

Chemistry

Delprov A

Årskurs

6

Elevens namn och klass/grupp

A lot of energy is used every day around the world. We can produce energy in many different ways. One source of energy is oil. In **Canada**, for instance, there are large amounts of something called **oil sands**. It has recently been discovered how to produce oil from oil sands.

Some people think that producing oil from oil sands is a good thing. Others think that there are a lot of disadvantages from producing oil from oil sands.



Alex

I think it is a bad idea to use oil sands/oil.

I think it is a good idea to use oil sands/oil.



Zara

On the next page there is a poster with information about oil sands and oil.

Read the texts and look at the pictures.

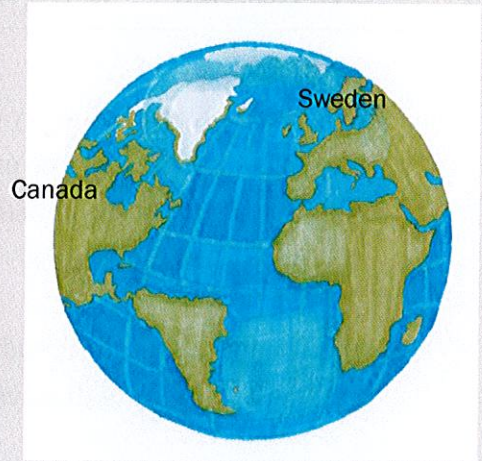


POSTER

A lot of energy is used when extracting oil from oil sand. When oil is extracted from oil sand, a lot of greenhouse gases are released. The release of gases may be eight times as large as compared to pumping up oil from the bottom of the sea. Moreover, a lot of water is used when extracting oil from oil sands, which may cause streams to become polluted.

When extracting, transporting and using oil there is a risk of explosion and fire.

Leaking oil may severely harm the environment.

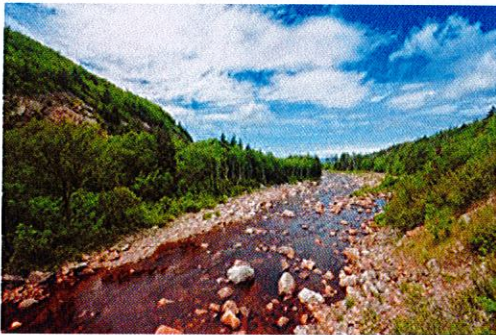


Oil sands consist of sand or clay, water and oil. Oil sands have become important lately and there are two reasons for this. One reason is that technology is now available for extracting the oil from the sand. Another reason is that we are running out of oil, making oil more expensive.

During the last fifty years, oil has been the most

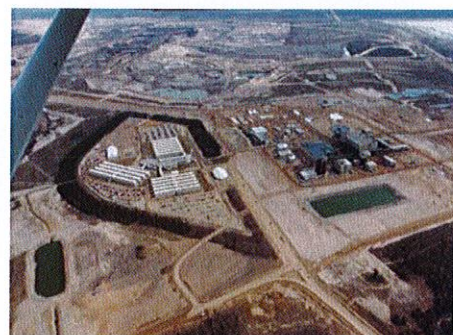
commonly used energy source in the world. This is because oil contains a lot of energy. Furthermore, oil is easy to store and transport.

Oil is used to fuel airplanes, cars, boats and trains. It is also used for machines in agriculture, forestry, mines and the building industry. A lot of things that we use every day is made of oil.



Nicolas Raymond
https://www.flickr.com

Canada has large forests that are not affected by humans. For instance, you can find the Grizzly bear here.



Jasonwoodhead23
https://www.flickr.com

In order to reach the oil sands in Canada, large forest areas must be cleared.

The world's largest, now known, reserves of oil

Country	Billions of barrels*
Saudi Arabia	263
Venezuela	211
Canada	175
Iran	137
Iraq	115
Kuwait	104

*1 barrel holds about 160 liters.

Källa: CIA, confirmed oil reserves 1 Jan-11

In some parts of the world, our society requires a lot of oil. This means that factories and transport may no longer work if there is no oil.



Your task is to help **both** Alex and Zara to find arguments supporting **their opinions**. Start by looking for useful information on the poster.

1. Write **two** arguments that Alex may use.
2. Write **two** arguments that Zara may use.

Do not forget to:

- use the information on the poster.
- **Support your arguments** with your knowledge of science.

Two arguments against using oil sands/oil:



I think it is a bad idea to use oil sands/oil...

...because...

...because...

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Two arguments for using oil sands/oil:

I think it is a good idea to use oil sands/oil...



