



Year 8

Physics

revision pack

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Instructions:

- 1) When starting revising a big question use the short summary and your own knoweldge to make a spider diagram in the space provided. The practice questions for each big question are broken into sections.
- 2) Before starting the practice questions for a section read the pages in the self-study pack that are noted at the top of each section.
- 3) Attempt all the practice questions in your book or on lined paper.
- 4) Check the answers using the markscheme in a green pen. Add any missing information to your spider diagram.

Where are we in space?

(A short summary of what we have learnt this year in answer to the big question above)

We live on Earth, a planet constantly moving through the universe. It rotates on its axis every 24 hours, giving us day and night.

The sun's gravity is always changing our planet's direction, making it curve in an orbit around the sun. Each orbit takes one year. England has summer and winter because the Earth's axis is slightly tilted. For part of each orbit England is tilted towards the sun and absorbs more energy. This makes the UK hotter and gives us summer.

Our sun is an average-sized star among billions in the universe. It belongs to the Milky Way; a collection of billions of stars called a galaxy. The Milky Way is just one of around 200 billion galaxies, each containing billions of stars, that make up our universe.

Task - Draw a spider-diagram summarising the information in the text above

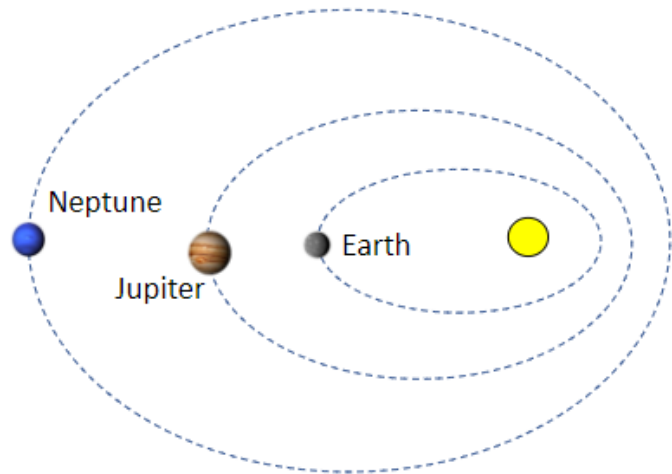
Knowledge Practise & Application:

Practise questions to test your recall of important knowledge and ability to apply this knowledge. Italics note relevant self-study packs to refer to should you get stuck.

Part A: P4 Topic self-study pack – Lessons 01, 02, 03

1. What is the Earth's main source of light?
2. What is at the centre of the solar system?
3. What is the solar system?
4. The Earth is a giant _____ and we live on its _____.
5. What causes night and day?
6. How long does it take the Earth to rotate once?
7. How long does the Earth take to orbit the sun?
8. How long does the moon take to orbit the Earth?
9. Is gravitational attraction a contact or non-contact force, and why?
10. On Earth gravity pulls everything towards the _____ of the Earth.
11. What does the size of a planet's gravity depend on?
12. Why is the moons gravity weaker than the Earth's gravity?
13. Mercury is smaller than Earth. How is the gravitational pull different?
14. What object in the solar system has the strongest gravity, and why?
15. How does gravity change with distance from an object?
16. The resultant force on all planets acts towards the _____ of the solar system.
17. How does the resultant force on planets affect their motion?
18. What causes planets to orbit the sun?

Earth: 67,000 mph, shorter more curved orbit
Jupiter: 29,00 mph, longer less curved orbit
Neptune: 12,000 mph, longest least curved orbit



19. How does the speed of the planets change with the distance from the sun?
20. Do planets closer to the sun or further away follow more curved paths?

Answers:

Part A:

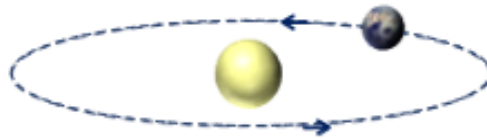
1. The sun
2. The sun
3. The sun, eight planets (and their moons), lots of asteroids, and a few dwarf planets
4. Sphere, surface
5. The rotation of the Earth
6. 24 hours
7. One year
8. One lunar month (28 days)
9. Non-contact. Because it can act at a distance
10. Centre
11. How massive the planet is.
12. Because the moon is less massive than the Earth
13. The size of the gravitational pull of Mercury will be smaller than that of Earth, because it is less massive.
14. The sun because it is the most massive.
15. Decreases slowly but does not stop.
16. Centre
17. Causes them to change direction.
18. The gravitational pull of the sun.
19. The speed of planets decreases the further they are from the sun
20. The planets closest to the sun follow more curved paths than those further away

