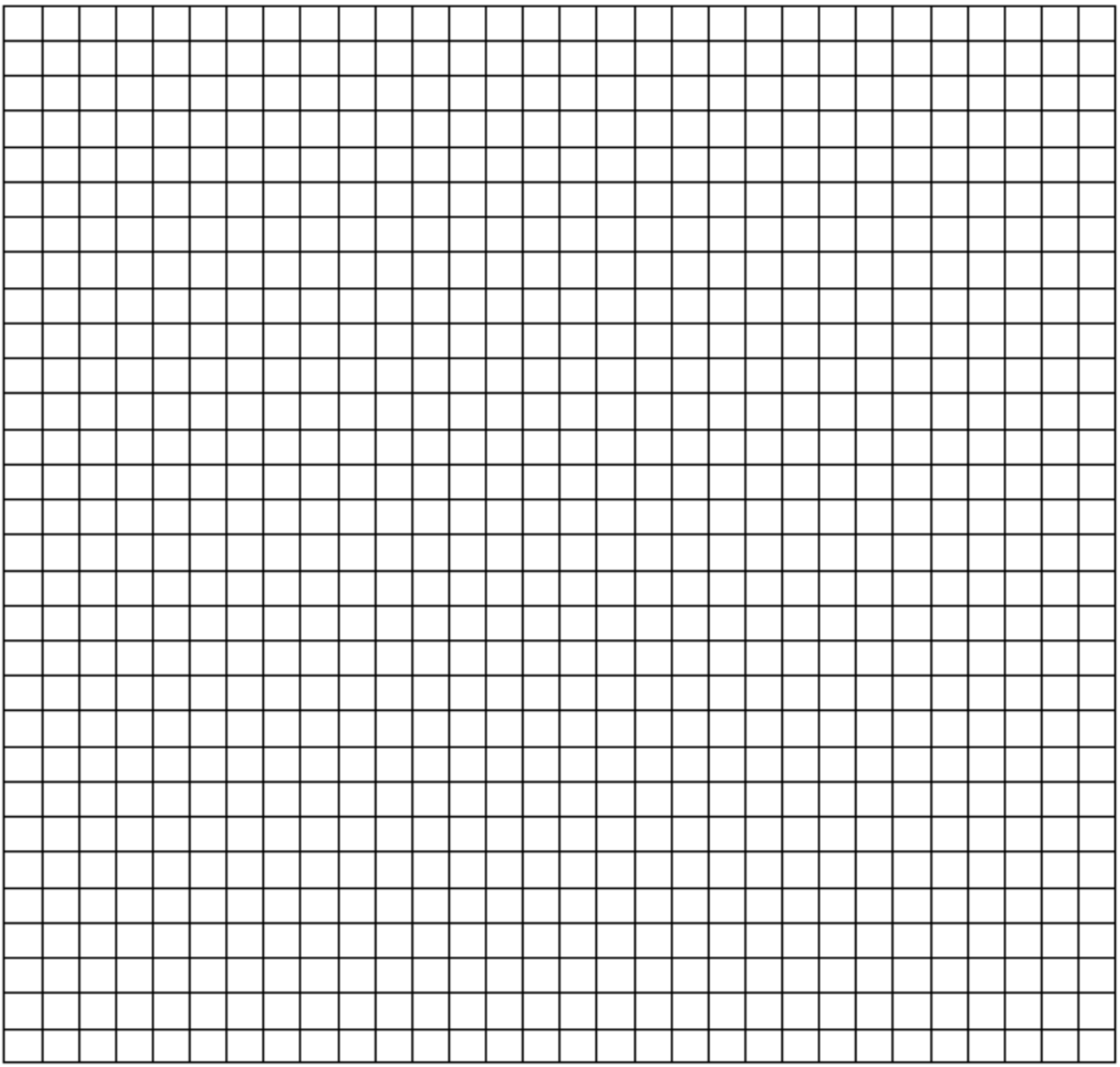
Reminder: Your uncertainty estimates and data should be recorded to the same decimal place.

Graph (15 pts)

- Create ONE graph to display BOTH your data and your partner's data.

