

Name: _____

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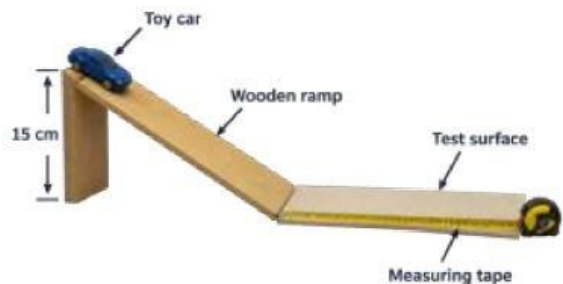
Science Process Skills: Variables and Bar Charts

Investigation: Toy Car on Different Surfaces

Aisyah and Ravi set up an experiment to find out how the type of floor surface affects the distance a toy car travels. They roll the same toy car down a ramp onto four different surfaces and measure how far it travels in centimeters (cm).

To make it a fair test, they:

- Use the same ramp at the same height (15 cm).
- Release the car from the top without pushing it.
- Use the same toy car for every trial.
- Test each surface three times and calculate the average distance.



Part 1: Identifying Variables

Write the correct variable for each description below. Choose from: **Independent variable**, **Dependent variable**, or **Control variable**.

What each variable means:

- **Independent variable:** the factor you change on purpose. In this investigation, it is the type of surface.
- **Dependent variable:** the result you measure or observe. Here, it is the distance the car travels.
- **Control variables:** the factors you keep the same for a fair test, such as the ramp height, the release method, and the toy car.

1. The variable that is changed on purpose by the students (**the type of surface**):

2. The variable that is measured to get results (**the distance traveled**):

3. The variables that are kept the same to make the test fair (**ramp height, size of car**):

4. State **two** control variables in this investigation and explain why they must be kept the same.

Part 2: Results Table and Bar Chart

Here are the average results collected by Aisyah and Ravi:

Surface Material	Average Distance Traveled (cm)
Smooth Tile	80
Polished Wood	65
Sandpaper	35
Thick Carpet	15

5. Draw a neat bar chart on the grid below to display the results from the table.

Checkpoint Graph Checklist:

- ☐ Give your chart a clear title.
- ☐ Label the y-axis with variable name and unit: **Average Distance (cm)**.
- ☐ Use an even, numbered scale on the y-axis (e.g., 0, 10, 20, 30...).
- ☐ Label the x-axis with: **Surface Material** and label each bar clearly.
- ☐ Draw bars with equal widths and leave equal spaces between bars.

Part 3: Drawing Conclusions

6. Which surface allowed the car to travel the furthest?

7. Which surface produced the greatest friction? Explain how the data supports your answer.

8. Predict how far the car might travel on a rubber mat if rubber has more friction than wood but less friction than sandpaper.

☐ A) 90 cm

☐ B) 50 cm

☐ C) 25 cm

☐ D) 10 cm