Language matters

Teaching I. S. through reading and writing

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PAOC Ka Chi Secondary School

Queries about the language policy as a science teacher

- What is the purpose of using English to teach science?
- Would the use of English as the MOI hinder students' understanding of science?
- Does the teaching of English language imply a decrease in the teaching time of science?
- How to motivate students to learn science through English?

"If we teach a subject which students find difficult, boring and unappealing, and if on top of that, students are being taught in a language they find difficult, then for them to learn anything is going to be a miracle."

(Deller and Price, 2007)

Inspirations from "Doing, Talking and Writing Science"

1. Science is a cultural construct

- Scientists communicate in specific genres: purposeful, predictable, objective, logical, systematic
- Genres convey thinking patterns, and are hence ways of constructing knowledge.

⇒ **Teaching science is guiding students to think in specific generic ways: experimental reports, descriptive reports, sequential explanations, analytical arguments, etc.**

Inspirations from "Doing, Talking and Writing Science"

2. Learning is from receptive knowledge to productive knowledge

- It is in the transition from receptive knowledge to productive knowledge that conceptualization begins.
- Productive knowledge is an authentic assessment of students' learning.

⇒ **Teaching is guiding students from the engagement in texts (doing, speaking, listening, reading, viewing) to the organization of knowledge and then to the production in writing.**

Changes in teaching practices

1. From texts to notes

- Using various types of graphic organizers, tables, charts or diagrams to represent different genres.
- Different genres require different types of organizers.
- Guiding students to organize their own notes.
- Examples: F. 1 I.S. Notes
  F. 3 Formation of Petroleum

No.: 14

Name: Albee. Wong ka Wai

Class: 3I

Subject: I.S «Petroleum.»

Date: 4月15日

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ANSWER SHEET

答 案 紙

GRAND TOTAL

PAGE TOTAL

Formation of petroleum.

Animals will be decomposed by ~~Soft~~ small bacteria and be covered by sand and silt. Then the weight pressing down on the mass will compress it into a layer. Finally, The heat of and pressure will at upon the mass. The end result, over time, is the formation of petroleum.

No.: 10

Name: Sophia

Class: 3I

Subject: Science

Date: 15-4-2016

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ANSWER SHEET

答 案 紙

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Formation of petroleum

Animals will be decomposed by small bacteria and be mixed with sand and silt. The weight will ampress it into a layer. The natural heat of the earth and intensive pressure will combin to act upon the mass. The end result, over time, is the formation of petroleum.

No.: 23

Name: Chrisey

Class: 3I

Subject: Science

Date: April. 15th

加拿大神召會嘉智中學

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ANSWER SHEET

答 案 紙

GRAND TOTAL

PAGE TOTAL

Petroleum formation occurs over millions of years

~~Firs~~t There are ~~three steps~~ in formation of petroleum. The first step is animals would be decomposed by small bacteria covered by sand, silt and mud. After that, they will compressed into a layer. Finally, the heat and pressure will act upon the mas. The end result, over time, is the formation of petroleum.

Changes in teaching practices

2. From speaking to writing

- Guiding students to formulate their understanding into sentences and paragraphs, giving necessary language support.
- Helping students to link up their paragraphs into passages.
- Examples:

