Nova’s Forces and Motion Challenge

Learning objective: To identify and explain the effects of forces including gravity, air resistance, water resistance, friction, and the use of simple machines.

Help Nova the owl master the physics of flight and motion! Read each question carefully and select or write the correct answer. Good luck!

Answer Key: 1. A (Gravity), 2. True, 3. Friction, 4. B (Air resistance), 5. False (it acts in the opposite direction), 6. Newton, 7. B (Pulleys), 8. True, 9. Mass, 10. A (Gears).

Word bank: Gravity · Friction · Air resistance · Mass · Newton · Levers · Pulleys · Gears

1. 1. Which force pulls objects towards the centre of the Earth? A) Gravity* B) Magnetism C) Friction D) Upthrust (1 mark)

2. 2. True or False: Friction is a force that acts between two surfaces that are sliding, or trying to slide, across each other. (1 mark)

3. 3. What force slows down an object moving through the air, like a paper aeroplane? (1 mark)

4. 4. Which of these is a way to reduce friction? A) Using rough surfaces B) Adding lubricant/oil* C) Applying more pressure D) Stopping movement (1 mark)

5. 5. True or False: Water resistance acts in the same direction as a swimming dolphin. (1 mark)

6. 6. What is the unit of force named after the scientist who studied gravity? (1 mark)

7. 7. Which simple machine uses a wheel and a rope to lift heavy loads? A) Levers B) Pulleys* C) Screws D) Inclined planes (1 mark)

8. 8. True or False: A larger surface area usually leads to greater air resistance. (1 mark)

9. 9. What do we call the amount of matter in an object, usually measured in kilograms? (1 mark)

10. 10. Which mechanism helps to change the speed or direction of rotation in a machine? A) Gears* B) Springs C) Magnets D) Elastic bands (1 mark)

Draw: Draw a diagram of a simple lever being used to lift a heavy rock. Label the 'load', the 'effort', and the 'pivot'.

Extension challenge: Nova is designing a parachute. If her parachute has a mass of 500g and she adds 200g of extra weight, how will the air resistance change as she falls? Explain your reasoning in two sentences.