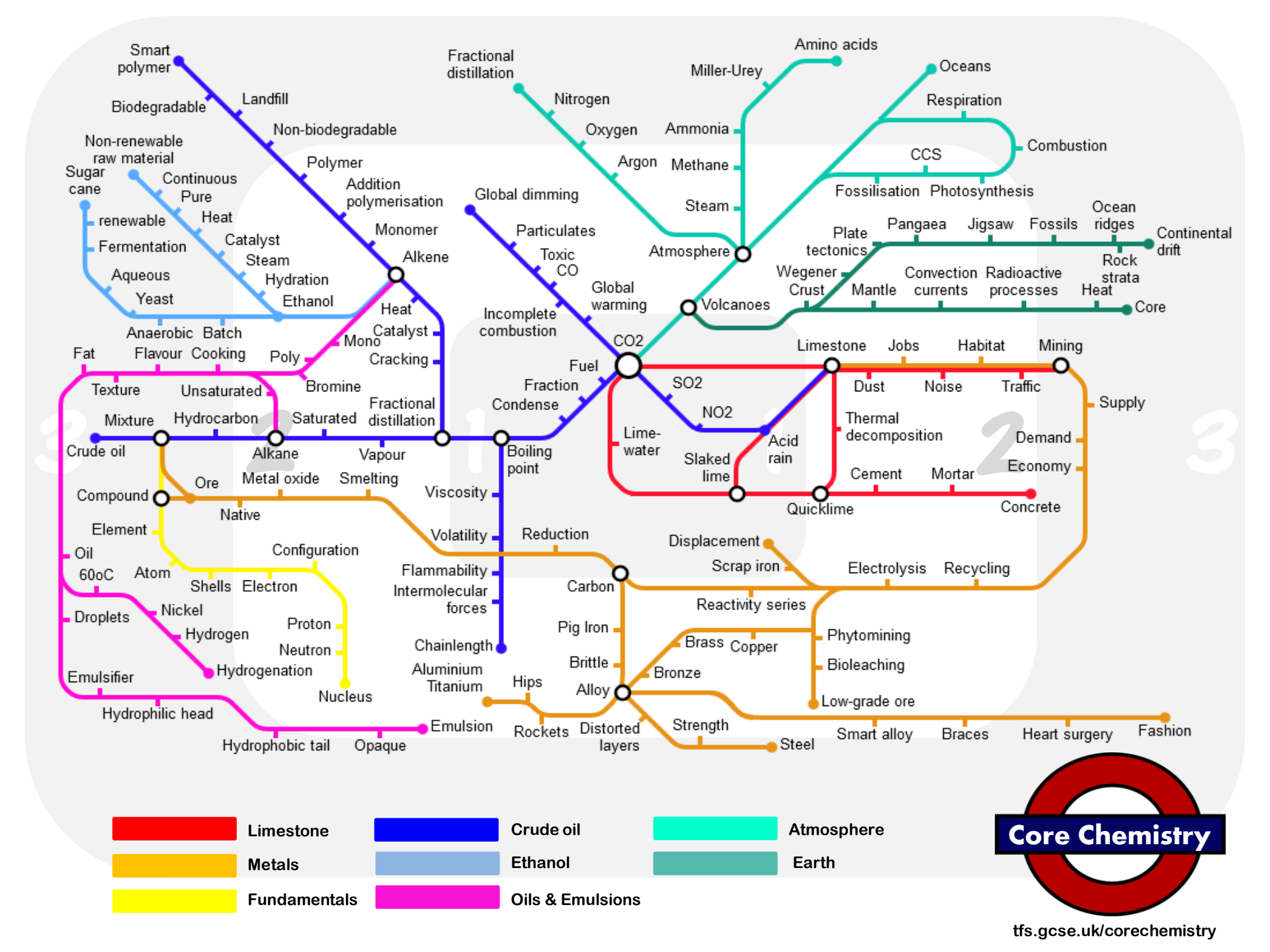

Smart polymer
Biodegradable
Landfill
Non-biodegradable
Polymer
Addition polymerisation
Monomer
Alkene
Non-renewable raw material
Sugar cane
Continuous
Pure
Heat
Catalyst
Steam
Hydration
Ethanol
renewable
Fermentation
Aqueous
Yeast
Anaerobic
Batch
Fat
Flavour
Cooking
Poly
Mono
Heat
Catalyst
Cracking
Bromine
Texture
Unsaturated
Mixture
Hydrocarbon
Saturated
Fractional distillation
Crude oil
Alkane
Vapour
Compound
Ore
Metal oxide
Smelting
Native
Element
Oil
60oC
Atom
Shells
Electron
Configuration
Droplets
Nickel
Hydrogen
Proton
Neutron
Hydrogenation
Nucleus
Emulsifier
Hydrophilic head
Hydrophobic tail
Opaque
Emulsion
Fractional distillation
Nitrogen
Oxygen
Argon
Global dimming
Particulates
Toxic CO
Incomplete combustion
Global warming
CO2
Fuel
Fraction
Condense
Boiling point
Viscosity
Volatility
Flammability
Intermolecular forces
Chainlength
Aluminium
Titanium
Hips
Rockets
Distorted layers
Alloy
Brittle
Pig Iron
Carbon
Reduction
Amino acids
Miller-Urey
Ammonia
Methane
Steam
Atmosphere
Oceans
Respiration
Combustion
CCS
Fossilisation
Photosynthesis
Volcanoes
Plate tectonics
Pangaea
Jigsaw
Fossils
Ocean ridges
Continental drift
Rock strata
Wegener
Crust
Mantle
Convection currents
Radioactive processes
Heat
Core
Limestone
Jobs
Habitat
Mining
Supply
Dust
Noise
Traffic
Demand
Economy
SO2
NO2
Lime-water
Slaked lime
Acid rain
Thermal decomposition
Cement
Mortar
Concrete
Quicklime
Displacement
Scrap iron
Electrolysis
Recycling
Reactivity series
Brass
Copper
Bronze
Phytomining
Bioleaching
Low-grade ore
Strength
Steel
Smart alloy
Braces
Heart surgery
Fashion
Limestone
Crude oil
Atmosphere
Metals
Ethanol
Earth
Fundamentals
