

# BTEC L3 Applied Science Y12 Bridging Work



**Please hand in to your Applied Science teacher in your first lesson.**

Name (print clearly): .....

Previous School: .....

Exam Board for GCSE Science: **OCR / AQA / Edexcel / Other** (circle one)

**Triple** or **Dual** (circle one)

**Add Science** Grade achieved at GCSE ...../...../.....

**Maths** Grade achieved at GCSE .....

**English** Grade achieved at GCSE .....

**For teacher use,**

Mark / Grade D M P U ALPS TARGET .....

Dear student,

We are looking forward to welcoming you to King Edward's sixth form in September.

We are very pleased that you have chosen to study Applied Science with us. You will be part of a large cohort of students that have also opted to study science at BTEC and A-Level.

You will not be surprised to find out that Applied Science is one of the most challenging post-16 subjects. However, most students find that the experience of studying the subject is highly rewarding and satisfies much of the curiosity developed in GCSE science.

There are a number of skills that you will need to develop in order to be successful in Applied Science. These include:

- **ability to communicate effectively in writing**
- **good levels of basic numeracy**
- **following instructions carefully in practical work (written and verbal)**
- **ability to find out information and work independently**
- **recognising when you are struggling and then doing something about it**
- **confidence in seeking help from your teachers**
- **completing work set by your teachers.**

**There is a strong correlation between the amount of work completed by students and the grades achieved by them.**

We also expect students to **contribute in lessons** by asking and answering questions. This will be one of the criteria by which you will be judged during regular reviews of your performance.

**Lessons need to be considered as a two way process!**

When you start the course, you will need to obtain a text book. We strongly recommend one written specifically for the course.

You will be able to buy a textbook for a discount through KES when you start in September.

Now answer the following questions. Read them carefully. Some of them are multiple choice so simply circle the letter of the correct response.

Math skills

**Decimals and Standard Form**

1. Convert the following numbers to standard form:

- a) 100 \_\_\_\_\_
- b) 1000 \_\_\_\_\_
- c) 10 000 \_\_\_\_\_
- d) 0.1 \_\_\_\_\_
- e) 0.01 \_\_\_\_\_
- f) 0.001 \_\_\_\_\_
- g) 21 000 000 \_\_\_\_\_
- h) 435 000 000 000 000 \_\_\_\_\_
- i) 0.000 000 003 9 \_\_\_\_\_

2. Convert the following units to metres and write them in standard form:

- a) 1 mm \_\_\_\_\_
- b) 1 nm \_\_\_\_\_
- c) 1  $\mu\text{m}$  \_\_\_\_\_
- d) 1 cm \_\_\_\_\_
- e) 27 mm \_\_\_\_\_
- f) 5647 mm \_\_\_\_\_
- g) 399 cm \_\_\_\_\_
- h) 29 000 000  $\mu\text{m}$  \_\_\_\_\_

\_\_\_\_\_ /17

3. Round the following numbers:

- a) 98.4478 to three significant figures \_\_\_\_\_
- b) 1 298.444 444 4 to four significant figures \_\_\_\_\_
- c) 5.555 55 to four significant figures \_\_\_\_\_
- d) 0.358 to one significant figure \_\_\_\_\_
- e) 0.000 464 8 to two significant figures \_\_\_\_\_

\_\_\_\_ /5

## **Science Investigations**

Define all the following terms that are to do with conducting an investigation

a) Independent variable

b) Dependant variable

c) Control variables

d) Anomaly

e) Accuracy

f) Precision

g) Reliability

h) Reproducibility

i) Bias

## Science Questions

**Q1.**

Plants absorb light to photosynthesise.

(a) What is the correct word equation for photosynthesis?

Tick **one** box.

carbon  
dioxide + glucose  $\longrightarrow$  oxygen + water

glucose + oxygen  $\longrightarrow$  carbon  
dioxide + water

oxygen + water  $\longrightarrow$  carbon  
dioxide + glucose

water + carbon  
dioxide  $\longrightarrow$  oxygen + glucose

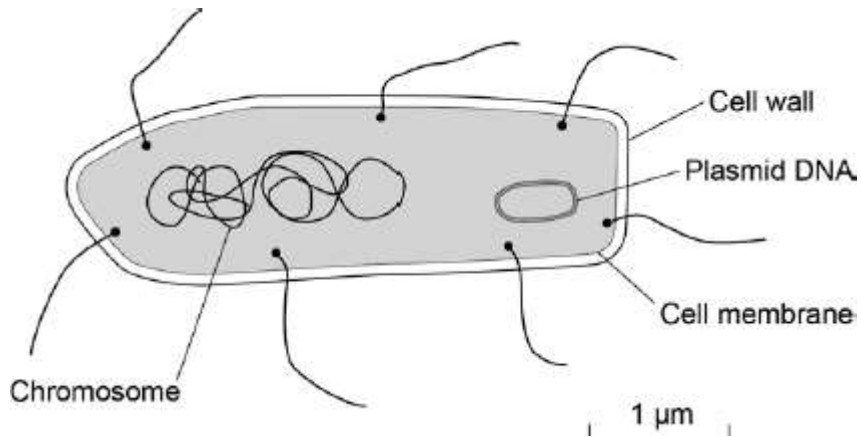
(1)

**Q2.**

Bacteria can cause disease.