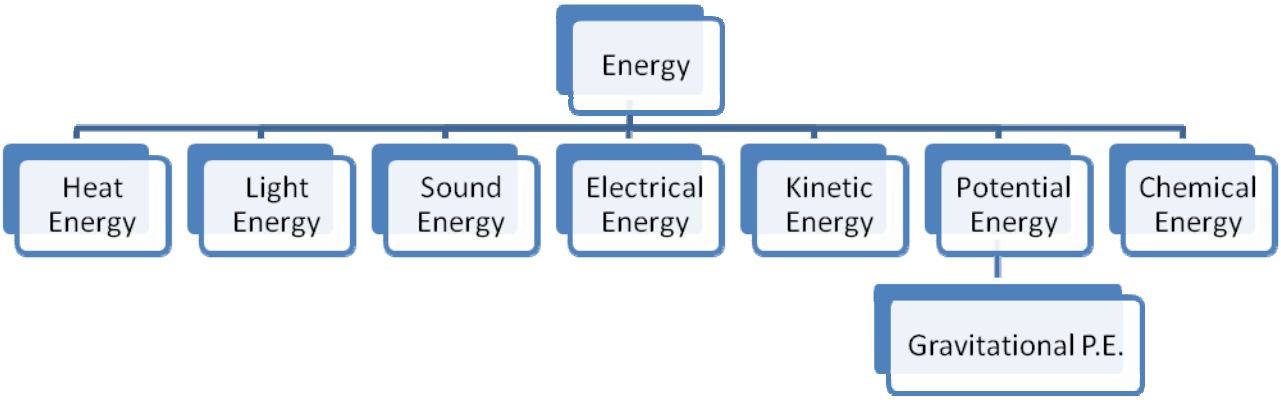
  F. 3: Balanced diet & Short writings

  F. 3: Petroleum

Thank You!

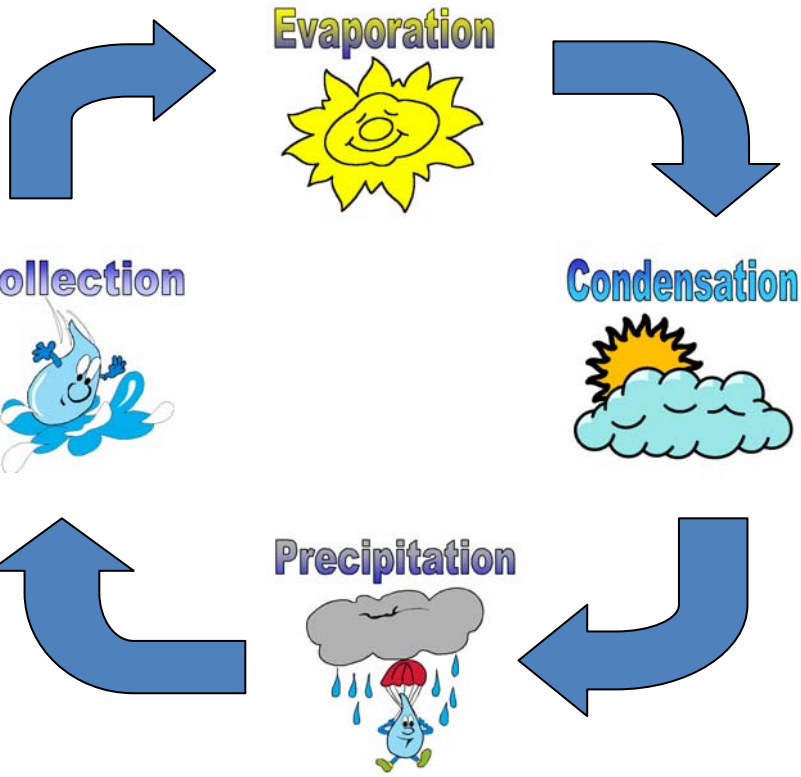
Fragments from F. 1 I. S. Notes

Forms of Energy



The Water Cycle

The Sun heats up water and turns it into vapours, which goes into the air.

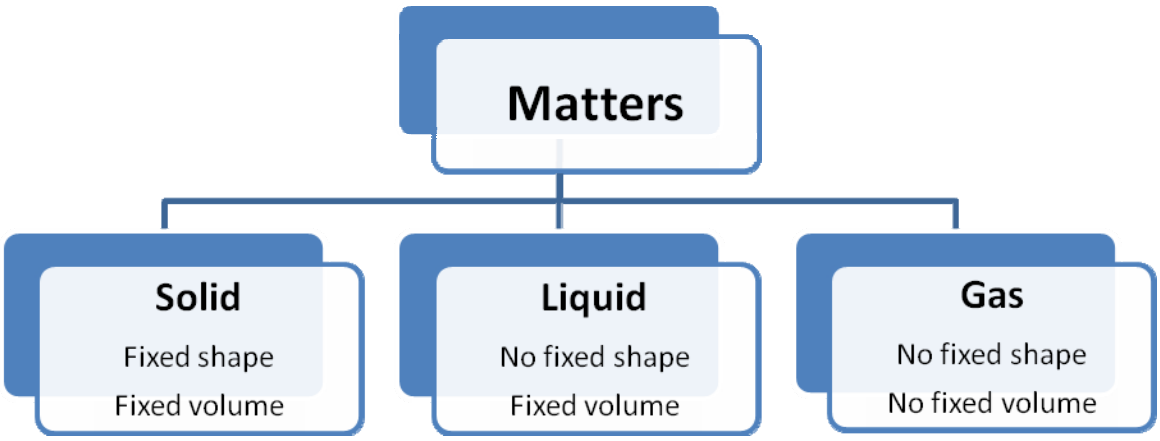


The earth collects water into rivers and lakes.