Oils & Emulsions
Core Chemistry
tfs.gcse.uk/corechemistry

QWC Core Travelcard

Command word

Evaluate:

Use the information supplied and your own knowledge to consider evidence for and against. Give a justified conclusion.

Connectives:
whereas, alternatively, unlike, equally, consequently, unless, if, as long as, however, such as, for instance, this means,….

Question

Biofuels are fuels made from plant material. In the UK, petrol and diesel contain at least 5% biofuel.

Evaluate the use of biofuels for transport. Should the percentage of biofuel in petrol and diesel increase or decrease in the future?

Value

6 marks

Route

Crude oil and ethanol

Valid within zones 1-3

QWC Core Travelcard

Mark band	Success criteria	Science points
1-2	**Simple description of an advantage and/or disadvantage. Weak SPaG. Weak or no conclusion. Poor organisation.**	Advantages: Biofuels are more sustainable than fossil fuels, are renewable, carbon neutral, provide jobs during harvest season. Disadvantages: Uses up farm land, leads to increased food prices, deforestation, batch process, slow.
3-4	**Clear description of advantages and disadvantages of using biofuels. There is a conclusion. Some SPaG errors.**	
5-6	**Detailed description of advantages and disadvantages of using biofuels. There is a justified conclusion. Almost faultless SPaG.**	

Route

Crude oil and ethanol

Valid within zones 1-3

tfs.gcse.uk/corechemistry

QWC Core Travelcard

Command word

Describe:

Recall facts, events or processes. Give an ordered account.

Connectives: Firstly, finally, next,….

Explain:

All the points in your answer must be linked logically.

Connectives: because, therefore, consequently,….

