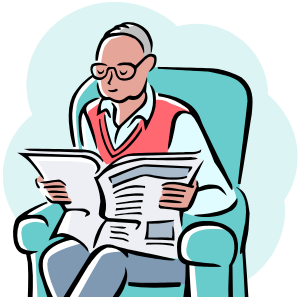
The Yuen Yuen Institute MFBM Nei Ming Chan Lui Chung Tak Memorial College
Cross-curricular Learning
S2 Integrated Science X English

Name:_____ Class:_____( ) Date:_____
(I.S. Ch.7 Living Things and Air)

Grammar:

How do you answer questions in a **clear and organised** way?

Answer: _____



Read the newspaper cutting below and answer the questions that follow.

Breakthrough in artificial photosynthesis

12/4/2012

Scientists in Sweden have constructed a molecular catalyst that can change water into oxygen and hydrogen very rapidly, using a process known as artificial photosynthesis.

Artificial photosynthesis is a process that imitates natural photosynthesis. Scientists have been working on artificial photosynthesis for many years. They have developed various systems that convert water and carbon dioxide into useful fuels, such as hydrogen, methanol and oxygen. However, the reactions are usually slow and inefficient.

The new molecular catalyst contains a ruthenium core that absorbs sunlight and transfers its energy to speed up the reactions.

Scientists say in the future this technology may be used on a large-scale to produce clean and renewable fuels from water using the power of the sun.

If artificial photosynthesis research is successful, what environmental problems may this technology help to solve? Explain your answer.

_____

_____

_____

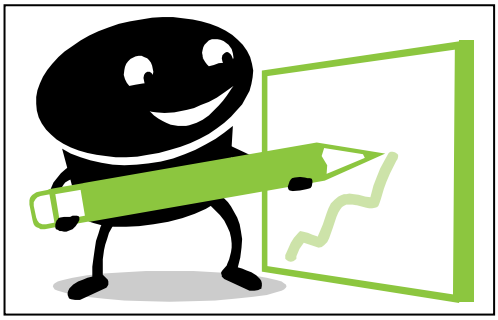
_____

Answer:

Since the fuels produced by this technology are oxygen and hydrogen, burning these fuels does not release carbon dioxide and some common air pollutants. **As a result,** this technology may ease global warming and air pollution.

Grammar: Connectives

because	so



because / since / as

1. We use *because, since* or *as* to introduce the reason of something or answer the question "why".
2. "because" is used in the middle of a sentence. If we want to use it at the beginning of a sentence, we should use "It is because…".

3. "Since" or "as" can be used at the beginning or in the middle of a sentence.
4. When "since" or "as" is put at the beginning of a sentence, a comma (,) is used to separate the two parts in a sentence.

*e.g. 1. Ryan bought a new shirt **because** he had an interview the next day.*
*e.g.2. Ryan bought a new shirt. **It is because** he had an interview the next day.*
*e.g.3. Ryan bought a new shirt **since** he had an interview the next day.*
*e.g.4. Ryan bought a new shirt **as** he had an interview the next day.*
*e.g.5. **Since** Ryan had an interview the next day, he bought a new shirt.*
*e.g.6. **As** Ryan had an interview the next day, he bought a new shirt.*

so / as a result / therefore

1. We use *so, as a result* or *therefore* to introduce the result of something.

2. "so" often comes in the middle of a sentence.

3. "As a result" often comes in the beginning of a sentence.

4. "Therefore" can come at the beginning or in the middle of a sentence.

5. Let's study the following example.
   e.g.1. *Ryan had an interview the next day **so** he bought a new shirt.*
   e.g.2. *Ryan had an interview the next day. **As a result,** he bought a new shirt.*
   e.g.3. *Ryan had an interview the next day, **therefore,** he bought a new shirt.*
   e.g.4. *Ryan had an interview the next day. **Therefore,** he bought a new shirt.*

6. Some of you may mix up "so" and "so that". Unlike "so", "so that" is used to talk about purpose.
   e.g. Ryan bought a new shirt so that he could look smart in the interview.

