

By the end of Spring 1, you will know:

Vectors and scalars

1. What is a scalar?
2. What are some examples of scalar quantities?
3. What is a vector?
4. What are some examples of vector quantities?
5. How can a vector be represented?
6. What is displacement?

Forces between objects & resultant forces

1. What is a force?
2. What can a force do to an object?
3. What are the units of force?
4. What is meant by a contact force?
5. Give an example of a contact force.
6. What is meant by non-contact force?
7. Give an example of a non-contact force.
8. When two objects interact what can be said about the forces on each other?
9. What is a resultant force?
10. What happens if the resultant force on an object is zero?
11. What happens if the resultant force on an object is greater than zero?
12. How do you calculate the resultant force if the forces are acting in the same direction?
13. How do you calculate the resultant force if the forces are acting in different directions?
14. What is a free-body diagram? (H)

Force and elasticity

1. What is meant when an object is called elastic?
2. How do you measure the extension of a stretched object?
3. How does the extension of a spring change when a force is applied to it?
4. What is meant by the limit of proportionality of a spring?
5. What equation links force, spring constant and extension?
6. What are the units of the spring constant?
7. What are the units of extension?

Centre of mass

1. What is meant by centre of mass?
2. Where is the centre of mass of a meter ruler located?
3. Where is the centre of mass of a freely suspended object located?
4. How do you find the centre of mass of a symmetrical object?

Parallelogram of forces (H)

1. What is meant by the parallelogram of forces?
2. What can the parallelogram of forces be used for?
3. What is the resultant force on a scale diagram of parallelogram of forces?

Resolution of forces (H)

1. What is meant by resolution of a force?
2. How do you resolve a force?
3. What can be said about the resultant force if an object is in equilibrium?

Speed, velocity, acceleration and Distance-Time Graphs

1. What is the equation to calculate speed?
2. What are the units of speed?
3. What is the difference between speed and velocity?
4. What is the equation to calculate acceleration?
5. What are the units of acceleration?
6. What is the difference between acceleration and deceleration?
7. How does a distance-time graph show if an object is stationary?
8. How does a distance-time graph show if an object is moving at a constant speed?
9. What does the gradient of a distance-time graph represent?

Velocity-Time Graphs and analysing motion graphs

1. How can a change in velocity be measured?
2. What does the gradient of the line on a V-T graph represent?
3. What does a horizontal line on a V-T graph represent?
4. What does a negative gradient on a V-T graph represent?

5. What does the area under the line on a V-T graph represent? (H)
6. How can the speed be calculated from a D-T graph when the speed is constant? (H)
7. How can the speed be calculated from a D-T graph when the speed is changing? (H)
8. What equation links initial velocity, final velocity, acceleration and distance? (H)

Force and acceleration

1. What equation links force, mass and acceleration?
2. What are the standard units of mass?
3. What effect does a greater resultant force have on the acceleration of an object?
4. What effect does a greater mass have on the acceleration of an object?
5. What is meant by the inertia of an object? (H)

Weight and terminal velocity

1. What is the difference between mass and weight?
2. What is the value for acceleration when an object is acted on only by gravity?
3. What equation links weight, mass and gravitational field strength?
4. What are the units of gravitational field strength?
5. What does terminal velocity mean?
6. What can be said about an object's resultant force if it is at terminal velocity?

Forces and breaking

1. What forces oppose the driving force of a vehicle?
2. What two components does the stopping distance of a vehicle depend on?
3. What factors affect thinking distance?
4. What factors affect breaking distance?

Momentum and using conservation of momentum (H)

1. What is the equation to calculate momentum?
2. What is the unit of momentum?
3. What is meant by conservation of momentum

By the end of Spring 1, the skills you will know are:

Force and extension

1. Name the dependent variable in this experiment.
2. What is the relationship between weight and spring extension?
3. What is the equation for spring constant?
4. Why is it important safety glasses were worn?
5. What is the function of the "pointer" in the experiment?
6. Which parts of the spring should be measured in the experiment?
7. How do you work out change in length?