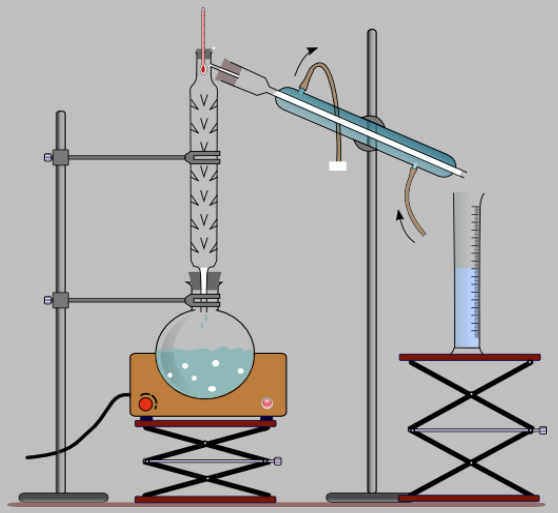
Question

Petrol is an important fuel.

Describe and explain how petrol is separated from the mixture of hydrocarbons in crude oil.

Value

6 marks



Route

Crude oil

Valid within zones 1-3

tfs.gcse.uk/corechemistry

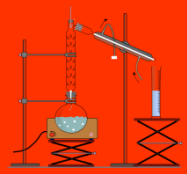
QWC Core Travelcard

Mark band	Success criteria	Science points
1-2	There is a statement that crude oil is heated or that substances are cooled. However there is little detail and any description may be confused or inaccurate. Weak SPaG.	• Process is called fractional distillation. • Crude is heated and vaporised. • Vapours rise. • When vapours cool to their boiling points, they condense. • Large hydrocarbons have high boiling points. The tower is cool at the top and hot at the bottom. • Condensed fractions separate from vapours. Very small hydrocarbons remain as vapours and leave tower at the top.
3-4	There is some description of heating / evaporating crude oil and either fractions have different boiling points or there is an indication of a temperature difference in the column. Some SPaG errors.	
5-6	There is a reasonable explanation of how petrol is or fractions are separated from crude oil using evaporating and condensing. Almost faultless SPaG.	

Route

Crude oil

Valid within zones 1-3



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QWC Core Travelcard

Command word

Explain:

All the points in your answer must be linked logically.

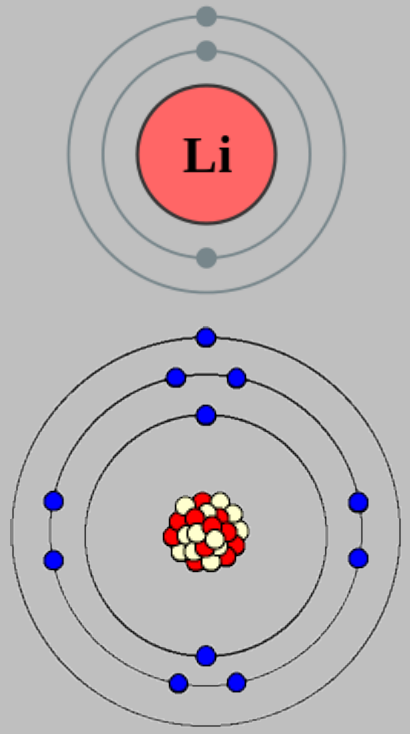
Connectives: because, therefore, consequently,….

Question

State and explain the trend in reactivity down group one in the Periodic Table.

Value

6 marks



Route

Fundamentals

Valid within zones 2-3

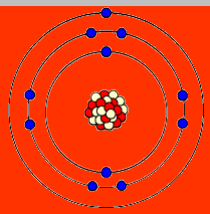
QWC Core Travelcard

Marks	Success criteria
1	The reactivity increases down the group.
2	As you go down the group, each atom gains a further shell. This means that the atoms become larger.
3	The distance between the outer electron and the positive nucleus therefore increases.
4	This means that the attraction between the outer electron and the nucleus decreases.
5	The outer electron is consequently lost easier.

Route

Fundamentals

Valid within zones 2-3



QWC Core Travelcard

Command word

Compare:

Describe the differences and similarities between two methods/processes /objects, commenting on both, not just one.

Connectives:
As with, likewise, unlike, whereas, instead of, on the other hand,….

