

NAME _____

PROBLEM: To calculate the speed of a rolling marble.

BACKGROUND INFORMATION: *Motion* is a change in position in a certain amount of time. All motion is compared to a *frame of reference*. The rate at which an object moves is its *speed*. Speed can be calculated by this formula:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Speed} = \text{Distance} \div \text{Time}$$

Objects whose speed does not change are said to have *constant speed*. *Average speed* is obtained by dividing total distance by total time.

MATERIALS: Stopwatch or clock w/ second hand ruler
 Marble Small block
 Meter stick or measuring tape Masking tape

PROCEDURE – PART 1:

1. On a level surface, make a ramp with the ruler and the block.
2. Roll the marble down the ramp.
3. Record the distance the marble rolls from the bottom of the ramp (ruler) across the floor in two seconds.
4. Repeat 4 more times.
5. Record the distance the marble rolls in three seconds.
6. Repeat 4 more times.
7. Record all data.

PROCEDURE – PART 2:

1. Using the same ramp, measure ½ meter straight across the floor to the bottom of the ramp.
2. Put a piece of masking tape at the ½ meter mark.
3. Roll the marble down the ramp.
4. Time how long it takes the marble to reach the ½ meter mark.
5. Repeat 4 more times.
6. Measure 1 meter straight across the floor to the bottom of the ramp.
7. Repeat steps 3 – 5.
8. Record all data.

DATA:**DISTANCE TRAVELED**

| Trial | 2 Sec | Speed D/2s | 3 Sec | Speed D/3s |
|-------|-------|------------|-------|------------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| Mean | | | | |

TIME

| Trial | ½ meter | Speed ½ m/T | 1 meter | Speed 1m/T |
|-------|---------|-------------|---------|------------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| Mean | | | | |

CLASS AVERAGES

| Group | Speed @ 2 sec | Speed @ 3 sec | Speed @ ½ m | Speed @ 1 m |
|--------|---------------|---------------|-------------|-------------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| 13 | | | | |
| 14 | | | | |
| 15 | | | | |
| Mean | | | | |
| Median | | | | |
| Mode | | | | |
| Range | | | | |

Create a graph to display the **most significant** data.

CONCLUSION:

Write a paragraph discussing the results of this activity. Explain what happened and why.