...because...

...because...

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What do things like rocks, clouds, and humans consist of?

About 2.500 years ago, some Greek philosophers were thinking about what everything in the world was composed by.

Democritus and his teacher suggested that the world was composed of things too small to be visible to the eye. They thought that if you split something in smaller and smaller pieces, eventually the pieces will become so small you cannot divide them any further. They called these smallest pieces “atoms”, which means “indivisible”. According to these philosophers, the atoms had different colours and different shapes and between the atoms there was nothing but empty space.

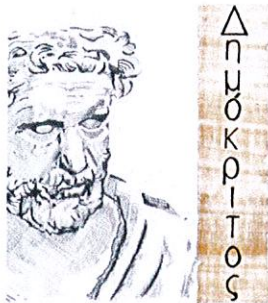
Even today we think that everything in the physical world consists of atoms.

A school class is going to make an exhibition about the views of the Greek philosophers. The exhibition is going to be displayed at the school library.

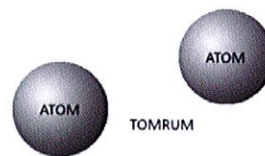
Some pupils have been asked to find a picture that shows Democritus’ thoughts about how the world is composed of atoms and empty space, but they are unable to decide which picture to choose.

Here you can see the pictures they are choosing from. On the next page you can read what the pupils think.