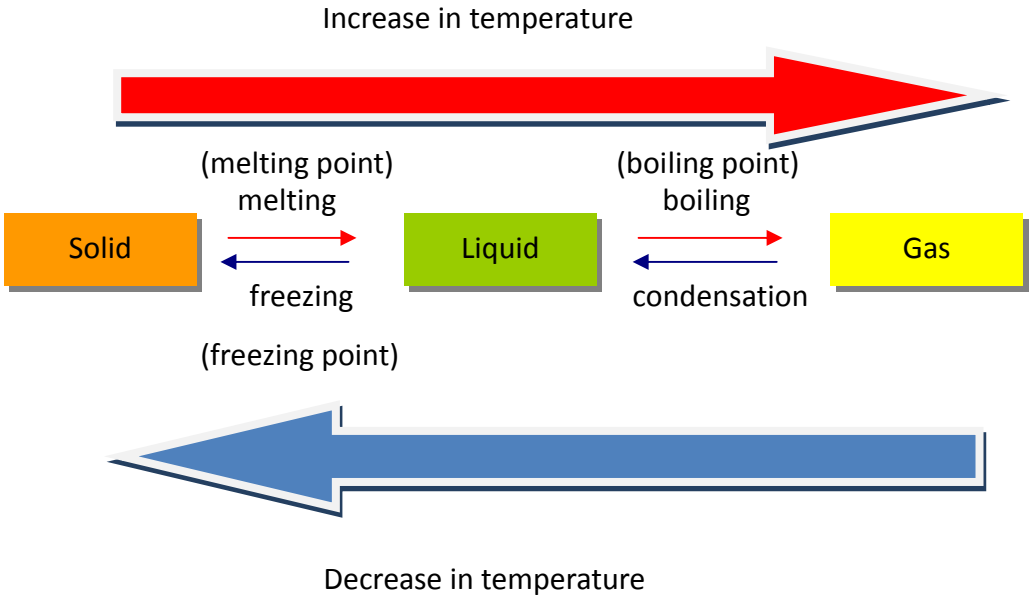
Water vapour in air gets cold and changes back into liquid, forming clouds.

Water in the clouds gets heavy and falls back to the earth.