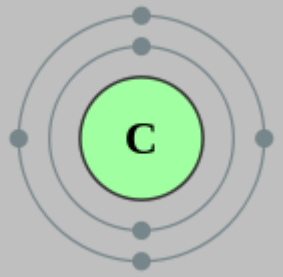
Question

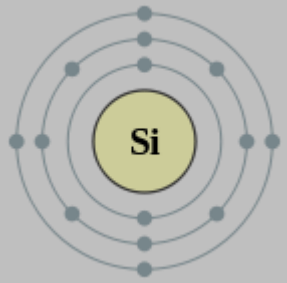
Describe the difference in atomic structure between a carbon atom and a silicon atom.

Refer to all subatomic particles in your answer.

Value

4 marks





Route

Fundamentals

Valid within zones 2-3

QWC Core Travelcard

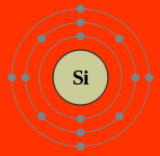
Success criteria

Marks	
1	Carbon has 2 rings whereas silicon has 3.
2	Carbon has 6 electrons, unlike silicon, which has 14.
3	In carbon, 2 electrons are on the first shell, 4 on the second. In silicon, 2 electrons are on the first shell, 8 on the second and 4 on the third shell. Both atoms have the same number of electrons on the outer shell.
4	Carbon has 6 protons and 6 neutrons inside the nucleus, whereas silicon has 14 protons and 14 neutrons.

Route

Fundamentals

Valid within zones 2-3



QWC Core Travelcard

Command word

Describe:

Recall facts, events or processes. Give an ordered account.

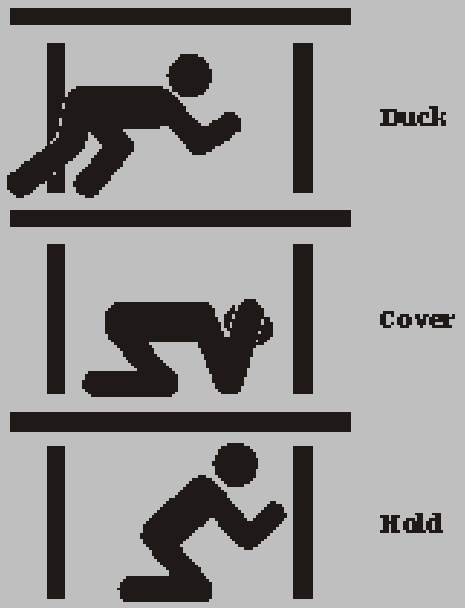
Connectives: Firstly, finally, next,….

Question

Describe how activity within the Earth results in earthquakes.

Value

3 marks



Route

Earth

Valid within zones 2-3

QWC Core Travelcard

Marks	Success criteria
1	**Firstly, heat is released by radioactive processes inside the core.**
2	**This causes convection currents inside the mantle.**
3	**And this results in sudden movement of the tectonic plates.**

Route

Earth

Valid within zones 2-3

QWC Core Travelcard

Command word

Compare:

Describe the differences and similarities between two methods/processes /objects, commenting on both, not just one.

Connectives:
As with, likewise, unlike, whereas, instead of, on the other hand,….

Question

Quarrying leaves behind large amounts of low-grade copper ore. It would be too expensive to extract copper from this ore by traditional methods such as smelting. Instead, phytomining is used. Plants are grown on the land and absorb copper compounds through their roots. Compare the advantages of phytomining with the traditional methods.

Value

5 marks

Route
Metals

Valid within zones 1-3

tfs.gcse.uk/corechemistry

QWC Core Travelcard

Marks	Success criteria
1	Using phytomining to extract copper meets the rising copper demand
2	while at the same time preserving high-grade copper deposits for future generations.
3	Unlike traditional mining, phytomining is carbon neutral as the same amount of CO_2 is released when the plant material is burnt as was absorbed by the plants during photosynthesis.
4	Phytomining also requires less energy which means less fossil fuel is required during the extraction process.
5	Using traditional mining on the other hand is much quicker.

Route

Metals

Valid within zones 1-3

QWC Core Travelcard

Command word

Suggest:

Apply your knowledge and understanding to a new situation.