When, While

e.g.1. The diaphragm is dome-shaped **when** it is in a relaxed state.
e.g.2. The bell jar is rigid **while** the volume of the chest can be changed by the movement of ribs.

If

e.g.1. *Place a glowing splint into a jar. **If** oxygen is present, the glowing splint relights.*
e.g.2. *Place a glowing splint into a jar. The glowing splint relights **if** oxygen is present.*

Grammar drill

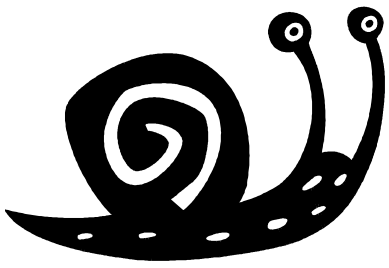
Part A Fill in the blanks with the most appropriate connectives provided. The connectives can be used more than once.

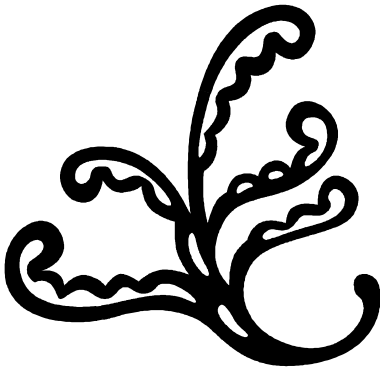
Therefore	When	If	It is because	because

1. Based on your observation, explain why dry cobalt chloride paper can be used to test for water. (TB 2A P.11 Experiment 20.2)
   Answer:
   _____a dry cobalt chloride paper shows colour changes (from blue to pink) when water is present.

2. According to the movement of the diaphragm, explain why our abdomen moves inwards and outwards during breathing? (TB 2A P.67 Experiment 22.3)
   Answer:
   _____we breathe in, the diaphragm contracts and becomes flattened. This pushes down the internal organs below the diaphragm. _____, the abdomen moves outwards.
   _____we breathe out, the diaphragm relaxes and becomes dome-shaped. The internal organs return to their original position. _____, the abdomen moves inwards.

3. What will happen to the snails and water plants if the aquarium is kept in the dark for a long period of time? Explain your answer.
   Answer:
   _____the aquarium is kept in the dark, both the snails and the water plants will die_____the water plants cannot carry out photosynthesis to make food and cannot produce oxygen for the snails.





Part B Fill in the blanks with the most appropriate connectives provided. The connectives can be used more than once.

When	if	causes…to…	Since	As a result	Therefore	therefore

1. At the end of the experiment, the coloured liquid drop was found to be at position X. Explain this change.

   Answer:

   The mealworms take in oxygen from the air in the glass container and give out carbon dioxide. The carbon dioxide released is absorbed by soda lime._____, the total amount of gases in the glass container decreases. This_____the gas pressure inside the glass container_____decrease._____, the coloured liquid drop moves towards the glass container.

2. Will the water in the pipette move upwards or downwards during the investigation? Explain your answer.

   Answer:

   The water in the pipette will move downwards. The plant carries out both photosynthesis and respiration at the same time._____the rate of photosynthesis is higher than that of respiration, more oxygen is produced than used by the plant._____, the air pressure inside the pipette increases.

3. Explain the results of the experiment in terms of gas pressure.

   Answer:

   _____the paper strip is pulled, the volume in the bottle increases. The pressure inside the bottle becomes lower than that outside. _____, air flows into the balloon. The balloon_____becomes larger.

   _____the paper strip is pushed, the volume in the bottle decreases. The pressure inside the bottle becomes higher than that outside._____, air is forced out of the balloon. The balloon_____becomes smaller.

4. Place a burning splint into the jar. The burning splint burns more brightly_____oxygen is present.

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Grammar:

Do you understand the following sentences?

1. The Earth **is surrounded** by a layer called atmosphere.
2. Foods rich in fats **are called** "high-energy foods".
3. The energy released from respiration **can be changed** to heat energy for keeping us warm.

What do they mean in a direct way?