Knowledge Practise & Application:

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Part B: P4 Topic self-study pack – Lessons 05, 06

1. What is the main energy store in stars?
2. Why does the sun seem brighter and larger than other stars?
3. What is a light year?
4. What is a galaxy?
5. How many galaxies are there in the universe?
6. Why can we see planets in our solar system?
7. The Earth spins on an axis which is _____ at an _____ compared to the sun.
8. What are the two hemispheres of the Earth?
9. Which hemisphere is the UK located?
10. How often does the hemisphere tilted towards the sun change?
11. What season is it when a hemisphere is tilted away from the sun?
12. What season is it when a hemisphere is tilted towards the sun?
13. The sun transfers energy to the planets by _____.
14. Why is more energy transferred to a hemisphere from the sun in the summer?
15. If it's summer in the UK, what season will it be in Australia, and why?



Answers:

Part B:

1. Nuclear store of energy
2. It is much closer to Earth than other stars.
3. The distance light travels through space in one year.
4. A group of billions of stars
5. (Scientists estimate) 200 billion.
6. Because they reflect some of the light from the sun.
7. Titled, angle.
8. Northern and southern hemisphere.
9. The Northern hemisphere.
10. Every half orbit so every six months.
11. Winter
12. Summer
13. Radiation
14. The Earth is tilted towards the sun so the surface is illuminated for longer each day and sun light is less spread out.

Why do things move and change?

(A short summary of what we have learnt this year in answer to the big question above)

Speed is a measure of how fast an object is moving, how many metres an object travels in one second. We can calculate the average speed of an object by measuring how long it takes to travel a certain distance and using the calculation $\text{speed} = \text{distance} \div \text{time}$. Equipment like stop watches and meter rulers are used to measure average speed. We can also use light gates to measure the time it takes for objects to travel very short distances. This is called an objects instantaneous speed. Distance time graphs show how the instantaneous speed of an object changes over time. A horizontal line on a D-T graph shows an object is stationary. A straight sloping line shows an object moving at a constant speed. Acceleration is shown by a curved line on a graph. Acceleration measures how fast the speed of an object is changing. An object with a positive acceleration is moving more and more distance every second.

Forces can explain why objects remain at “rest” as well as why they change their motion. An object that is at ‘rest’ on a planet still has forces acting on it. It’s will have weight acting downwards and a normal contact force acting up. Weight is the force which object pushes down on a surface. The weight caused by gravity = gravity (N/kg) x mass of an object (kg). Weight is measured in Newtons.

Springs exert a force on an object which is the same size, but in the opposite direction to the force an object stretches or squashes it with. All surfaces are “springy” at a microscopic level. All surfaces exert a force on any that is the same size, but in the opposite direction as the force exerted on it. This is called the “normal contact force.” The normal contact force exerted by a surface can support the weight of an object.

Levers are simple machines which can be used to increase the turning effect of a force. The turning effect of a force is increased if it is exerted further away from a levers pivot.

Task - Draw a spider-diagram summarising the information in the text above

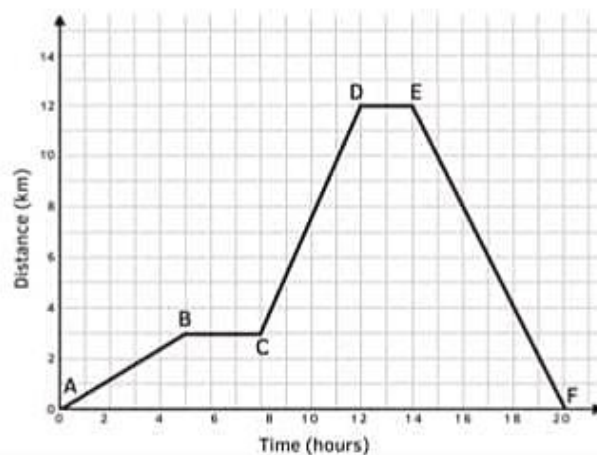
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Part A: P5 Topic self-study pack – Lessons 01, 02, 03, 04, 05

1. What two things does an objects speed depend on?
2. What is the formula for calculating speed?
3. What equipment can be used for measuring distance travelled?
4. What equipment can be used for measuring the time taken?
5. What does “steady speed” mean?
6. What does “instantaneous” speed mean?
7. What can we use to measure the instantaneous speed of an object?
8. On a distance-time graph, what does the x-axis show?
9. On a distance-time graph, what does the y-axis show?
10. How does a D-T graph show the distance of an object from its starting point?
11. How does a D-T graph show the speed of an object?