Vocabulary:
I think that, may, might, could

Question

Suggest why an emulsion paint has to be stirred thoroughly before it can be applied to a surface such as a wall.

Value

6 marks

Route

Oils and Emulsions

Valid within zones 2-3

tfs.gcse.uk/corechemistry

QWC Core Travelcard

Success criteria

Marks	
1	I think that emulsion paint is made of oil and paint solution. The oil and paint solution are immiscible.
2	Emulsion paint will contain an emulsifier, a substance that has a hydrophilic head which would dissolve in the paint solution and
3	a hydrophobic tail which would dissolve in the oil.
4	Stirring the paint will break the oil into droplets which will be surrounded by the emulsifier.
5	The droplets won't be able to join back up.
6	The emulsion that is formed is now thicker and is probably easier to apply to the surface.

Route

Oils and Emulsions

Valid within zones 2-3

QWC Core Travelcard

Command word

Describe:

Recall facts, events or processes. Give an ordered account.

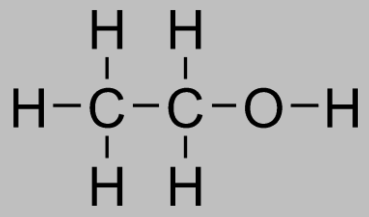
Connectives: Firstly, finally, next,….

Question

Describe how you can produce ethanol from octane and ethanol from sugar cane.

Value

6 marks



Route

Ethanol

Valid within zones 2-3

QWC Core Travelcard

Marks

Success criteria

1 Firstly, octane is heated and vaporised and
2 passed over a hot catalyst.
This will form ethene.
3 Next, ethene is reacted with steam in the presence of a catalyst to form ethanol.
This process is called hydration.

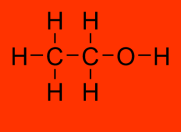
4 To form ethanol from sugar cane, sugar solution
5 is mixed with yeast
6 at 37°C in
anaerobic conditions.
This process is called fermentation.

Max 3 points from each process

Route

Ethanol

Valid within zones 2-3



QWC Core Travelcard

Command word

Compare:

Describe the differences and similarities between two methods/processes /objects, commenting on both, not just one.

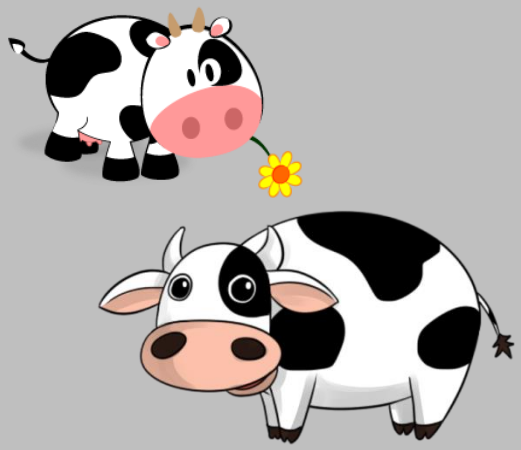
Connectives:
As with, likewise, unlike, whereas, instead of, on the other hand,….

Question

Supermarkets claim that using plastic milk bags instead of glass milk bottles would have less environmental impact. Do you agree with this claim? Make appropriate comparisons to justify your answer.

Value

4 marks



Route

Crude oil

Valid within zones 1-3

QWC Core Travelcard

Success criteria

Marks

1
2 No. Although, unlike glass bottles, the plastic bags can be rolled up so that they use up less landfill space, plastic comes from a non-renewable and limited raw material, whereas glass is made from widely available sand.

3 Most of the plastic bags will be used only once and then thrown away. Glass on the other hand can be re-used many times.

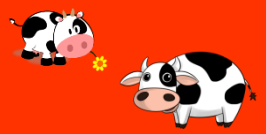
4 The glass can also be recycled to make new bottles, whereas recycled plastic bags are not always made into new plastic bags.

Note: you could argue for 'yes' but might find it difficult to find 4 different arguments.

Route

Crude oil

Valid within zones 1-3



QWC Core Travelcard

Command word

Describe:

Recall facts, events or processes. Give an ordered account.