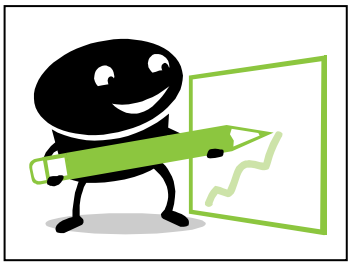
1. _____

2. _____

3. _____

_____

Grammar: Passive voice



There are two types of voice in English – active voice and passive voice.
Active voice: *A layer called atmosphere surrounds the Earth.*
Passive voice: *The Earth* ***is surrounded*** *by a layer called atmosphere.*

What is their usage?

Answer: _____

When we use active voice, we emphasise the doer – "a layer called atmosphere".
When we use passive voice, we emphasise the receiver – "the Earth".

Voice	Example	Emphasis
_____ _____	A layer called atmosphere surrounds the Earth.	A layer called atmosphere
Passive voice	The Earth **is surrounded** by a layer called atmosphere.	_____

When do we need to use passive voice?

1. Stress on the receiver of the action.
   e.g. *The famous painting Mona Lisa is stolen from the museum.*

2. We do not know who did the action.
   e.g. *Two policemen were shot.* (We do not know who shot the policemen.)

3. No need to mention who did the action.
   e.g. *The ICAC was founded in 1974.* (No need to know who set up the ICAC. The important thing is when the ICAC was set up.)

   e.g. *The shooting case was investigated.* (We all know that the police investigated the case, so no need to mention them.)

Verb forms:

The verb in passive voice is made up in this way: be + past participle

What is past participle? See the table below.

Simple present	Simple past	Present participle	Past participle
take	took	taking	taken
call	called	calling	called
put	put	putting	put

e.g.0. The teacher takes away the candle. (singular present active positive +)
The teacher does not take away the candle. (singular present active negative -)
Does the teacher take the candle away? (singular present active question)

e.g.1. The candle **is taken** away. (singular present passive positive +)
e.g.2. The candle **is not taken** away. (singular present passive negative -)
e.g.3. **Is** the candle **taken** away? (singular present passive question)
e.g.4. The candles **are taken** away. (plural present passive positive +)
e.g.5. The candles **are not taken** away. (plural present passive negative -)
e.g.6. **Are** the candles **taken** away? (plural present passive question)

e.g.0. The teacher took away the candle. (singular past active positive +)
The teacher did not take away the candle. (singular past active negative -)
Did the teacher take away the candle? (singular past active question)

e.g.7. The candle **was taken** away. (singular past passive positive +)
e.g.8. The candle **was not taken** away. (singular past passive negative -)
e.g.9. **Was** the candle **taken** away? (singular past passive question)
e.g.10. The candles **were taken** away. (plural past passive positive +)
e.g.11. The candles **were not taken** away. (plural past passive negative -)
e.g.12. **Were** the candles **taken** away? (plural past passive question)

e.g.0. The teacher will take away the candle/candles. (future active positive +)
The teacher will not take away the candle/candles. (future active negative -)
Will the teacher take away the candle/candles? (future active question)

e.g.13. The candle **will be taken** away. (singular future passive positive +)
e.g.14. The candle **will not be taken** away. (singular future passive negative -)
e.g.15. The candles **will be taken** away. (plural future passive positive +)
e.g.16. The candles **will not be taken** away. (plural future passive negative -)
e.g.17. **Will** the candle/candles **be taken** away? (future passive question)

With modal verbs:

Modal verbs:

can	may	should	ought to	must
could	might			

e.g.0. We <u>can take</u> away the candle/candles. (active positive +)
We <u>cannot take</u> away the candle/candles. (active negative -)
<u>Can</u> we <u>take</u> away the candle/candles? (active question)

e.g.18. The candle/candles **can be taken** away. (passive positive +)
e.g.19. The candle/candles **cannot be taken** away. (passive negative -)
e.g.20. **Can** the candle/candles **be taken** away? (passive question)

e.g.21. The candle/candles **should be taken** away. (passive positive +)
e.g.22. The candle/candles **should not be taken** away. (passive negative -)
e.g.23. **Should** the candle/candles **be taken** away? (passive question)

e.g.24. The candle/candles **must be** taken away. (passive positive +)
e.g.25. The candle/candles **must not be** taken away. (passive negative -)
e.g.26. **Must** the candle/candles **be taken** away? (passive question)