1



2

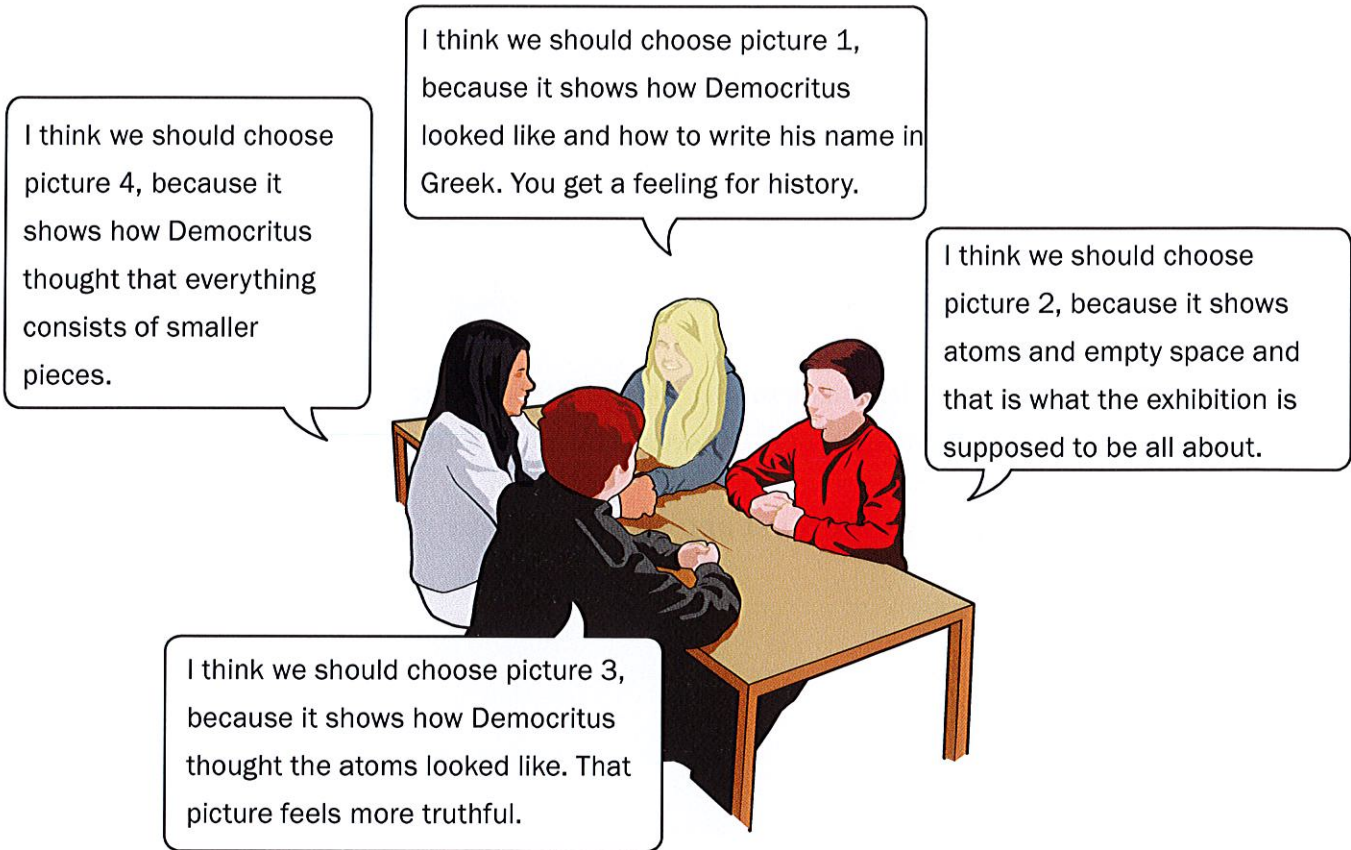


3



4





The picture chosen for the exhibition must clearly communicate Democritus' thoughts about how everything in the world is composed of atoms.

Your task is to help the pupils by **rejecting** three of the pictures.

For each picture you reject, you must **justify** your choice as thoroughly as possible.

I **reject** picture number _____ because

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I **reject** picture number _____ because

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Turn →

cont. from page 7

I **reject** picture number _____ because

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Now you only have one picture left. Explain why you think this picture is the best one to communicate Democritus' thoughts about how everything in the world is composed of atoms.

Picture number _____ is **the most appropriate** because

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You are going to show how the building blocks of water (molecules) move around. To make it easier to understand, you need to use both pictures and text. The pictures and texts should show the building blocks in water of different temperatures.

Use the information provided in the text below.

We believe that all things (substances) are made of building blocks so small that they cannot be seen with the naked eye. The building blocks in water and other elements are moving all the time. Water may exist as a solid (ice) and as a liquid. Steam is the gaseous phase of water.

In ice, the building blocks are locked in position. They shake and push each other. When the ice becomes warmer some building blocks will start moving around, switching places while they shake. This is when the ice starts to melt, which happens around zero degrees (0°C).

In water (the liquid phase) the building blocks are moving around, switching places while they shake. When the water becomes warmer, the building blocks will move around even more. The more the building blocks move around, the distance between them will grow bigger. The building blocks moving around the most may tear themselves loose from the others. As the water becomes warmer, more building blocks will tear themselves loose.

At a hundred degrees (100°C), all of the building blocks are moving so fast that they can tear themselves loose from the others. This is when water becomes steam. In steam, the building blocks move freely in relation to each other and with high speed. The warmer it is, the more they move around. Then the distance between the building blocks will grow bigger.

Ice, liquid water and steam are all made up of the same substance, as the building blocks never change. The thing that changes is how they move in relation to each other.

Draw **pictures** with **texts** illustrating the water molecules in:

- ice
- cold water (10 degrees)
- warm water (60 degrees)
- steam.

Your pictures and texts should illustrate the **distance** between the building blocks and their **movement**.

