

LINEAR LEAPING

Throughout your Physical Education class this year you have learned how to improve your physical fitness by repeating exercises with good form, especially for the exercises: Burpees, Bench-ups, Side-to-side Jumps, and Jumping Jacks.

Group Discussion Question

Can you maintain a pace in your exercising for 5 minutes that keeps your rate of exercise constant throughout the entire time?

Group Investigation

In gym class, you have looked at the four exercises that we will practice today:

- Choose **one exercise** that you will try to maintain a **consistent pace for 5 full minutes**.
- In your group, each person in the group must complete a different exercise. In your group, you rotate through the following roles: **exerciser, counter, timer/recorder, exercise trainer (checking form)**.

Each person in the group as the exerciser will do the following:

- Warm up by completing your exercise from 5-20 times. Make sure that other members of your group should count, record, and check the exercise's form and use these warm-ups as practice for the roles.
- Once you have warmed up and you are consistently able to do your exercise with good form and your group members can do their tasks efficiently, begin the experiment.
- *Note: the final number of warm-ups you do is the starting value of the experiment.* The recorder/timer will measure over five minutes the **appropriate intervals of time** of choice, while the counter keeps track of the total number of correct exercises you have completed. You should also keep track of how many exercises you have completed over time. Throughout this experiment, you should attempt to try to keep your rate of exercise as consistent as possible. You should have at least 5 pieces of data beyond the initial warm-up value.
- Record your results in a table that shows the time elapsed and the total number of exercises completed.
- Rotate through the roles so that each person conducts the exercises and collects the data.

LINEAR LEAPING – PART ONE

Individual Analysis

Be sure that each person has the data that they created for their exercise (not the data they collected). The work will be done **on your own**.

Take a rest from the leaping and move onto to the linear...

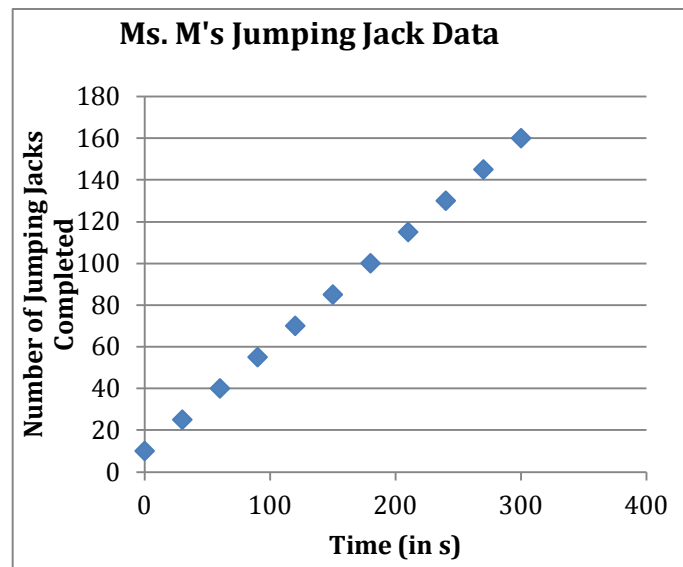
1. **A2, C2** Create a graphical display for your data, with appropriate labels and indicate the independent and dependent variables.
2. **K2** Is your data linear? Justify your response in at least two ways.

3. Assume the data does have a linear relationship (regardless of your answer in question 2).
 - a. **K1** Determine the equation of the line for this data.
 - b. **K1, A1** What is the slope of this line? Comment on what this value means realistically.
 - c. **A2** What is the y-intercept of this line? Comment on what this value means realistically.
 - d. **K2, A1** Using your linear model, how many exercises could you do in 20 minutes (whew!)? Confirm your response using the equation and the graph.
 - e. **K2, A1** Using your linear model, how many minutes would it take to do 400 exercises? Confirm your response using the equation and the graph.

LINEAR LEAPING – PART TWO

Individual Analysis

4. **T2, C1** If you decided to exercise at your full potential, instead of trying to perform at a consistent rate, describe how you think the data and the linear model would change.
5. Before packing for the weekend, Ms. Makunja modelled the Jumping Jacks. She is fit exerciser. She then created this graph from her experience.
 - a. **A2, C2** Explain in words and with a table, how Ms. M's data collection exercising looked.
 - b. **T2, C2** Mrs. Winston felt fit this morning during a long warm-up, but Mr. S was mindful that he did not want Mrs. W to deliver the baby this week. So Mrs. W conducted the Jumping Jacks, she was *very very gentle* in her work out.



Prepare a new graph for Mrs. W that would result from the change in the participant exercising. Explain your reasoning.

- c. **T2, C2** How would the graph differ if the group has used Mr. Nourse, with his tremendously-fit, yoga-master, healthy exerciser, who had done 50 warm-ups ahead of time.

Prepare a new graph for Mr. Nourse that would result from the change in the participant exercising. Explain your reasoning.

6. **T2, C1** If Mr. S. decided to exercise at his full potential during the warm-up, then arrived at the experiment data collecting time exhausted, describe how you think the data and the linear model would change.