

Nova's Scientific Investigation: The Forces Field Journal

Learning objective: To identify, measure, and analyse the effects of air resistance, water resistance, and friction as forces that act between moving surfaces.

Join Nova the barn owl on an investigative mission. Choose an object to test, such as a paper aeroplane, a toy car on different surfaces, or a floating object in water. Use this template to record your scientific findings accurately. Ensure you use precise scientific vocabulary when explaining your observations.

Word bank: friction · air resistance · water resistance · surface area · gravity · drag · acceleration · deceleration · force · newtons

1. Hypothesis: Explain what you think will happen to your object's motion and justify your reasoning using your knowledge of forces. (2 marks)

2. Methodology: Describe the steps you took to conduct your test, ensuring you kept it a fair test by controlling variables. (3 marks)

3. Observations: Record your findings. If you used a force meter, note the measurements in Newtons. If not, describe the speed and movement you observed. (2 marks)

4. Analysis: Compare and contrast the movement of your object on two different surfaces or in two different environments. What was the impact of friction or drag? (4 marks)

5. Evaluation: What might happen if you altered the surface area of your object? Explain how this would change the amount of air or water resistance acting upon it. (3 marks)

6. Conclusion: Synthesise your results. Based on your evidence, was your original hypothesis supported or refuted? Explain why. (3 marks)

Extension challenge: Design a 'Greater Depth' experiment: If you were tasked with designing a vehicle to travel across a muddy field as quickly as possible, how would you minimise the impact of friction? Draw a labelled diagram of your invention and write a paragraph justifying your design choices based on the principles of forces.