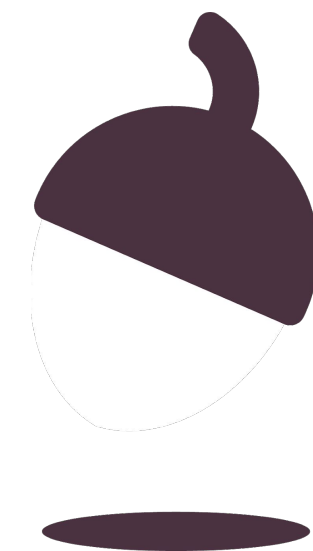


Physics - Key Stage 4  
Space

# The solar system

## Student's downloadable resources

Mr C White



**OAK**  
NATIONAL  
ACADEMY

# Question slides from video



Complete the definitions if you are confident, or use the next slide to match up

UNIVERSE	
GALAXY	
NEBULA	
SOLAR SYSTEM	
STAR	
PLANET	
DWARF PLANET	
MOON	



# Match the definitions to the celestial objects.

<b>UNIVERSE</b>	A large cloud of gas and dust
<b>GALAXY</b>	A massive body that gives off light (and other electromagnetic radiation) due to fusion of hydrogen
<b>NEBULA</b>	A body in orbit around a star which has not cleared its orbit and is mostly spherical
<b>SOLAR SYSTEM</b>	All that can be observed in the cosmos; all of space and time.
<b>STAR</b>	A rocky/gaseous body in orbit around a planet
<b>PLANET</b>	A star orbited by planets (like our Sun) and other bodies
<b>DWARF PLANET</b>	A body in orbit around a star which has cleared its orbit and is mostly spherical
<b>MOON</b> <b>(natural satellite)</b>	A group of millions or billions of stars held together by gravitational attraction



# Standard form - useful for huge quantities

**Some quick maths practice** (4 minutes):

- (1) What is 100 billion in standard form to 1 significant figure?
- (2) How far is 1 light year in metres? Use the data below, your calculator and the correct equation that links speed, distance and time to calculate it to 2 significant figures in standard form.

Speed of light =  $3.0 \times 10^8$  m/s

1 year =  $3.2 \times 10^7$ s



# Independent task

- (1) Name the **large cloud of gas and dust** where stars are formed.
- (2) Name the **process** by which stars emit radiation (like light and heat).
- (3) Name the **force** responsible for pulling matter together to make a star.
- (4) Name the **force** responsible for making stars tend to collapse.
- (5) Name the **force** responsible for making stars tend to expand.
- (6) Name **any of the smallest nuclei** that are fused in the cores of stars to produce energy in the stable periods of their lives.



# EXAM STYLE QUESTIONS

- a) Briefly describe how a star like the Sun is formed. (2 marks)
- b) Nuclear fusion is the reaction by which stars release energy.
  - i) Explain how nuclear fusion releases energy. (3 marks)
  - ii) Describe the conditions for a star to reach stable equilibrium. (3 marks)



# Answers





## Matching exercise - SOLUTIONS

<b>UNIVERSE</b>	<b>All that can be observed in the cosmos; all of space and time</b>
<b>GALAXY</b>	<b>A group of millions or billions of stars held together by gravitational attraction</b>
<b>NEBULA</b>	<b>A large cloud of gas and dust</b>
<b>SOLAR SYSTEM</b>	<b>A star orbited by planets (like our Sun) and other bodies</b>
<b>STAR</b>	<b>A massive body that gives off light (and other electromagnetic radiation) due to fusion of hydrogen</b>
<b>PLANET</b>	<b>A body in orbit around a star which has cleared its orbit and is mostly spherical</b>
<b>DWARF PLANET</b>	<b>A body in orbit around a star which has not cleared its orbit and is mostly spherical</b>
<b>MOON (natural satellite)</b>	<b>A rocky body in orbit around a planet</b>



# Standard form - **SOLUTIONS**

(1) What is 100 billion in standard form to 1 significant figure?

**1 billion =  $10^9$ , so 100 billion will be 2 more powers of ten**

$$\mathbf{100 \times 10^9 = \underline{1 \times 10^{11}}.}$$

(2) How far is 1 light year in metres?

**distance = speed x time**

$$\mathbf{distance = (3.0 \times 10^8) \times (3.2 \times 10^7) = \underline{9.6 \times 10^{15}\text{m}}}$$



## Independent task - SOLUTIONS

- (1) Name the large cloud of gas and dust where stars are formed. **NEBULA**
- (2) Name the process by which stars emit radiation (like light and heat).  
**(NUCLEAR) FUSION**
- (3) Name the force responsible for pulling matter together to make a star.  
**GRAVITY**
- (4) Name the force responsible for making stars tend to collapse. **GRAVITY**
- (5) Name the force responsible for making stars tend to expand.  
**RADIATION PRESSURE**
- (6) Name any of the smallest nuclei that are fused in the cores of stars to produce energy in the stable periods of their lives. **HYDROGEN/  
DEUTERIUM/ HYDROGEN-2/ TRITIUM/ HYDROGEN-3**



# EXAM STYLE QUESTIONS - SOLUTIONS

(a) Briefly describe how a star like the Sun is formed. (2 marks)

**Dust and gas / in a nebula (1)**

**are pulled together by gravitational attraction/gravity (1)**

(b) Nuclear fusion is the reaction by which stars release energy.

i) Explain how nuclear fusion releases energy. (3 marks)

**Small nuclei / hydrogen nuclei (1)**

**join to form larger nuclei/helium nuclei (1)**

**and a small quantity of mass is converted into energy/mass-energy of the reactants is greater than the mass-energy of products (1)**

ii) Describe the conditions for a star to reach stable equilibrium. (3 marks)

**Two forces are equal in magnitude and in opposition (1)**

**due to radiation pressure outwards (1)**

**and gravitational collapse/force/gravity inwards (1)**