12. At what point on the D-T graph is the object the furthest from the starting point?
13. Is the object travelling faster between A-B or -C-D and how do you know?
14. Between what points on the graph is the object travelling back towards the start point?
15. What is happening to the object between B and C?



16. How does the motion of an object change if it has “positive acceleration”?
17. How does the motion of an object change if it has “negative acceleration”?
18. How does a D-T graph show an object is speeding up?
19. How does a D-T graph show an object is slowing down?

Answers:

Part A:

1. Distance travelled and time taken
2. Speed = distance \div time
3. Tape measure, metre wheel or ruler
4. Stopwatch
5. The speed is not changing/speed is staying the same
6. The time taken to travel a very short distance
7. Light gates
8. Time
9. Distance
10. Height of the graph
11. Slope of the graph
12. Between D and E
13. Faster between C-D because the slope of the graph is steeper
14. Between E and F
15. The object is not moving, it is stationary
16. It is speeding up
17. It is slowing down
18. The graph curves and goes up more every second

Knowledge Practise & Application:

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Part B: P5 Topic self-study pack – Lessons 06, 07, 08, 10

1. What two states of matter are fluids?
2. When is drag produced?
3. What causes drag?
4. Why do streamlined objects produce less drag?
5. Why do faster moving objects produce more drag?
6. What do we call the drag caused by air?
7. Why does a parachute cause a skydiver to slow down?
8. What two forces are unbalanced if a falling object (in air) is accelerating?
9. When taking measurements, scientists always take _____ readings.
10. Why do scientists take repeat readings of any measurement?
11. What is random error?
12. What do scientists calculate from a set of repeat readings?
13. What is relative motion?
14. How do we calculate relative motion of two objects moving in the same direction?
15. How do we calculate relative motion of two objects moving in the opposite direction?
16. What is the relative motion of two objects moving at the same speed in the same direction?
17. You are sitting on a train moving at 80 m/s. You start to overtake a train moving at 70 m/s. What is the train's speed relative to you?
18. You are sitting on a train moving at 50 m/s. A train passes in the opposite direction with a relative motion of 80 m/s. What is the train's speed as it passes you?



Answers:

Part B:

1. Liquids and gases
2. When an object moves through a fluid
3. Particles in a fluid pushing back on a moving object
4. They push particles more gently so fluid particles push back more gently
5. They push fluid particles away with more force (so fluid particles push back with more force)
6. Air resistance
7. It increases air resistance
8. Pull of gravity and air resistance
9. Repeat
10. To reduce the effect of random error
11. Small, unpredictable differences between any measurement and the real value
12. An average/a mean
13. The speed of an object compared to the speed of something else that is moving
14. Relative motion = fastest speed – slowest speed
15. Relative motion = speed of A + speed of B
16. Zero
17. Relative motion = fastest speed – slowest speed = 10 m/s
18. Relative motion = speed of A + speed of B. $80 = 50 + \text{speed of B}$. Speed of B = $80 - 50 = 30$ m/s

Knowledge Practise & Application:

Practise questions to test your recall of important knowledge and ability to apply this knowledge. Italics note relevant self-study packs to refer to should you get stuck.

Part C: P7 Topic self-study pack – Lessons 01, 02, 03, 05, 06, 08, 09

1. What is an object's 'weight'?
2. What are the units of weight?
3. What is an object's 'mass'?
4. What are the units of mass?
5. What two things affect an objects weight caused by gravity?
6. What is the equation for 'weight caused by gravity'?
7. How many grams are in one kilogram?
8. What does 'kilo' mean?
9. What is the weight of a washing machine on the Moon with a mass of 15kg. Gravity on the moon is 2N/kg.
10. What is the scientific term for squashing a spring?
11. What do we call forces produced by objects that have been squashed?
12. What happens to a bridge when it supports an objects weight?
13. The force the bridge exerts supporting the weight of an object is _____ in size, but _____ in direction, to the weight of the object.
14. Why are compression forces called "contact forces"?
15. What happens to a floor when a weight presses down on it?
16. Why are all solids a tiny bit springy?
17. What happens to a spring if two pulling forces are exerted on it?
18. What is an accurate measurement?
19. What is a repeatable measurement?
20. What two features does every lever have?
21. What do we use levers for?
22. How does increasing a force's distance from a pivot change its turning effect?
23. What is the equation for the turning effect of a force?
24. What is a moment?
25. How does distance affect the moment of a force?
26. If the distance between the force and the pivot is divided by four, what will happen to the amount of force needed to have the same turning effect?



