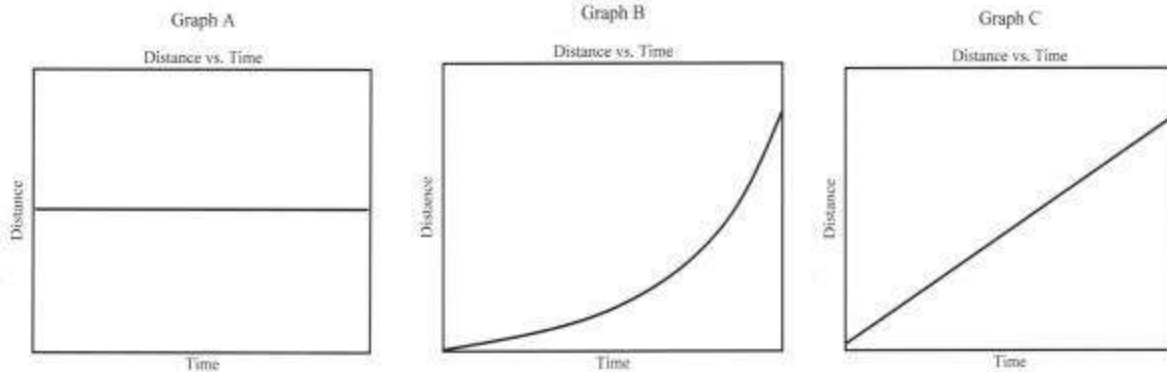


9th Grade Motion, Force, and Mechanical Energy Performance Assessment

(INDIVIDUAL RESPONSE)

1. Observe the motion of the bubble rising in the tube.



- a. Which graph best represents the observed motion? _____.
- b. Define the term speed using the words distance and time.
- c. Explain why your graph choice illustrates the motion of the bubble using the words speed, distance, and time.

Design and conduct an investigation to describe the motion of the bubble using a distance vs. time graph.

(GROUP RESPONSE)

2. Write a plan for your investigation. Your plan must include:
 - a. Question you are testing
 - b. Hypothesis (i.e. describe the expected results)
 - c. Materials list
 - d. Procedures (As part of your plan, choose an appropriate time interval.)
 - e. Design for a data table

3. Now conduct your investigation and record your data in your data table. Record the color of the bubble tube you have been given on the space below: (GROUP RESPONSE)

(QUESTIONS 4-11: INDIVIDUAL RESPONSE)

4. Graph your data, using as much of the paper as possible. Draw a best-fit line or curve through the data points. (INDIVIDUAL RESPONSE)

5. Use **experimental data** from your investigation to **describe the speed** of the bubble. (INDIVIDUAL RESPONSE)

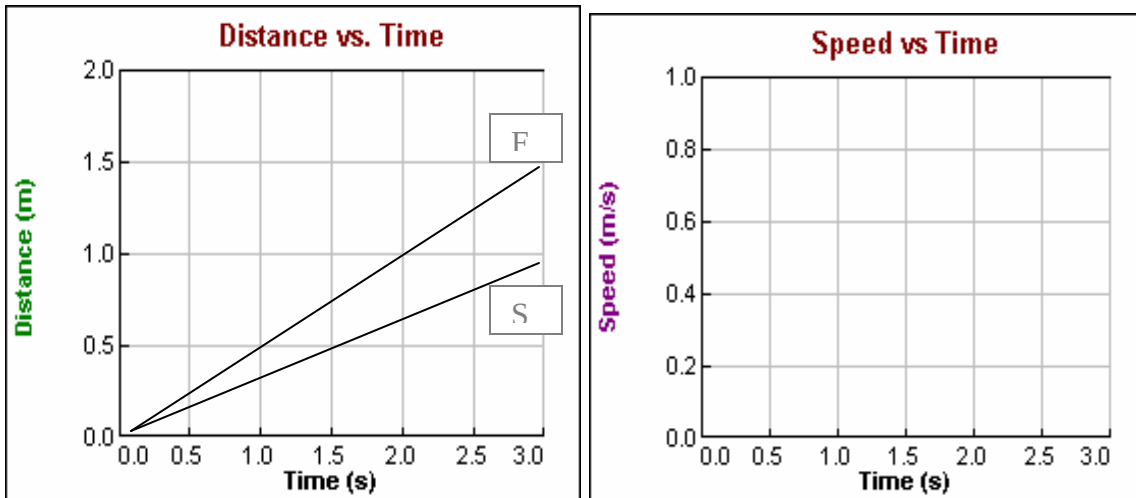
6. Use data from your investigation to **calculate** the average speed of the bubble. Explain your answer using appropriate formulas and calculations. (INDIVIDUAL RESPONSE)

7. Your teacher will supply you with a second bubble tube. Observe the motion of the bubble in the two tubes simultaneously. Record the color of the bubble tube you have been given on the line below:

- a. Compare the motion of the two bubbles and draw another line or curve on your distance vs. time graph that represents the motion of the second bubble. Label either lines (or curves) on the graph.
- b. How did you decide where to draw the second line or curve?

8. Without opening the tube, is it possible to change the speed of the bubble in either tube? If possible, explain how the speed would change and why? If not, explain why?

9. Alison performs the previous experiment and obtains the following distance vs. time data for the slow bubble tube (S) and fast bubble tube (F).

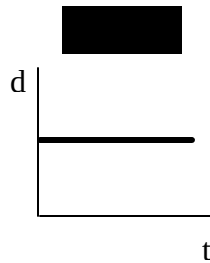


- Calculate** the speeds from Alison's d vs. t graph.
- Display** the calculated speeds on the Speed vs. Time graph and **label** using (S) and (F).
- What kind of motion is being displayed on the Speed vs. Time graph based on your calculations?

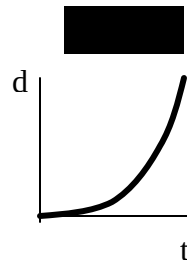
10. A diver is rising to the surface after examining the wreck of a cargo ship. The onboard monitor shows the position of the divers every three seconds as illustrated below.



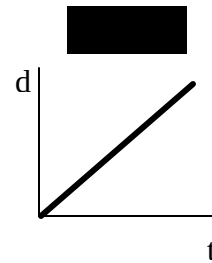
A. Which of the **distance vs. time** graphs below best illustrates the motion of the diver? _____



Graph 1



Graph 2

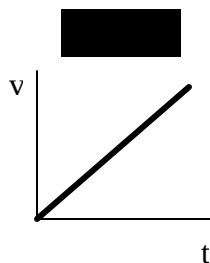


Graph 3

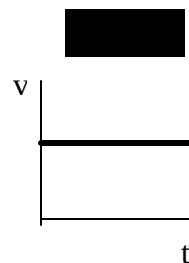
B. Explain the reason for your choice.



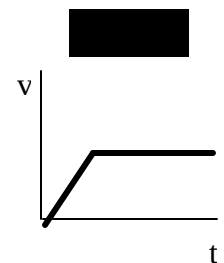
C. Which of the **speed vs. time** graphs below best illustrates the motion of the diver? _____



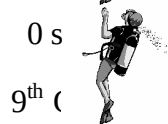
Graph 4



Graph 5



Graph 6



D. Explain the reason for your choice.