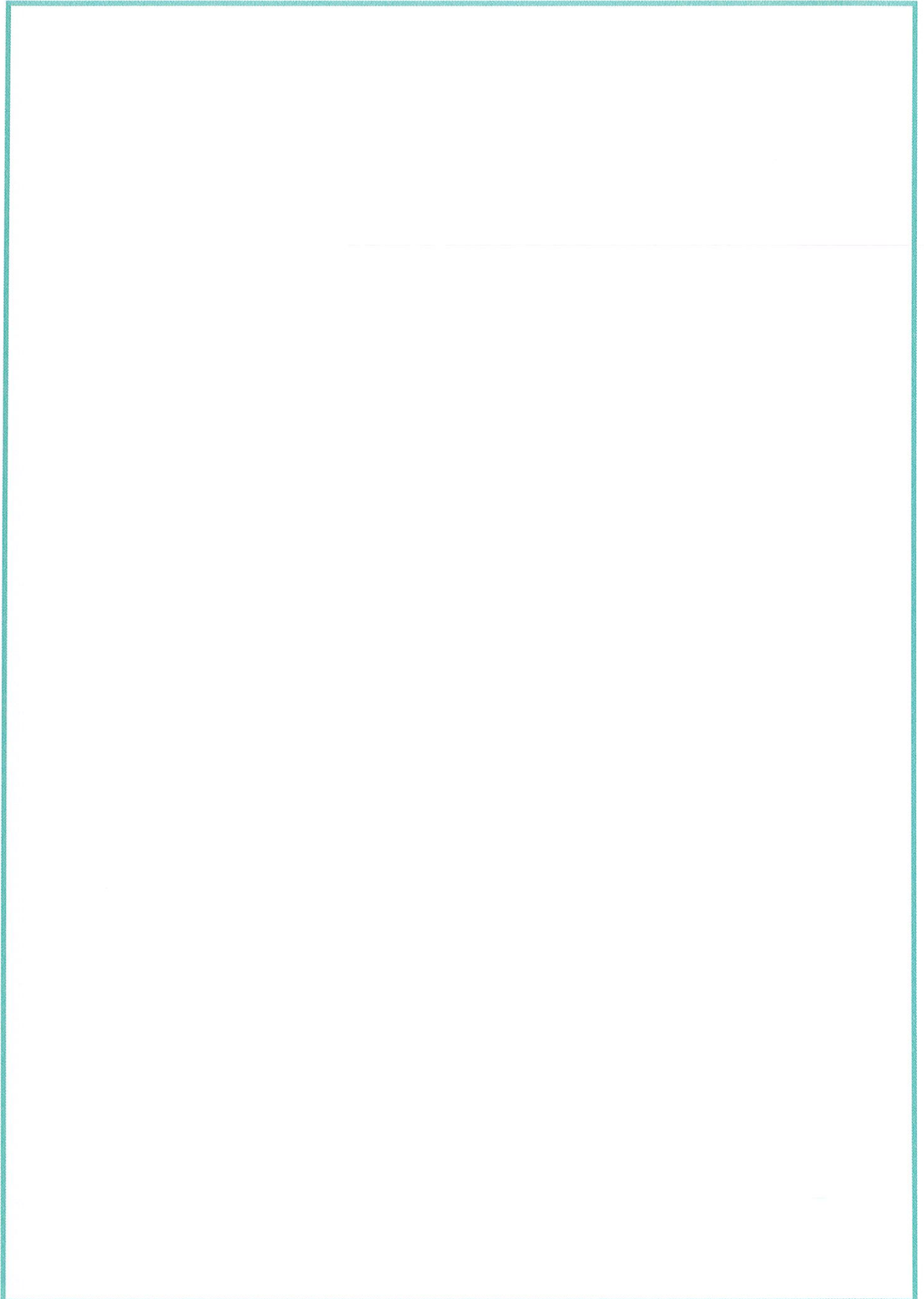
Tip: The building blocks can be drawn as dots or circles and the movements can be illustrated by arrows.

Do not forget to:

- use both **pictures** and short **texts**.
- make sure that the texts **support** the pictures.



Draw and write here.





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Chemistry

Delprov B

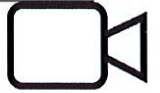
Årskurs

6

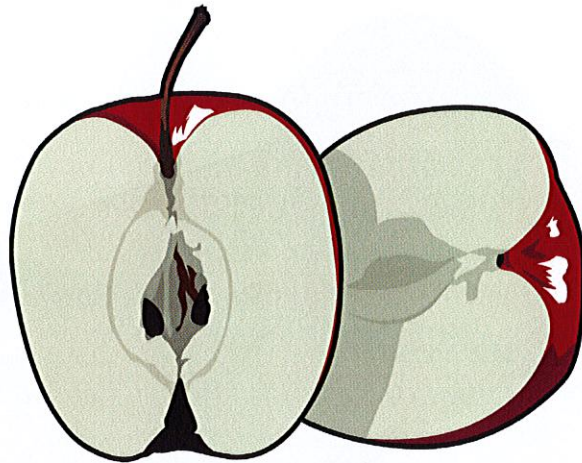
Elevens namn och klass/grupp

1. Day 1

1. Day 1



In the film, Tobias did an experiment in his kitchen. He tried to find out how much water evaporated from pieces of apple that were put into an oven to dry for 5 hours at 100°C.



At the end of the film, Tobias concludes that 60 grams of water have disappeared from one fifth of the apple. However, Tobias is not careful enough in his experiment, and he cannot draw that conclusion.

Write down three suggestions for how Tobias could have done his experiment differently to be able to draw his conclusion.

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ATTENTION! YOUR TEACHER WILL TELL YOU WHEN YOU SHOULD DO THIS TASK.

The juice of red cabbages turns into different colours when it comes into contact with acidic or basic substances.



Look at the two beakers your teacher has put out. One of them contains an acidic substance and red cabbage juice. The other one contains a basic substance and red cabbage juice.

a. In the table, write down which colours the mixtures in the beakers have.

Contents	COLOUR of the mixture in the beaker	Conclusion: The substance is acidic or basic
Acidic substance and red cabbage juice		ACID
Basic substance and red cabbage juice		BASE



b. Investigate for yourself if three other substances are acids or bases.