Modal verbs with *wh*-questions:

wh-question words

What	Who	When	Where	Why	How

e.g.0. **How do** the teacher **take** away the candle/candles? (present active)
How did the teacher **take** away the candle/candles? (past active)

e.g.27. **How is** the candle **taken** away? (singular present passive)
e.g.28. **How are** the candles **taken** away? (plural present passive)
e.g.29. **How was** the candle **taken** away? (singular past passive)
e.g.30. **How were** the candles **taken** away? (plural past passive)

e.g.31. **When is** the candle **taken** away? (singular present passive)
e.g.32. **When are** the candles **taken** away? (plural present passive)
e.g.33. **When was** the candle **taken** away? (singular past passive)
e.g.34. **How were** the candles **taken** away? (plural past passive)

Further notes:

1. In passive voice, we put the adverb between the verb "be" and the past participle.
   e.g.1. *The thieves **were** badly **hit**.*

   e.g.2. *The food produced **is** usually **stored** in the form of starch.*

   e.g.3. *The process of photosynthesis **can** also **be summarised** in a diagram.*

Grammar drill

Fill in the blanks with active voice or passive voice with correct verb forms.

1. In burning, energy_____**(give)** out in the form of heat energy and light energy.
2. Water and carbon dioxide_____**(produce)** by a burning candle.
3. Hydrogencarbonate indicator_____**only**_____**(use)** to test for carbon dioxide.
4. The fire **can**_____**(put)** out by a wet curtain.
5. The chemical energy stored in food_____**(change)** to useful forms of energy by a process called respiration in our body.
6. The mouth of the boiling tube **should**_____**(not point)** towards anybody.
7. We **should**_____**(wear)** safety goggles when we are doing experiments
8. Many household fire accidents_____**(cause)** by carelessness.
9. Diesel exhaust_____**(cause)** lung cancer.
10. A fire triangle_____**(make)** up of three conditions necessary for burning to occur.
11. Carbon dioxide_____**(absorbed)** by leaves in bright light condition.
12. Leaves_____**(release)** carbon dioxide in the dark.
13. Green plants can produce their own food and provide energy for animals. They_____**(call)** producers.

14. Animals obtain their energy by feeding on plants or other animals. We_____**(call)** them consumers.

15. The feeding relationships among plants and animals **can**_____**(show)** by food chain.

16. Photosynthesis_____**(produce)** food and oxygen.

17. Green plants can make their own food by a process called photosynthesis. During this process, light energy_____**(change)** to chemical energy stored in the food they produce.

18. When we breathe in, air_____**(draw)** into the lungs.

19. When we breathe out, the lungs_____**(force)** air out of themselves.

20. We **can**_____**(obtain)** the energy from the food we eat.

21. Non-smokers may breathe in the smoke given out from other people's cigarettes. This_____**(call)** passive smoking.

Challenging part

Fill in the blanks with passive voice with correct verb forms.

1. The diaphragm_____**(flatten)** by its contraction instead of_____**(pull)** downwards by hands.

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Vocabulary and Sentences

Unit 7 Living things and air

Part A Study the expressions and examples and make your own sentences in the space provided.

(Chapter 20) Air and burning

The following are some useful words or phrases in this chapter:

1 composed of (由…組成)

Example:

The Earth is surrounded by a layer called atmosphere, which is *composed of* air.

Make your own sentence:

_____

_____

2 made up of (由…組成)

Example:

A fire triangle is *made up of* three conditions necessary for burning to occur.

Make your own sentence:

_____

_____

3 put out (弄熄)

Example:

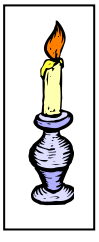
We can *put out* a candle flame by spraying some water on it.

Make your own sentence:

_____

_____

4 go out (熄滅)



Example:

A burning candle *goes out* when all the wax is burned up.

Make your own sentence:

_____

_____

5 break out (發生)

Example:

We should keep calm if a fire *breaks out* in our flat.