States of Matters



Changes of States



PAOC Ka Chi Secondary School

F. 3 Integrated Science

English Worksheet 1

Name: _____

Class: _____

12.3 Balanced Diet

1. Match the following English words with the Chinese terms below:

Carbohydrates Fats Fibre Minerals Proteins Vitamins

碳水化合物 _____

蛋白質 _____

脂肪 _____

維生素 _____

礦物質 _____

食物纖維 _____

Score: _____

2. Food pyramid

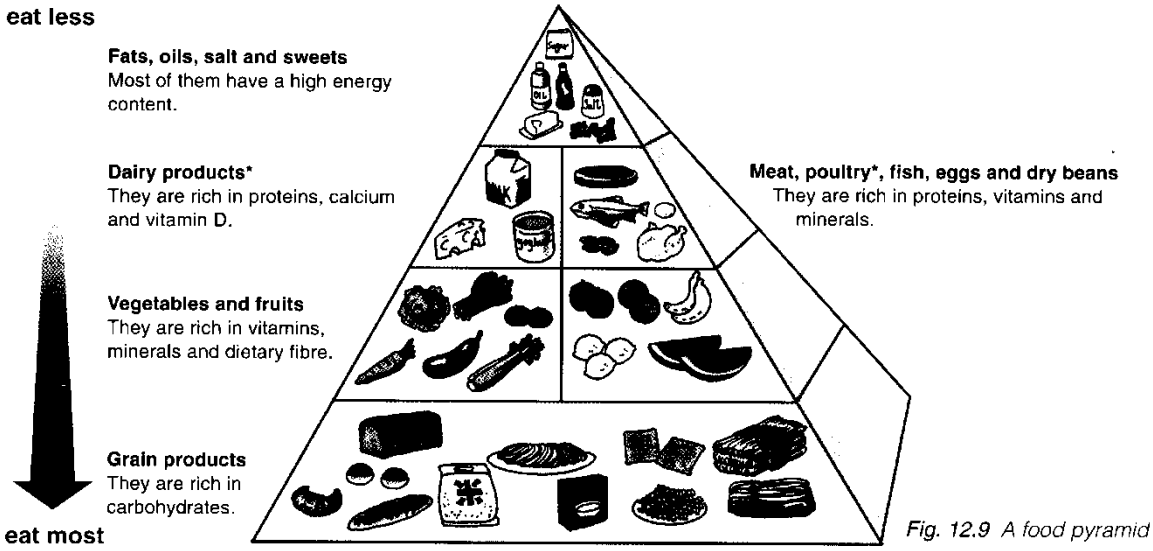


Fig. 12.9 A food pyramid

We should eat _____ the most, because it _____

We should eat _____ the least, because it _____

We should eat more of _____ and less of _____.

3. Design your own balanced diet

A teenage boy needs 15,000 kJ/day, and a teenage girl needs 10,000 kJ/day. Choose foods from the given menu and design a **balanced diet** for three meals in a day. Calculate the total amount of energy provided from your designed diet.

Meal	**Choice of foods**	**Energy values (kJ)**
Breakfast		
Lunch		
Dinner		
	Total	

4.

> The Parent-Teacher Association (家長教師會) of Ka Chi Secondary School have advised school tuck shop to stop selling fish balls, hot-dogs, potato chips and instant noodles. They think these foods are unhealthy.

a. Why are these foods considered unhealthy?

_____

_____

b. What kinds of healthy food should be sold at the tuck shop? Suggest three.

_____

_____

Menu

	Energy value (kJ)
Grain group	
• 1 slice of bread	400
• 1/2 bowl of ready-to-eat cereal	400
• 1 piece of cracker	250
• 1 bowl of rice or pasta	1000
Vegetable group	
• 1 dish of raw leafy vegetables (e.g. lettuce)	80
• 1/2 dish of non-leafy vegetables (e.g. carrots, tomatoes)	80
Fruit group	
• 1 apple, banana, orange or pear	200
• 1/2 cup of chopped or canned fruit	300
• 1 cup of fruit juice	400
Dairy group	
• 1 cup of milk or yoghurt (low-fat)	300
• 1 piece of cheese (low-fat)	300
Meat and Bean group	
• 1 bowl of red meat	2000
• 1 bowl of fish	800
• 1 bowl of cooked beans	300
• 1/2 bowl of tofu	100
• 1 egg	400
• 1 fried egg	500
Fats, oils and desserts	
• 2 scoops of ice-cream	800
• 1 cup of jelly	300
• 1 slice of cheese cake	700
• 1 chocolate bar	1500
• 1 cup of coffee	200
• 1 glass of soda	600
• 1 tablespoon of butter	250
• 1 tablespoon of peanut butter	200

I.S. Short writing

Balanced diet Lo Pui Lai Polly, 3I (11)

Food pyramid

A food pyramid is important to our balanced diet. It can give you information about your health. It tells you which things you should eat more and which things less.

An example of a balanced diet

For breakfast, we can have a cup of milk or yoghurt (low fat), a fried egg, a slice of bread, and a dish of raw leafy vegetables, e.g, lettuce. For lunch, we can have a bowl of rice or pasta, a dish or raw leafy vegetables, a cup of fruit juice, a bowl of fish and a chocolate bar. And for dinner, we can have a bowl of rice or pasta, half a dish of non-leafy vegetables, a kind of fruit, a bowl of red meat and a slice of cheese cake. This diet will provide us an energy content of about 10,000 kJ, enough for a day's need for a teenage girl.

A suggestion

I have a suggestion. I think the school tuck shop should stop selling junk foods such as fish balls, hot-dogs, potato chips and instant noodles, because these foods have too much fats and salts. It would be better to sell ham sandwiches, milk and fruit.

I. S. Short writing

Balanced diet Kan Wing Lung William, 3I (19)

Food pyramid

A food pyramid is important to your health. It tells us that, in order to have a balanced diet, we should eat carbohydrates the most, because it gives us energy. Rice, bread and noodles are rich in carbohydrates. We should also eat quite a lot of vegetables and fruit. They are rich in vitamins, minerals and dietary fibre. We should eat less meat, fish eggs and dairy products. These are rich in proteins. We should eat fats the least. We do not need much fats.

Suggested menu

An average teenage boy needs 15,000 kJ per day. I have designed the following balanced diet for the three meals in a day.