KEY
☐ = _____ (name)
☐ = _____ (name)

1. Title your graph with an appropriate title.
2. Label each axis with the appropriate variable and unit.
    - Graph distance on the y-axis and time on the x-axis
3. Mark an appropriate scale according to the data.
4. In one color plot each of your data points and draw a best fit line.
5. In another color, plot each of your partner's data points and draw a best fit line.



Data Analysis

1. Calculate the slope of YOUR best fit line. You must select two points on your line. Draw a box around each point selected. Show all calculations with equation, substitution with units, and answer in decimal format with units. (4 pts)

2. Calculate the slope of your PARTNER'S best fit line. You must select two points on your line. Draw a box around each point selected. Show all calculations with equation, substitution with units, and answer in decimal format with units. (4 pts)

3. Determine the physics formula that relates to the variables that you graphed. (1 pt)

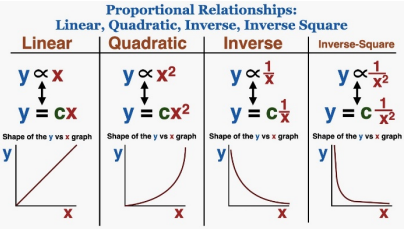
4. What physical quantity is represented by the slope of the graph? (1 pt)

5. Manipulate your slope to find your average speed. Show all work. (3 pts)

6. Manipulate your partner's slope to find their average speed. Show all work. (3 pts)

7. Based on your analysis of the data, make a claim that answers the research question. (1 pt)

- What is the relationship between the distance a person travels and the time needed to travel that distance?



The relationship between _____ and _____ is _____.

8. State some evidence in support of your claim. (2 pts)

The shape of the plotted graph is _____.

9. Explain your reasoning as to how your evidence supports your claim. (2 pts)

On my graph of _____ vs _____ a _____ shape can be drawn through or close to most of the data points.

10. Explain your reasoning using physics principles. (2 pts)

This relationship exists because as an object moves . . .

11. Based on your analysis of the data, write the specific (experimental) equation for the relationship you investigated in this activity that answers the research question. (Start with $y = mx + b$, then substitute appropriate variables for x and y as well as specific values for m and b with units.) (2 pts)

$y = mx+b$

___ = ( )___ + ___

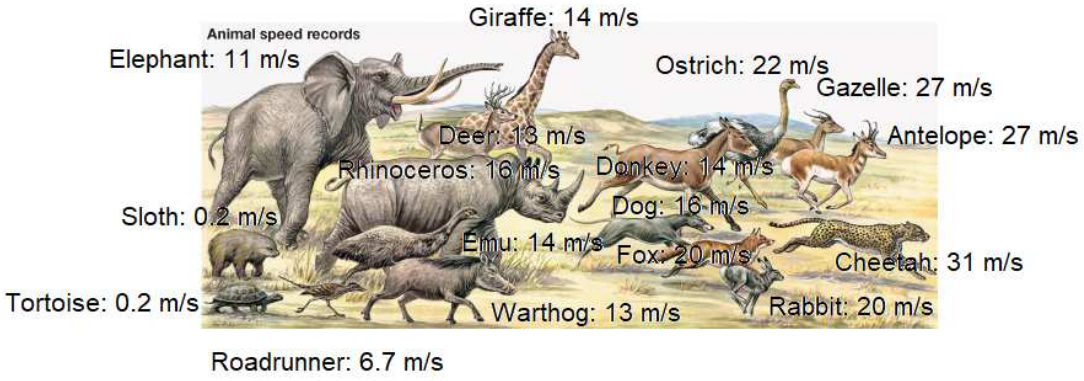
12. Use your specific formula to calculate the distance YOU would cover in 30.0 seconds. Show your work. (4 pts)

13. Describe a specific and significant source of uncertainty you encountered when taking data AND discuss how it affected specific variables in your data.

(4 pts)

14. Explain how the identified uncertainty (above) could be reduced in future experiments.

(2 pts)



15. If you could compare yourself to ANY animal based on your speed, prowess, or style, which would you select? Why?

(2 pts)