Material:

Red cabbage juice, lemon juice, white vinegar, soap, 4 pipettes, 3 paper containers.

Method:

- 1) Place three paper containers on the bench.
- 2) Using the pipette, add 5 drops of lemon juice in the first container.
- 3) Add 5 drops of white vinegar in the second container.
- 4) Add 5 drops of soap in the third container.
- 5) Add 3 – 4 drops of red cabbage juice onto each substance in the containers.
- 6) Write up your results in the table below. Write your conclusions with the help of the colours of the substances mixed with cabbage juice in exercise a.

Substance	COLOUR of the mixture in the paper container	My conclusion: the substance is ACIDIC or BASIC
5 drops of lemon juice		
5 drops of vinegar		
5 drops of soap		

*Teacher's signature
certifying completed
experiment.*



Conny puts two sugar cubes in his tea and thinks about its weight. He thinks that the weight of his tea has increased the same amount as the two sugar cubes weigh.



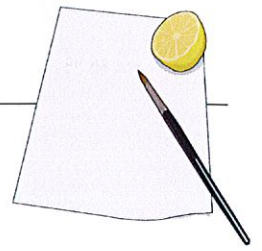
Plan an experiment for finding out if the **weight** of the tea increases by the same number of grams that the added sugar weighs. Write carefully so that someone else can do the experiment in exactly the same way.

The materials I will need:

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This is the way I will do the experiment:

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Class 6C wrote a message on a piece of paper using a paintbrush dipped in lemon juice. Then they left the paper to dry. The words were invisible. Their teacher asked the class to think of a way to make the words visible again. The pupils had some suggestions:

Agnes: We could iron the paper.

Britta: If we brush on a base substance, maybe it will change colour.

Carl: We could dampen the paper with water.

David: We could hold the paper over something warm, like a candle.

Erik: We could brush on something that isn't acid or neutral and maybe the words will reappear.

Feri: We could put the paper into the freezer.

Goran: We could sprinkle it with carbon powder

a. Give an example of two pupils who have similar suggestions (investigate the same things):

..... and

What will their suggestions investigate?

.....

b. Give an example of two more pupils who have similar suggestions (investigate the same thing):

..... and

What will their suggestions investigate?

.....

c. Give an example of two more pupils who have similar suggestions (investigate the same thing):

..... and

What will their suggestions investigate?

.....



One class divided into two groups and planned a soap bubble competition for Friday. They made the blowing tool themselves from steel wire and made soap bubble mixture from two different recipes (see below).

Here are their recipes:

Recipe, Group A

1 dl detergent
2 dl water
½ tsp icing sugar or
granulated sugar

Recipe, Group B

½ dl detergent
2 dl water
1 tsp icing sugar or
granulated sugar
½ dl glycerol

a. What things are **similar** in the two recipes?

Give four clear examples.

-
-
-
-

What **differences** are there between the recipes?

Give three clear examples

-
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b. Which of the following questions would the class be able to answer when they have their soap bubble competition?

Put a cross in each row in the correct box.

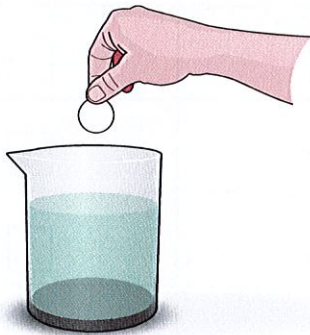
Question	The class <u>will</u> be able to answer the question.	The class <u>will not</u> be able to answer the question.
A) Which mixture makes the toughest and most durable bubbles?	<input type="checkbox"/>	<input type="checkbox"/>
B) How thick is the wall of each bubble?	<input type="checkbox"/>	<input type="checkbox"/>
C) What volume does each bubble have?	<input type="checkbox"/>	<input type="checkbox"/>
D) Does the size of the blowing tool's loop influence the size of the bubble?	<input type="checkbox"/>	<input type="checkbox"/>
E) Does different weather influence the size of the bubbles?	<input type="checkbox"/>	<input type="checkbox"/>
F) What effect does it have if you blow harder or lighter?	<input type="checkbox"/>	<input type="checkbox"/>



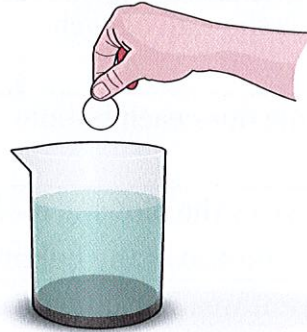
One day, Julia's mother had a headache and wanted to take a fizzy tablet to ease the pain. She thought it took a long time to dissolve the tablet in normal tap water.

