

Forces in Motion: Nova's Scientific Sketchbook

Learning objective: To identify and illustrate different types of forces, including friction, air resistance, and gravity, acting on moving objects.

Use the drawing prompt below to create a diagram of an object in motion. Use your scientific knowledge to add arrows and labels, showing the forces acting upon the object.

Draw: Draw a high-quality, scientific diagram of a mountain bike moving down a grassy slope. The style should be clear and neat, like a textbook illustration. Include the ground (the slope), the bike, and use bold arrows to represent forces. Ensure the arrows are of different colors or lengths to show the relative strength of the forces. Include Nova the owl in the corner wearing goggles, observing the scene with a notepad.



Label words: Gravity · Friction · Air resistance · Upward push · Motion · Surface · Contact force · Non-contact force

Steps:

1. Step 1: Draw a mountain bike rolling down a gentle grassy hill. Add an arrow to show the direction of motion.
2. Step 2: Label the force that pulls the bike towards the center of the Earth.
3. Step 3: Draw and label an arrow showing the friction between the tyres and the grass.

4. Step 4: Explain why the bike would move faster if it were traveling on smooth tarmac instead of long, thick grass. Use the word 'friction' in your answer.
5. Step 5: Compare and contrast how air resistance acts on the cyclist compared to how gravity acts on the bike.
6. Step 6: Justify why a cyclist might want to crouch low over their handlebars to reduce the effect of air resistance.