Run-Walk Speed Lab

Name :_____

Date: _____

Materials needed:
- Activity Sheet
- Piece of graph paper
- Tape or other object for start/stop points
- Ruler / Measuring Tape
- A stopwatch
- Space to Run (outside or gymnasium)

Directions:
- Lab Introduction (*see 'Speed Lab' slides*)
- Students complete their hypothesis / prediction
- Students will choose a partner for this activity
- The class will go outside or to a gym suitable for running
- Each team will measure a distance of 100 meters (marking a starting and finish line)
- Students will time one another as they run / walk / (?) their specific distance (3 x each)
- Times will be recorded and graphed
- Students will calculate their average speeds for each type of movement.
- Complete activity sheet

Prediction: How can we calculate the speed we sprint, jog, or walk without a radar gun? _____

_____

_____

Background Vocabulary:

Motion is a change in position measured by distance and time.

Speed is the rate of change in position. Speed combines information about how far an object moves **(distance)** with how long it takes to move that distance **(time).**

Speed is the rate at which an object moves.

Formulas for this activity (*how could you find distance or time?****):***

Speed = distance ÷ time

Distance = _____

Time = _____

Data Collection:

Once your team has measured your running distance, marking a "Starting Line" and "Finish Line", you will time one another to see how long it takes to run, walk, and another type of movement of your choosing. You will have 3 times for each travel mode. *Distance should be the same for all of your trials!*

Travel Mode	Time-1 (sec.)	Time-2 (sec.)	Time-3 (sec.)	Distance (meters)	Speed (m/s)
Walk					
Run					
Other:					

Analysis:

1.) Find your average or mean speed for each mode of travel.

Walk: _____

Run: _____

Other(_____): _____

2.) Using your graph paper, ***create a distance (y-axis) - time (x-axis) graph***. Use a line to connect your starting and finish points for each mode of travel, using your ***average speed*** . Make sure to include a key to indicate what each line represents. *Don't forget your axis and graph titles!!*

3.) Describe each of the 3 lines. What does the slope (steepness) of the line represent in this activity?

_____

_____

_____

_____

4.) If you recorded all of your classmates' data on your graph, how could you quickly tell who was the fastest and slowest runner in the class?

_____

_____

5.) A straight line between two points means that speed is constant from start to finish. Do you think this is true of walking, running, and 'other'? What are some reasons speed may change between start / finish?

_____

_____

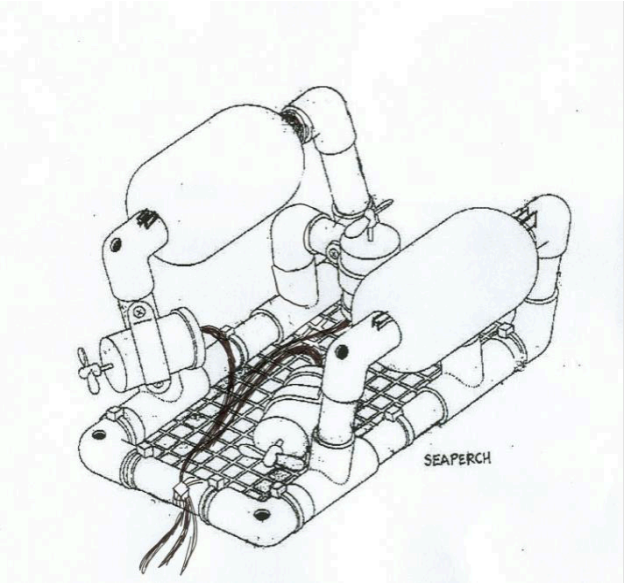
_____

6.) **1 meter / second = 2.24 miles / hour**

Can you figure out how fast you ran in miles / hour (mph)?

BONUS +5 : *On your graph paper, try to draw another "line" between the start and finish points that more accurately represents your 'running' speed. (**hint: your time and distance will always be increasing, unless you ran backwards at some point :)***

SeaPerch Speed Lab (Connections)



Prediction: If I find the average speed of my SeaPerch after it travels 2 meters, then its average speed will be _____ meters/second.

Directions:

1. With your SeaPerch team/group, measure 2 meters and mark the start / finish point.
2. Set your SeaPerch in the water at the indicated start sign.
3. Time the SeaPerch to see how long it takes for it to travel 2 meters. Record your data.
4. Make three trials and find the average speed of the three trials, just like you did in the last activity. Record the data.
5. Add up your three speeds and divide by three to find the average speed of your SeaPerch.

Trial	Distance	Time	Speed
1	2 meters	seconds	m/sec
2	2 meters	seconds	m/sec
3	2 meters	seconds	m/sec
Average			m/sec

Analysis

Answer the following questions after you have found the average speed of your SeaPerch.

1. What was the average speed of your SeaPerch? What formula did you use?

_____

2. How close was your prediction you made in the beginning of the lab?

_____

3. Where does the SeaPerch get the energy to move through the water?

_____

_____

4. Did your SeaPerch travel at a constant speed? Why or why not?

_____

_____

_____

6. What are some key differences between a SeaPerch's movement and your movement? What causes the SeaPerch to face additional forces of friction?

_____

_____

_____

7. When did your SeaPerch decelerate? Why?

_____

_____

8. Why is it important to use an *average speed* with multiple trials, instead of just using the speed from a single trial?

_____

_____

9. How far will the SeaPerch travel if its speed is 0.80 meters/second in 8 seconds? Show the formula you used and your work.

10. How do you think we could make the SeaPerch go faster or slower?

_____

_____

_____

_____