Julia wondered if the tablet would dissolve more quickly in carbonated water, and she decided to investigate that.

Help Julia to plan her investigation so that she gets a valid result. Write clearly so that someone else could do exactly the same experiment!



Carbonated water



Tap water

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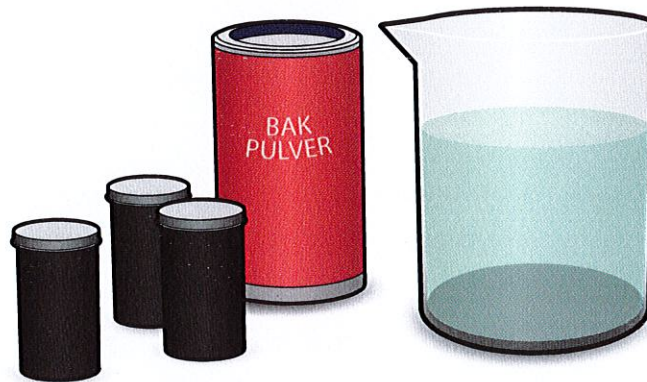
During a science lesson, Julia and Filip did an experiment with baking powder and water.

This is what they did:

- They mixed baking powder and water in three beakers with tight-fitting lids.
- They shook the beakers.

After different lengths of time, the lids flew off.

Give Julia and Filip four suggestions for how they can repeat their experiment so that all the lids fly off at the same time!



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Chemistry

Delprov C

Årskurs

6

Elevens namn och klass/grupp

1

Which one of these materials is the best conductor of electric current and heat?

Mark **one** alternative.

wood

metal

rock

plastic



2



horse shoe



chain



key



screw

These things are made of iron.

Why is iron a suitable material for making these things? Give **two** examples.

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3

The science of chemistry develops through new discoveries. Some old ideas are not considered to be true anymore, while some old ideas still are.

Which old ideas about chemistry are still considered true? Mark with an X for each statement.

	still considered true	not considered true	
Knowledge in chemistry may be used to develop new medicines.	<input type="checkbox"/>	<input type="checkbox"/>	
All substances consist of fire, soil, water and air.	<input type="checkbox"/>	<input type="checkbox"/>	
When something burns, no atoms disappear.	<input type="checkbox"/>	<input type="checkbox"/>	
You can produce salt by letting salt water evaporate.	<input type="checkbox"/>	<input type="checkbox"/>	
You can make gold from iron.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

4

The scientist Louis Pasteur who lived in the late 1800s came up with a method that makes milk last longer, before it turns sour. The method is called pasteurization, and is still used today by dairies.

What does pasteurization mean? Mark with an X for each statement.

Pasteurization means that the dairies

	true	false	
cool the milk down for a long time.	<input type="checkbox"/>	<input type="checkbox"/>	
heat the milk shortly.	<input type="checkbox"/>	<input type="checkbox"/>	
add sugar to the milk.	<input type="checkbox"/>	<input type="checkbox"/>	
add salt to the milk.	<input type="checkbox"/>	<input type="checkbox"/>	
kill the bacteria that can make us sick.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

5

The statements below are about air.
Mark each statement true or false.

	true	false
Air consists mostly of oxygen.	<input type="checkbox"/>	<input type="checkbox"/>
Air expands when it gets cold.	<input type="checkbox"/>	<input type="checkbox"/>
Air is a mixture of different substaces.	<input type="checkbox"/>	<input type="checkbox"/>
It is not possible to compress air.	<input type="checkbox"/>	<input type="checkbox"/>
Air consists of molecules.	<input type="checkbox"/>	<input type="checkbox"/>

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6

You need air to be able to light a wood fire .

What substance in the air is needed to light the fire?



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a) Which one of the following statements is an example of water **evaporating**?

Mark one statement.

A towel dries.

The lake freezes in the winter.

The car window mists up.

The snowman becomes a puddle.

b) Which one of the following statements is an example of **condensation**?

Mark one statement.

A puddle disappears on a hot summer day.

Sweat forms on your forehead after running.

Ice cubes become water when you put them in the sun.

A can of soft drink gets wet on the outside when you take it out of the fridge.



