

Investigating Forces with Max and Nova

Learning objective: To identify and describe the effects of forces including friction, air resistance, and magnetism on moving objects.

Use this writing frame to document your investigation into how different forces affect the motion of a toy car. Use the word bank to help explain your scientific reasoning and ensure you include specific examples from your experiment.

Max and Nova set up an experiment to discover how different surface textures change the way a toy car travels across a track.

Word bank: friction · surface · resistance · opposing force · accelerate · decelerate · consequently · furthermore · in contrast · magnetic attraction · gravity

1. Introduction: State the purpose of your experiment. What scientific question were you trying to answer? Begin with: The aim of our investigation was to explore how... (2 marks)

2. Methodology: Describe the surfaces you tested and how you ensured it was a fair test. Begin with: To ensure our test was fair, we kept the following variables the same:... (3 marks)

3. Observations: Explain what happened to the car on different surfaces. Use the word 'friction' in your explanation. Begin with: When the car travelled over the carpet, it slowed down because... (3 marks)

4. Analysis: Explain why a smooth surface allows an object to travel further. Begin with: I observed that the car travelled the furthest on the smooth surface because... (3 marks)

5. Higher-Order Thinking: Compare and contrast the effects of air resistance on a apartment piece of paper versus a crumpled ball of paper. Begin with: Although both objects are affected by air resistance, the crumpled ball... (4 marks)

6. Justification: If you were designing a bicycle tyre, what properties would you want it to have and why? Justify your answer. Begin with: If I were designing a tyre, I would choose a material that... (4 marks)

Extension challenge: Imagine a world without any friction. Write a short paragraph explaining how daily activities, such as walking or holding a pencil, might change. What might happen if gravity suddenly became twice as strong?