Answers:

Part C:

1. The force which is pushed down on a surface
2. Newtons (N)
3. The amount of matter it contains
4. Kilograms (kg)
5. Mass of object and strength of gravity
6. Weight (N) = gravity (N/kg) x mass (kg)
7. 1000
8. 1000
9. Weight (N) = gravity (N/kg) x mass (kg) = 2 x 15 = 30 N
10. Compressing
11. Compression forces
12. It bends downwards
13. Equal, opposite
14. They are produced when two objects are touching
15. It is squashed a tiny bit
16. The holds between the particles are springy
17. It stretches
18. One that is very close to the true value
19. The same person can repeat it and get the same results
20. Rigid structure and a pivot
21. To increase the turning effect of a force
22. It increases it
23. Turning effect (Nm) = distance (m) x force (N)
24. The turning effect of a force
25. The bigger the distance from the pivot, the bigger the turning effect of a force
26. The force needed to have the same turning effect would be multiplied by four

How does information and energy spread?

(A short summary of what we have learnt this year in answer to the big question above)

Light is emitted in all directions from every point on a source. Pin hole cameras, lenses and mirrors can all be explained using the “ray model” of light. This explains how we see images of an object when light is reflected off an object or refracted through it.

A pinhole camera produces an inverted as light from a source can only travel in one direction through the hole on to the screen.

Lenses produce an image by refracting light as it passes through the lens.

Mirrors produce a reflection, not an image, of an object that appears to be behind the mirror and is always back to front.

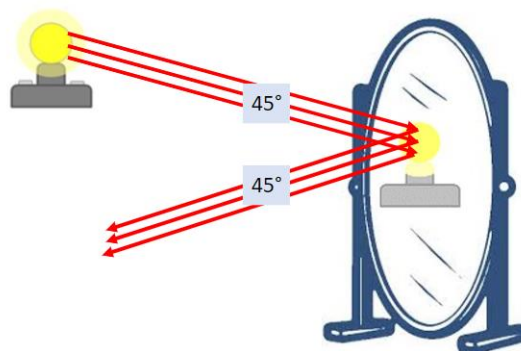
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Knowledge Practise & Application:

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Part A: P6 Topic self-study pack – Lessons 01, 03, 04, 05, 07

1. How does light radiate out from a source?
2. What does light transfer?
3. Why does the hole on a pin hole camera have to be small?
4. Describe the image produced by a pin hole camera
5. Where does a reflection appear on a mirror?
6. Describe the appearance of a reflection in a mirror.
7. Where is the reflection observed in the mirror produced?
8. Why does a reflection appear in a mirror?
9. In science, what is a “law”?
10. What is the law of reflection?
11. What is the word for a material light travels through?
12. What do physicists call the surface between two mediums?
13. What three things can light do when it reaches an object?
14. What happens to light when it passes across a boundary?
15. What is it called when light changes direction at a boundary?
16. What happens to light as it reaches a lens?
17. Describe the surface of a lens
18. What type of lenses refract light more?
19. What does a converging lens do to the light reaching it from one point on an object?
20. Describe the image produced by a lens.



Answers:

Part A:

1. Light is emitted in all directions from every point on a source
2. Energy and information
3. So it only allows light to pass through in one direction
4. Clear, inverted image
5. Behind the mirror
6. Inverted (back to front) and behind the mirror
7. Our eyes
8. The reflected light reaches our eyes in the same way as if the object was behind the mirror.
9. A description of a phenomena that scientists expect to be true in every situation
10. Angle of incidence = angle of reflection
11. A medium
12. A boundary
13. One
14. Reflect, transmit, or be absorbed
15. Refraction
16. It is refracted
17. Lenses have a curves surface
18. Lenses with a more curves surface
19. Refracts all the light from one part of an object back into one point on the image
20. Lenses produce inverted images