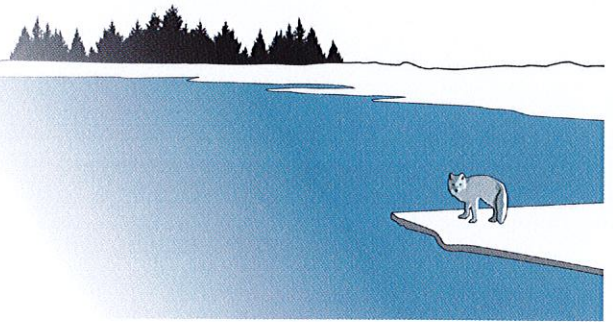
What happens to the motions of water molecules when water freezes to ice?

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9

Why does the rain on earth never come to an end?
Explain as carefully as you can, and draw a picture.



Explanation:

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Picture:

A large, empty rectangular box with a red border and rounded corners, intended for drawing a picture related to the question.

Fill in the sentences below about different substances in water.
Use some of the words in the box.

acidic alkaline salt sugar water nothing a solution

If you mix sugar with water and stir until you no longer see the sugar, you have made

If you boil salt water for a long time, eventually remains on the bottom of the casserole.

If you mix dishwasher detergents in water, the water becomes

If you mix citric acid in water, the water becomes



11

For a tree to grow it needs sunlight, water and something else.

Which one of the substances below does the tree need to grow? Mark **one** alternative.

oxygene

carbon dioxide

sugar

starch



12

The pictures below show different raw materials.

Write something that can be made from each raw material.

Give **one** example for each raw material.



sand

You can make



copper ore

You can make



crude oil

You can make

from sand.

from copper ore.

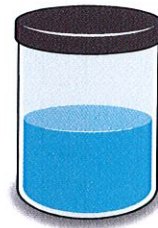
from crude oil.



A jar is filled with ice cubes and a tight lid is put on top. The jar and its contents is weighed. It weighs 630 grams. When all the ice has melted the jar is weighed again.



before



after

a) How much does the jar weigh when the ice has melted? Mark **one** alternative.

Much more than 630 grams .

A little more than 630 grams.

Still 630 grams.

A little less than 630 grams.

Much less than 630 gram.



b) Explain your choice.

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Chemicals are labelled with symbols showing in what way they can be dangerous. Currently, there are both old and new symbols in use.

Write the meaning of each symbol (a, b, c and d). Choose from the words in the box.

Harmful and irritating

Corrosive

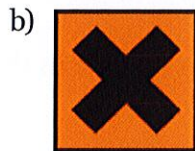
Explosive

Flammable

*Environmentally hazardous
(harmful to the environment)*

*Old
symbols*

*New
symbols*



Some fuels cause the amount of carbon dioxide in the air to increase year by year. There are also fuels that do **not** make it increase.

a) Mark the alternative below that does **not** increase the amount of carbon dioxide in the air each year. Mark **one** alternative.

- | | |
|----------|--------------------------|
| oil | <input type="checkbox"/> |
| coal | <input type="checkbox"/> |
| firewood | <input type="checkbox"/> |
| gasoline | <input type="checkbox"/> |

b) Why is it that the amount of carbon dioxide in the atmosphere does **not** increase each year when this fuel is used?

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16

If the amount of carbon dioxide increases in the atmosphere, it may affect the environment.

What can people do to prevent the amount of carbon dioxide from increasing in the atmosphere?

Give **two different** examples and explain why your examples work.

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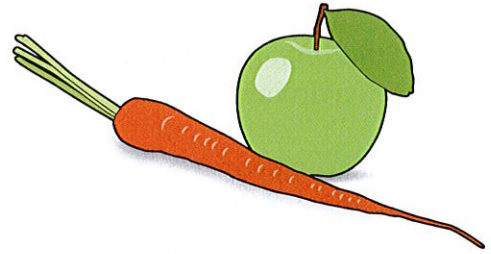
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17

Many people eat carrots and apples.



Which of the following statements are most accurate?

Mark **two** alternatives.

- Carrots and apples contain high amounts of sugar.
- Carrots and apples contain high amounts of fat.
- Carrots and apples contain essential vitamins.
- Carrots and apples contain fibres.
- Carrots and apples contain high amounts of proteins.



18

Food contains different substances, which are important to our health to a greater or lesser extent.

Mark each statement true **or** false.

- | | true | false |
|--|--------------------------|--------------------------|
| Sugar contains a lot of vitamins. | <input type="checkbox"/> | <input type="checkbox"/> |
| Fats are rich in energy. | <input type="checkbox"/> | <input type="checkbox"/> |
| Milk contains calcium, which is important for your skeleton. | <input type="checkbox"/> | <input type="checkbox"/> |
| Fat is the most important substance for building muscles. | <input type="checkbox"/> | <input type="checkbox"/> |
| Sugar is rich in energy. | <input type="checkbox"/> | <input type="checkbox"/> |



The picture below shows food divided into groups.

a) Which group contains the highest level of protein?