**Figure 1** shows some features of a *Salmonella* bacterium.

**Figure 1**



- (a) Draw **one** line from each feature of the *Salmonella* bacterium to the function.

Feature	Function
Cell membrane	Controls the movement of substances into and out of the cell
Plasmid DNA	Carries genetic information
	Provides support and protection
	The site of protein synthesis

(2)

- (b) How is *Salmonella* spread between people?

Tick **one** box.

Animal bites

Contaminated food

Sneezing

Sexual contact

(1)

(c) Give **two** ways you could stop *Salmonella* from spreading.

1.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2)

(d) Harmful bacteria can also be useful.

Scientists are doing research to find out if *Salmonella* can be used in a vaccine to treat cancer.

The *Salmonella* vaccine can be injected into the blood or swallowed in a tablet.

One benefit of injecting the vaccine is that it gets to the cancer quickly in the blood.

What is another benefit?

Tick **one** box.

All cancers can be treated by the injection

It will not cause sickness and diarrhoea side effects

The injection is not painful to the patient

The injection introduces cancer cells into the body

(1)

**Q3.**

This question is about calcium.

(a) What type of compound is calcium oxide?

Tick **one** box.

An acid

A base

A carbonate

A salt

(1)

(b) Ionic compounds, such as calcium oxide, have high melting points.

Complete the sentences. Use words from the box.

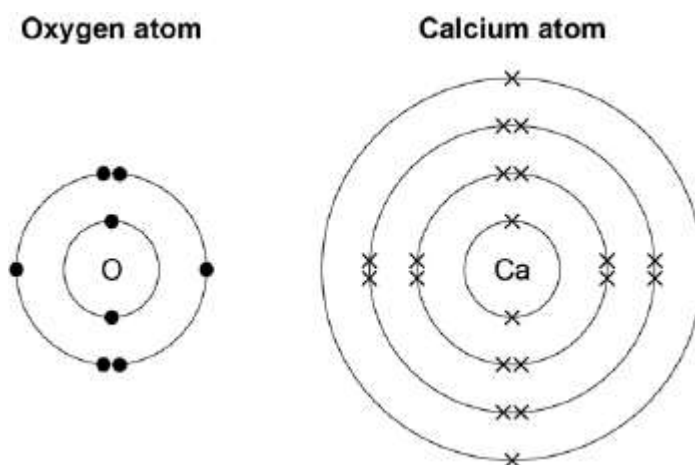
<b>bonds</b>	<b>forces</b>	<b>ions</b>	<b>layers</b>
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Calcium oxide has a giant ionic lattice in which there are strong electrostatic

\_\_\_\_\_ of attraction in all directions.

(1)

(c) The figure below shows the electronic structure of an oxygen atom and a calcium atom.



Describe how the calcium atom and the oxygen atom forms calcium



oxide.

You should give the charge on each ion formed.

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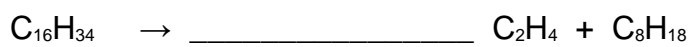
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(4)  
(Total 6 marks)

**Q4.**

- (a) The hydrocarbon  $C_{16}H_{34}$  can be cracked.

Balance the equation for cracking  $C_{16}H_{34}$



(1)

- (b) Describe the differences between cracking and distillation.

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(2)

(c) What type of reaction is cracking?

Tick **one** box.

Combustion

Decomposition

Neutralisation

Precipitation

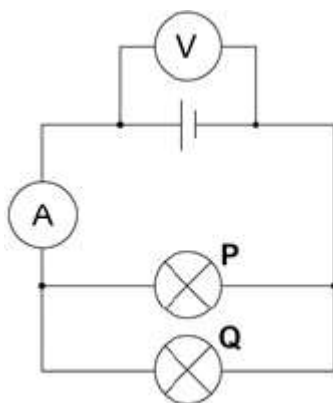
(1)

**Q5.**

**Figure 1** shows a circuit diagram containing two identical lamps arranged in parallel.

The reading on the ammeter is 186 mA.

**Figure 1**



(a) Which statement about the current through the lamps is true?

Tick **one** box.

The current through both lamp **P** and lamp **Q** is **0.093 A**

The current through both lamp **P** and lamp **Q** is **0.186 A**

The current through both lamp **P** and lamp **Q** is **0.93 A**

The current through both lamp **P** and lamp **Q** is **1.86 A**

(1)

(b) One of the lamps breaks and is not replaced.

Which statement about the current in the other lamp is true?

Tick **one** box.

The current through the lamp is **0.093 A**

The current through the lamp is **0.186 A**

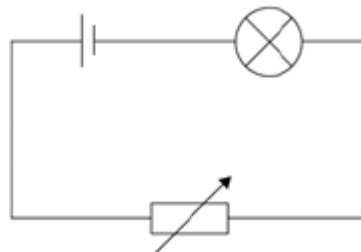
The current through the lamp is **0.93 A**

The current through the lamp is **1.86 A**

(1)

(c) **Figure 2** shows a circuit that can be used to alter the brightness of a lamp.

**Figure 2**



The resistance of the variable resistor is increased.

What effect will this have on the brightness of the lamp?

Explain your answer.

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(2)

- (d) When the potential difference across the lamp is 3.3 V, the current is 0.15 A.

Write down the equation that links current, potential difference and resistance.

Equation

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(1)

- (e) Calculate the resistance of the lamp.

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Resistance = \_\_\_\_\_  $\Omega$

(3)