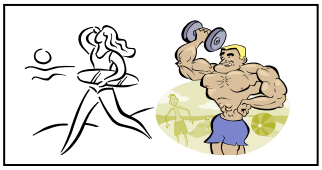
Make your own sentence:

_____

_____

(Chapter 21) How living things obtain energy

The following are some useful words or phrases in this chapter:



1 carry out (進行)

Example:

Our body requires energy to function and to *carry out* various activities in daily life.

Make your own sentence:

_____

_____

(Chapter 22) Gaseous exchange between living things and the environment

The following are some useful words or phrases in this chapter:

1 take place (進行)

Example:

In humans, the exchange of oxygen and carbon dioxide *takes place* in the air sacs.

Make your own sentence:

_____

_____

Part B Study the expressions and examples and make your own sentences in the space provided.

Expression	Example
… turn … from …to… (…能使…由…變為…)	Carbon dioxide **turns** lime water **from** colourless **to** milky. _____ _____
cause … to … (…能使…)	Oxygen **causes** a burning splint **to** burn more brightly. _____ _____
… change from …to… (…由…變為…)	Hydrogencarbonate indicator **changes from** red **to** yellow in carbon dioxide. _____ _____
… take in … (…吸收…)	Green plants **take in** carbon dioxide and water from the surroundings during photosynthesis. _____ _____
… give out … (…釋出…)	Animals **give out** carbon dioxide through gaseous exchange. _____ _____
… carry out … (…進行…)	Living things **carry out** respiration all the time. _____ _____
…obtain …from … (…從…中獲取…)	Living things **obtain** energy **from** the food they eat. _____ _____

…pass through… (…穿過…)	Oxygen in the air **passes through** the thin walls of air sacs into the blood in blood capillaries. _____ _____
…carry…to … (…把…帶到…)	Blood **carries** oxygen **to** all body cells for respiration. _____ _____
…release… (…釋出…)	Green plants take in oxygen and **release** carbon dioxide at night. _____ _____
…is necessary for… (…是…所需的條件)	Chlorophyll **is necessary for** photosynthesis. _____ _____
…feed on… (…以…為食物)	Animals **feed on** plants or other animals to obtain energy. _____ _____

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Reading comprehension (STSE Worksheet)

Global warming and our world (Related Unit: 7)

Part I — Some impacts of global warming

1. Study the following article and answer the questions that follow.

Adapting to rising sea levels with floating houses?

26 Aug 2011

Global warming leads to the melting of ice, which in turn causes the rise in sea level. Because of rising sea level, some areas of the globe are in danger of disappearing from the map, being buried underwater. People must adapt and maybe, one day, live in floating houses.

The Netherlands, with about 40% of its area located below the sea level, is one of the countries most at risk from the rising sea levels. Dutch scientists predict a rise in sea levels of up to 110 cm (43 inches) by the year 2100. By that time, more and more houses will be buried underwater.

To find solutions to this problem, the Dutch scientists have developed a new type of house – the floating houses in recent years. These floating houses may be a way out for humans when facing the problem of rising sea level.

The Dutch has found a new way to cope with the rising sea level.

(a) Briefly explain how global warming leads to the rise in sea level.

(b) How does the rising sea level affect the Netherlands?

(c) What has been developed by the Dutch scientists to solve the problem?

2. Study the following article and answer the questions that follow.

Shrinking blossoms

5 July 2012

Blooming cherry blossom is one of Japan's most iconic landscapes. Cherry trees accumulate energy during the cold winter. When springs come, cherry trees start growing buds. When the temperature reaches 15 ºC to 20 ºC, the buds open up.

However, this natural blossoming schedule has been disturbed by global warming. As the average temperature increases over the years, the blossom of cherry trees is becoming earlier and earlier. The cherry blossom season across all of Japan comes 4.2 days earlier on average over the past 52 years. Scientists worry that if global warming continues, the survival of cherry trees will be threatened.

Cherry Blossoms (Sakura)

(a) How are the cherry trees in Japan affected by global warming?

(b) Suggest TWO ways that we can do in our daily lives to help reduce the problems caused by global warming.

