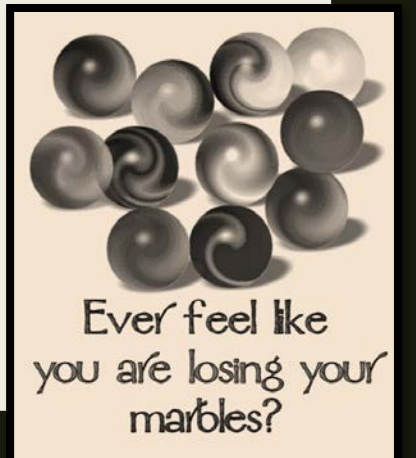


# MARBLE RACING

Practice Calculating Speed



# Problem

- How does the angle of the ramp affect the marble's speed?



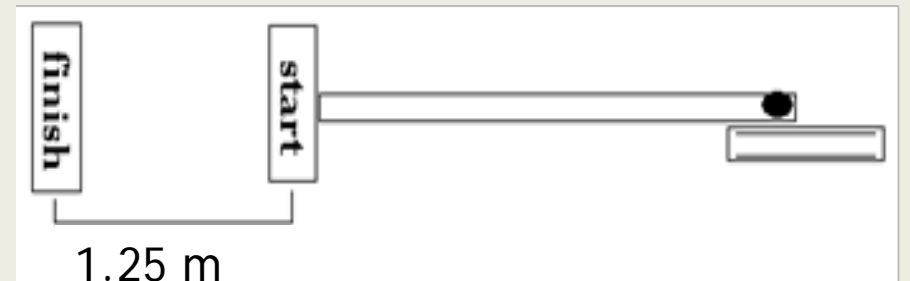
# Materials



- Ruler
- Meter stick
- Masking Tape
- 5 Books
- Marble
- Timer
- Protractor

# Procedure

1. Mark a finish line on the lab bench or floor with a piece of tape. Use a meter stick to mark a start line 125 cm (1.25 meters) away.
2. Set up a ramp with your ruler to roll a marble or toy car down. The bottom end of the ramp should be at the start line.
3. Set the ramp at a low angle using 1 text book. Measure the angle of the ramp.
4. Start the timer when the marble crosses the start line and stop it when it gets to the finish line. You may want to place an object at the finish line, so that it will make a loud sound when the marble hits it.
5. Repeat this 3 times. Find the average time of your results (remember to find the average, you add the values and then divide by the number of values). Round your average to the nearest hundredths place.
6. Repeat the procedure in steps 4 and 5, increasing the height of the ramp by one book each time. Measure the angle of the ramp.