Connectives: Firstly, finally, next,….

Question

Describe in detail how carbon is cycled between living organisms and the atmosphere.

Value

6 marks

Route

Atmosphere

Valid within zones 2-3

QWC Core Travelcard

Marks	Success criteria
1	Plants take in carbon dioxide for photosynthesis which takes carbon dioxide out of the atmosphere.
2 3	When plants die, microorganisms feed on the dead plant material. The food is used by the microorganisms for respiration, which puts carbon dioxide back into the atmosphere.
4	Plants can also be eaten by animals. This food is used by animals for respiration which releases carbon dioxide back into the atmosphere.
5	Humans also combust plants and trees which puts carbon dioxide back into the atmosphere.
6	Some dead plant material turns into fossil fuel. This locks up a large amount of carbon.

Route

Atmosphere

Valid within zones 2-3

QWC Core Travelcard

Command word

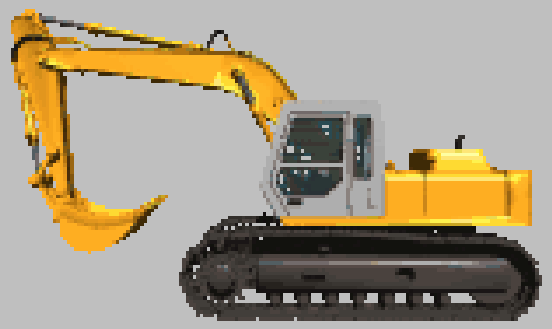
Evaluate:

Use the information supplied and your own knowledge to consider evidence for and against. Give a justified conclusion.

Connectives:
whereas, alternatively, unlike, equally, consequently, unless, if, as long as, however, such as, for instance, this means,….

Question

Evaluate the economic, social, environmental effects of mining limestone.



Value

6 marks

Route

Limestone & Metals

Valid within zones 1-3

QWC Core Travelcard

Mark band	Success criteria	Science points
1-2	**Simple description of an advantage and/or disadvantage. Weak SPaG. Weak or no conclusion. Poor organisation.**	Advantages: Environmental- once exhausted it can be turned into a nature park which would attract new animals. Social/Economic- creates jobs. Workers move into area and spend money in local shops. Disadvantages: Environmental- destruction of habitat, dust, noise and sound pollution from extra traffic and machinery. Social/Economic- tourists will stay away reducing the income for local tourism industry.
3-4	**Clear description of environmental and social or economic advantages and disadvantages of mining. There is a conclusion. Some SPaG errors.**	
5-6	**Detailed description of environmental and social or economic advantages and disadvantages of mining. There is a justified conclusion. Almost faultless SPaG.**	

Route

Limestone & Metals

Valid within zones 1-3

tfs.gcse.uk/corechemistry

QWC Core Travelcard

Command word

Explain:

All the points in your answer must be linked logically.

Connectives: because, therefore, consequently,….

Question

Amino acids are essential for life. Simple amino acids, such as glycine (NH_2CH_2COOH) could have been produced by reactions between ammonia, water and hydrocarbons. Explain why scientists believe that there might be life on other planets, provided that their atmospheres contain gases such as methane, nitrogen, hydrogen and carbon monoxide.

Value

4 marks

Primordial Soup

Ingredients:

One ocean of water
Sunlight (as available)
Organic materials from space: amino acids, fatty acids, polycyclic aromatic hydrocarbons, other hydrocarbons as neeed

Dissolve organic materials in ocean, let simmer in sunlight for up to a billion years. Makes large numbers of prebiotic cells.

Route

Atmosphere

Valid within zones 2-3

QWC Core Travelcard

Success criteria

Marks	
1	Amino acids contain the elements nitrogen, hydrogen, carbon and oxygen. These elements are present in methane, carbon monoxide, nitrogen and hydrogen gas.
2	Methane is a hydrocarbon or carbon monoxide + hydrogen can react to make a hydrocarbon.
3	Nitrogen and hydrogen can react and form ammonia.
4	Carbon monoxide can also react with hydrogen and form water.

Route

Atmosphere

Valid within zones 2-3