3. Collect more articles about other impacts of global warming. Paste them in the space below and list the impacts.

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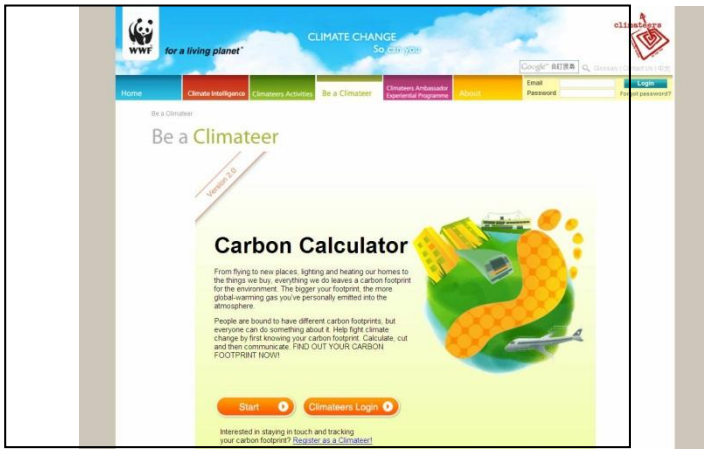
Extended activity (STSE Worksheet)

Global warming and our world (Related Unit: 7)

Part II — Carbon footprint

Carbon dioxide is one of the major gases causing_____. Every day, we leave a 'carbon footprint' for the environment. The bigger your carbon footprint, the more _____ you cause to the environment.

1. Try to find out your carbon footprint in the website below:



http://www.climateers.org/eng/contents/carbon_calculator.php

Your carbon footprint is _____

In the website, you will be asked the following questions.

Q1 Where do you live?

Q2 How many people live in your apartment?

Q3 Do you have your Electricity / Towngas bill?

Q4.1 How many times per week does your household use the washing machine?

Q4.2 How would you describe the amount of water you use during your shower/bath?

heavy weight water user / middle weight water user / feather weight water user

Q4.3 Does your toilet use freshwater or sea water for flushing?

Q5 How often do you recycle these items?

Cans / Plastic / Paper

Q1 How much do you tend to spend on the MTR every month?

Q2 How much do you tend to spend on public buses every month?

Q3 How much do you tend to spend on public mini-buses every month?

Q4 How much do you tend to spend on taxi every month?

Q5 Do you use the ferry/hydrofoil regularly?

Q6 Are you a car owner?

Q1 Have you travelled by plane in past year?

Q2 How many times (return flights) have you flown over the last year?

Q3 Which class do you choose mostly?

Economy / Business or First

Ms Wong Hei 's result:

And your Carbon

Footprint is...

Annual: **7.41** tonnes of CO_2

Last Month: **1.62** tonnes of CO_2

Your carbon footprint last year will take **322.01** number of trees taking one whole year to absorb!

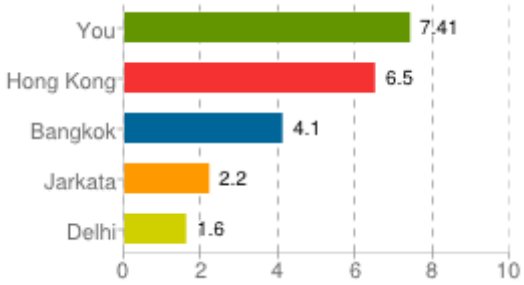
Personal Analysis | Compare with other places

Home	2.21
Local Transport	0.14
Air Travel	2.35
HK add-on	2.70

Annual : 7.41 tonnes

Personal Analysis | **Compare with other places**

Compare with others



Tonnes of CO_2 per person per year (these cities/countries footprints do not include flights)

2. You have just calculated your carbon footprint. Try to compare your carbon footprint with those of your classmates.

3. We may have different carbon footprints, but every one of us can do something to help fight global warming. Having a_____is one of the ways. Try to find out more in the website below and design your own plan to reduce your carbon footprint.

http://www.climateers.org/eng/contents/climateer_beaclimateer_index.php

Write down your plan for reducing your carbon footprint in the space below.
You may draw picture to illustrate your plan.