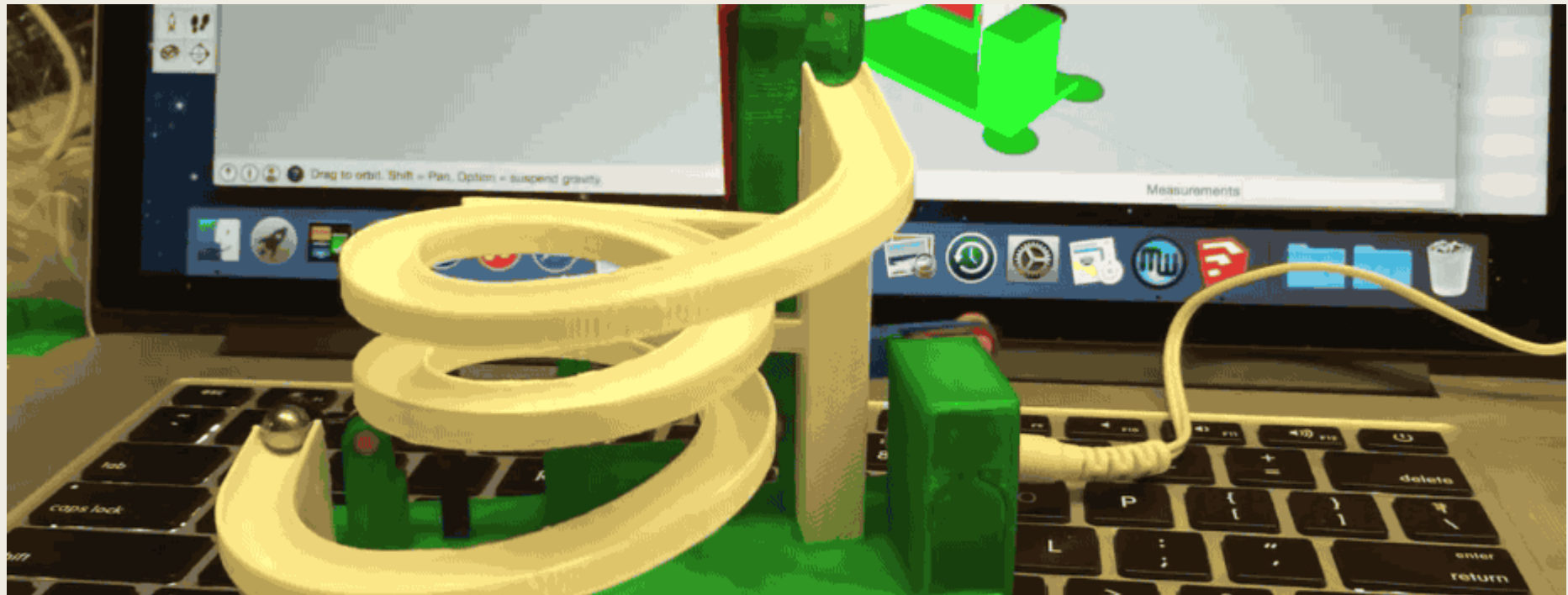


# Identify Variables

- IV
- DV
- CV

# Hypothesis

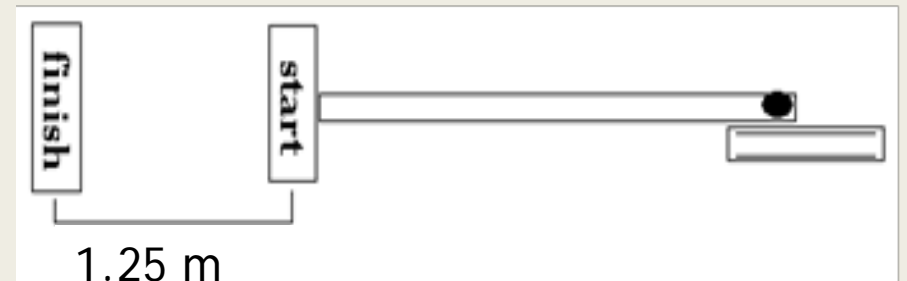
- If, then, because





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1

Make a line graph to show the relationship between the angle of the ramp (IV) and the marble's average speed (DV).

2

Summarize your graph in paragraph form (qualitative and quantitative)

- “The graph shows the effect of (IV) on (DV)” Discuss highs/lows (“the fastest time was . . .” / “the slowest time was . . .”)
- Trends/Patterns: positive (both increase together), negative (as one increases, the other decreases), no trend (no real pattern is evident).

## Data Analysis

# Conclusion Questions

1. Make a claim on the effect angle have on the speed of a marble.
2. What effect does time have on the speed of a moving object?
3. Was your hypothesis proven or rejected? Explain your answer.
4. How is average speed different than instantaneous speed?
5. What is the definition of constant speed?
6. Which definition of speed (average speed, constant speed, instantaneous speed) did we use in this investigation? Why?
7. Why are line graphs used for data like this?
8. What challenges did you have in completing this lab?
9. What is a real life example of this experiment, where angle of descent might affect speed?
10. Do you think lighter or heavier marbles would change your results? Explain.