For breakfast, we may eat two slices of bread and an egg, one cup of yoghurt, and drink one cup of milk. For lunch, we may eat two bowls of rice, an egg, a dish of raw leafy vegetables and a bowl of red meat, and drink a cup of fruit juice. For dinner, we may eat two bowls of rice, two bowls of red meat, three piece of cheese, a bowl of tofu and a slice of chocolate cake, and drink a cup of fruit juice.

This diet provides a total of 15120 kJ.

I. S. Short writing

Balanced diet Yao Kaixi, 3I (23)

A balanced diet means to eat different kinds of food in right proportions to get enough of important nutrients. It can help us to stay healthy and beautiful. Do you know how to have a balanced diet? Let me tell you.

First, we need massive amount of carbohydrates. They are from rice. Carbohydrates provide us with energy. Without energy, we cannot do anything. Secondly, we have to eat a lot of vegetables and fruits. Our body needs vitamins , minerals and fibres to stay healthy. These are from vegetables and fruits. We can eat some meat and fish. They contain proteins that we need. Fats is the least that we need. If you take in too much fats, you will become fat and unhealthy. We should have a diet high in fibre and low in fats.

Actually, it is not difficult to have a balanced diet, but it takes time and practice. You can become more healthy and beautiful. Good luck!

PAOC Ka Chi Secondary School

F. 3 Integrated Science

Petroleum

Name: _____

Class: _____

1. Formation of petroleum

Study the following passage and fill in the graphic organizer.

Petroleum formation occurs over millions of years

When small sea animals die they will sink. They will lie on the sea bed, where they will be decomposed by small bacteria and be mixed with sand and silt. The partially decomposed remains will form a large, gelatinous mass, which will then slowly become covered by multiple layers of sand, silt and mud. This burying process takes millions of years, with layers piling up one atop another.

As the depth of the sediment builds up, the weight of the sand and silt pressing down on the mass will compress it into a layer which is much thinner than the original.

Finally, when the depth of the buried decomposing layer reaches somewhere around 10,000 feet, the natural heat of the earth and the intensive pressure will combine to act upon the mass. The end result, over time, is the formation of petroleum.

Abridged from www.petroleum.co.uk/formation

Steps 1. _____ 2. _____ 3. _____

_____ _____ _____

Descriptions

Step 1		Step 2		Step 3
_____		_____		_____
_____		_____		_____
_____	Conditions:	_____	Conditions:	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Now rewrite the process of petroleum formation in three sentences.

Formation of petroleum

_____

_____

_____

_____

_____

_____

_____

2. Fractional distillation (分餾)

a. Theory

Refer to the experiment on the fractional distillation of petroleum, and discuss the following questions.

i. What did you control in obtaining different fractions (餾分) ?

In other words, different fractions have different _____.

ii. Why are the fractions different in this property?

_____

_____

iii. Write a short paragraph on the theory of fractional distillation.

Theory of Fractional Distillation

_____

_____

_____

_____

_____

_____

_____

b. Matching of terms

Match the Chinese terms below with the following English words.

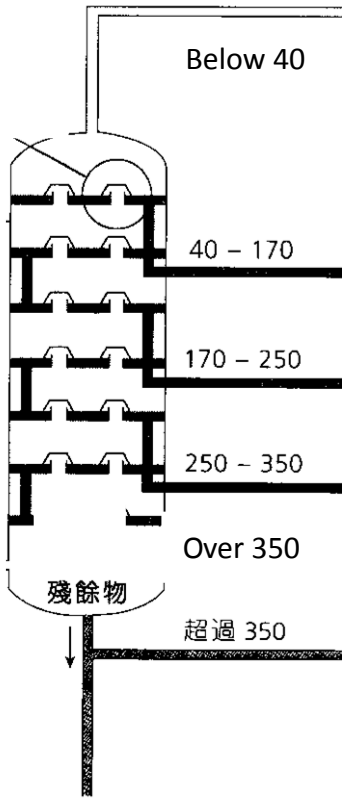
蠟　　火水　　瀝青　　石油　　汽油　　燃油

煉油氣　　潤滑油　　柴油　　石腦油

Petroleum	_____	LPG	_____
Petrol	_____	Naphtha	_____
Kerosene	_____	Diesel	_____
Fuel oil	_____	Lubricant	_____
Wax	_____	Bitumen	_____

