Biology

TASK 1

Activity: Microscopes

1. Using the link, remind yourself how to use a microscope to view cells
   https://www.bbc.co.uk/bitesize/guides/z84jtv4/revision/4

Chemistry

Incredible Materials

Did you know… that the incredible material graphene was discovered and isolated right here in Manchester? But here's the real surprise, it was isolated using nothing more advanced than a piece of sticky tape!

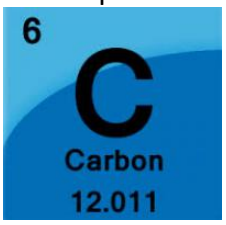
Task 1: Properties of the allotropes of carbon

Keywords: Allotropes, atoms, bonding, structure, physical properties, covalent, isotopes

Aim: To find out the properties of diamond, graphite and graphene and how they relate to each structure

1. Write a glossary of each of the keywords listed above. What does each word mean? Where possible, can you give an example?

2. Here is the entry for carbon from the periodic table:



One of the isotopes of carbon has a mass number of 12. Draw one atom of carbon-12, including the proton, neutrons and electrons.

3. When carbon atoms bond together, a covalent bond is formed. Draw a dot and cross diagram to show one atoms of carbon bonding to another. How many covalent bonds can a carbon atom normally make?

Physics

TASK 1

Falling from space!

On October 14th 2012 Felix Baumgartner jumped from the record height of **38,969.3 meters**. During this time he achieved a maximum speed of **1,357.64 km/h.**

He was accelerated to this speed only under the force of gravity.

Here are some questions which will help you understand acceleration. Use your knowledge from GCSE and internet research to answer them.

Task Questions:

1. Here is the formula for acceleration.
   Define all the symbols used. What are the units of acceleration? (2 marks)

$$a = \frac{v - u}{t}$$

2. The acceleration due to gravity on Earth is approximately 9.81 m/s^2. If an object freefall under gravity for a time of 10 seconds, estimate the change in speed of the object. (2 marks)

3. Here is a video of the space jump https://www.youtube.com/watch?v=vvbN-cWe0A0 . Watch this and notice that after 25 m/s, Felix is moving at 806 km/h.
   i) Convert 806 km/h to meters per second. (1 mark)

   ii) Use the formula for acceleration to provide a value for the acceleration he experienced. (2 marks)

   iii) Explain why does his acceleration decrease as he travels deeper into the atmosphere? (2 marks)