Mark **one** alternative.

group A

group B

group C

group D

b) Which group contains the highest level of fat?

Mark **one** alternative.

group A

group B

group C

group D

c) Which two groups contains the highest levels of carbohydrate?

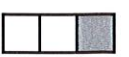
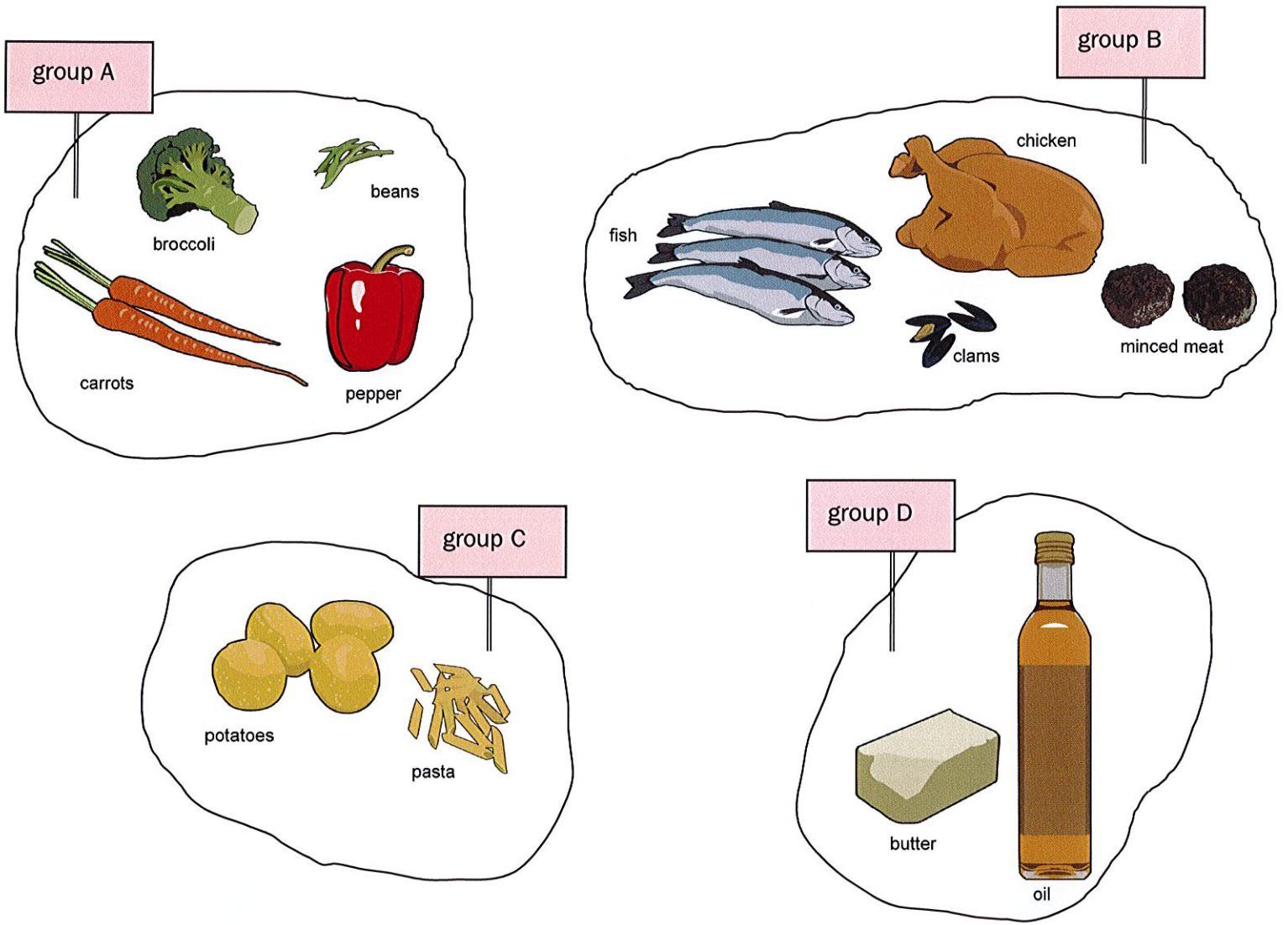
Mark **two** alternatives.

group A

group B

group C

group D





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