Key Maths Skills

8. Rearrange equation
9. Measuring using a ruler
10. Gradient of a line (H)

Acceleration

1. What is Newton's second law?
2. What is the equation linking force, mass and acceleration?
3. Why is it an advantage to use light gates?
4. What is the potential source of error in this investigation?
5. Draw a free body diagram to show the forces acting on the trolley during the experiment.
6. List all the contact forces.
7. List all the non-contact forces.
8. What is the difference between speed and velocity?

Key Maths Skills

1. Rearrange equation
2. Gradient of a line (H)

By the end of Spring 2, you will know:

The nature and properties of waves

1. What are the two types of waves?
2. What two things can be transferred by waves?
3. What is the direction of oscillation in a transverse wave?

4. What is the direction of energy transfer in a longitudinal wave?
5. Give an example if a transverse wave.
6. Give an example of a longitudinal wave.
7. What do mechanical waves need to transfer.
8. What type of wave travel through air?
9. Define amplitude
10. Define wavelength
11. Define frequency
12. Define period
13. Give the equation to calculate period.
14. What are the units of period
15. What are the units of frequency.
16. Draw and label a transverse wave.
17. Draw and label a longitudinal wave.
18. What is the equation to calculate wave speed?
19. What is the units of wave speed?

Reflection and refraction (H)

1. What 4 things do substances do to electromagnetic waves.
2. What happens to plane waves crossing a boundary between two different materials?

More about waves

1. What are sound waves?
2. What can sound waves not travel through?
3. Give three ways waves can be investigated.

The electromagnetic spectrum

1. What type of wave is an EM wave?
2. What do EM waves transfer energy to?
3. How many waves is the EM spectrum?
4. What speed do they travel in a vacuum or in air?
5. How are the waves that form the EM spectrum grouped?
6. Name the 7 regions of the EM spectrum.

Light, infrared, microwaves, radio waves and communications

1. Give a use for light, infrared, microwave and radiowaves.
2. What causes the refraction of waves? (HT)
3. What can electrical circuits do to produce radiowaves? (HT)

4. Name a danger of light, infrared and microwave.

Ultraviolet waves, X-rays, gamma rays and uses in medicine

1. Give a use for UV waves, X-rays and gamma rays.
2. How can EM waves be generated or absorbed from atoms? (HT)
3. Where do gamma rays originate from? (HT)
4. Which are ionising waves on the EM spectrum?
5. What is radiation dose a measure of?
6. Give a risk of UV, X-rays and gamma rays.

Magnetism and electromagnetism

1. Where is the magnetic field strongest?
2. What type of force do two magnets exert on each other?
3. What do 2 like poles do?
4. What do 2 unlike poles do?
5. What does a permanent magnet produce?
6. How can an induced magnet be made?
7. What type of force does induced magnetism cause?
8. What happens to induced magnets when they are removed from a magnetic field?

Magnetic fields and magnetic fields of electric devices

1. What is the magnetic field?
2. Name 3 magnetic materials
3. What affects the strength of a magnetic field?
4. What direction does a magnetic field go?
5. What does a compass contain?
6. What direction do compass needles point?
7. What is made when a current flows through a wire?
8. What does the strength of a magnetic field in a wire depend on?
9. What is the magnetic field in a solenoid like?
10. How can you increase the strength of a solenoid?
11. What is an electromagnet?

The motor effect (H)

1. What is the motor effect?
2. What equation links force, magnetic flux density, current and length?
3. What are the units for each?
4. What is the basis of an electric motor?

By the end of Spring 2, the skills you will know are:

Waves

1. What piece of equipment is used to measure time?
2. Sketch the wave produced on the string and label it with amplitude and the wavelength.
3. Describe the direction of movement of particles and transfer of energy in the wave on the string.
4. A student pushes a slinky back and fourth to investigate longitudinal waves, draw a labelled diagram of this.
5. What is an alternative way of measuring wavelength that does not involve a strobe light?
6. What is the function of the white screen and lamp?
7. How can frequency be calculated?
8. How can wave speed be calculated?
9. What are the units for wavelength, frequency and wave speed?
10. What is an advantage of using a wave generator or motor to produce waves in a ripple tank instead of producing them by hand?

Key Maths Skills

1. Rearrange equations
2. Substitute into equations
3. Converting between units and standard form