c. Uses of different fractions

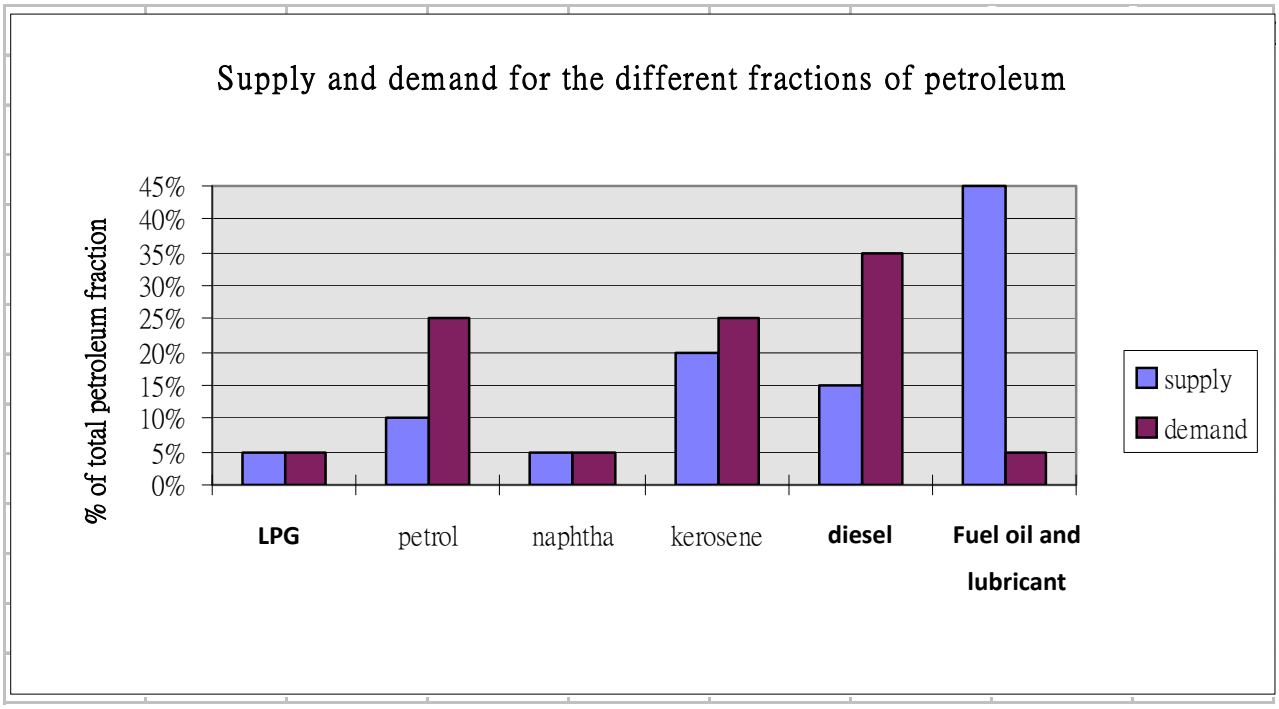
Fill in the following blanks showing the names and uses of different fractions of petroleum.



	Fractions	**Uses**
a)	_____	_____
b)	_____	_____
	_____	_____
c)	_____	_____
		_____
d)	_____	_____
		_____
e)	_____	_____
f)	_____	_____
g)	_____	_____

3. Supply and demand of petroleum fractions

Study the bar chart below and answer the questions that follow:



1. Compare the supply and demand of LPG.

_____

_____

2. Compare the supply and demand of petrol.

_____

_____

3. Why is the demand of petrol so high?

_____

_____

4. Compare the supply and demand of fuel oil and lubricant.

_____

_____

5. How can we balance the supply and demand of petroleum fractions?

_____

_____

Now write a short paragraph on the Supply and Demand of Petroleum Fractions.

Supply and Demand of Petroleum Fractions

_____

_____

_____

_____

_____

_____

_____

4. Writing task

Write a short passage on **Petroleum**, following the guideline below:

Paragraph 1	Formation of petroleum
Paragraph 2	Fractional distillation ➢ Theory ➢ Uses of different fractions ➢ A diagram showing the fractionating tower and different fractions should be included
Paragraph 3	Supply and demand of petroleum ➢ Compare the supply and demand of various fractions ➢ Suggest how to balance the supply and demand of fractions