



**Year 8**

# Chemistry

**revision pack**

**Contents page:**

Page 2-4: What is the Earth made of and how is it changing?

Page 5-12: What is chemical change?

Page 13-15: How does chemistry effect our world?

**Instructions:**

- 1) When starting revising a big question use the short summary and your own knoweldge to make a spider diagram in the space provided. The practice questions for each big question are broken into sections.
- 2) Before starting the practice questions for a section read the pages in the self-study pack that are noted at the top of each section.
- 3) Attempt all the practice questions in your book or on lined paper.
- 4) Check the answers using the markscheme in a green pen. Add any missing information to your spider diagram.

# What is the Earth made of and how is it changing?

*(A short summary of what we have learnt this year in answer to the big question above)*

The geosphere is made up of the mostly solid mineral parts of the Earth. It is made of four layers, a solid metal inner core, a liquid metal outer core, a solid rocky mantle and a thin, rocky crust. The surface of the Earth is broken in huge tectonic plates which move a few cm every year. The crust is made of three types of rock:

- **Igneous rocks:** Small parts of the mantle get hot enough to melt. When molten rock cools it forms rock made of crystals (igneous rock).
- **Sedimentary rocks:** Rock on the surface of the Earth is slowly weathered and eroded to form tiny grains of sediment. These sediments can be compacted and cemented together to form sedimentary rock
- **Metamorphic rock:** Deep in the mantle rock can be transformed at high temperature and pressure. This rearranges the minerals forming metamorphic rock. Metamorphic rocks often contain bands of crystals.

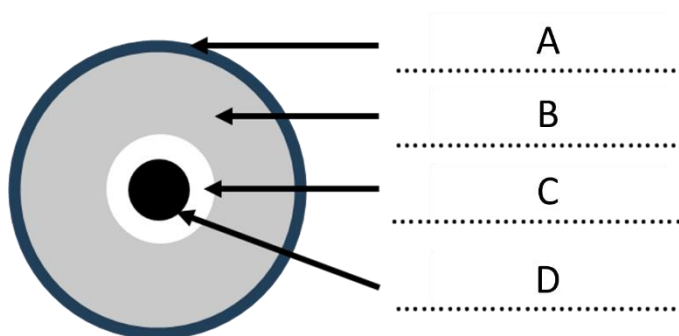
Task - Draw a spider-diagram summarising the information in the text above

## Knowledge Practise & Application:

Practise questions to test your recall of important knowledge and ability to apply this knowledge. *Italics note relevant self-study packs to refer to should you get stuck.*

### Part A: C5a Topic self-study pack – Lessons 01, 02, 03, 04, 05, 06, 07

1. What is a rock?
2. Are rocks mixtures or single substances?
3. Describe the structure of sedimentary rocks:
4. Describe the structure of igneous rock:
5. Describe the structure of metamorphic rocks:
6. What is a “mineral” (in geology)?
7. What type of chemical structure do minerals have?
8. Why do minerals have high melting points (hint: giant structures)?
9. What state of matter are minerals usually found in?
10. What are crystals?
11. What is the geosphere ?
12. What are the main four layers of the geosphere?
13. What is the Earth’s crust made of?
14. Which layers of the geosphere are solid?
15. How does the temperature change as you go deeper into the Earth?
16. What is a tectonic plate?
17. How far does a tectonic plate move a year?
18. Name 3 pieces of evidence do we have that continents used to be joined together?
19. What flows slowly and allows tectonic plates to move
20. Why is scientists' explanation of tectonic plate movement changing?
21. What do scientists think are the two main causes of tectonic plate movement?
22. What percentage of the Earth’s crust is made of igneous or metamorphic rock?
23. How are igneous rocks formed?
24. Where is magma found?
25. Why do intrusive igneous rocks have large crystals
26. Why do extrusive rocks have small crystals?
27. Label the four main layers that make up the geosphere



28. Copy and complete the table identifying the three types of rock:

Type of Rock	Description:
	Randomly arranged crystals
	Crystals that are mostly arranged in bands
	Cemented together grains

## Answers:

### Part A:

1. A natural material that comes from the Earth's crust
2. Rocks are mixtures made of more than one chemical substance
3. A random arrangement of grains cemented together
4. Randomly arranged crystals
5. Crystals that are arranged into bands
6. A chemical substance rocks are made of
7. A giant structure
8. All the atoms in a mineral have a strong hold on each other The sun
9. solid
10. Solids made of one mineral
11. The mostly solid mineral parts rotation of the Earth
12. Inner core, outer core, mantle and crust
13. Rocks
14. Inner core, mantle, crust
15. Gets hotter
16. Huge slab of the crust and upper mantle
17. A few cm
18. Continents are moving, shape and rock types of edges of continents match up, same fossils found on matching edges.
19. A layer of solid mantle
20. New evidence is being discovered?
21. Slab pull and ridge push
22. 95%
23. Cooling of magma or lava
24. At the edge of plate boundaries deep underground
25. Lava cools slowly below ground.
26. Lava cools quickly above ground
27. A = Crust / B = Mantle / C = Outer core / D = Inner core
28. Igneous  
Metaphoric  
Sedimentary

# What is chemical change?

*(A short summary of what we have learnt this year in answer to the big question above)*

During a chemical change atoms are rearranged to form new substances. The new substances formed will have different properties to the substances that reacted away. New properties appearing is evidence that a new substance has been formed. Chemists classify chemical reactions into groups including: oxidation reactions (including combustion), displacement reactions, precipitation reactions and thermal decomposition. Mass is always conserved in chemical changes but some types of reactions appear to produce a change in mass. This is usually because a substance is in the gas state.

During a chemical reaction energy is transferred between the chemical stores of the substances in the reaction and the thermal store of their surroundings. Energy is transferred from the chemical stores of the reacting substances to the surroundings in an exothermic change. Energy is transferred from the surroundings into the chemical store of the substances reacting in an endothermic change. Most chemical reactions are exothermic. Exothermic reactions cause an increase in the temperature of their surroundings. A small number of chemical reactions are endothermic. Endothermic reactions cause a decrease in temperature of the surroundings. Scientists measure the change in temperature of the surroundings by recording the temperature before and after a change then calculating the difference.

Acids are a group of substances which have similar properties and can react with alkalis and metals. Both acids and alkalis dissolve in solvents to form solutions. Acids form acidic solutions or and alkalis form alkaline solution. We can measure the acidity or alkalinity of a solution using the pH scale. Neutralisation is a chemical reaction between a base and an acid which produces a salt and water. Neutralisation changes the pH of an acidic solution and provides us with evidence of chemical change. Pollution released from sources can form acid rain through a series of reactions in the air. Acid rain reacts with rocks and damages wildlife.

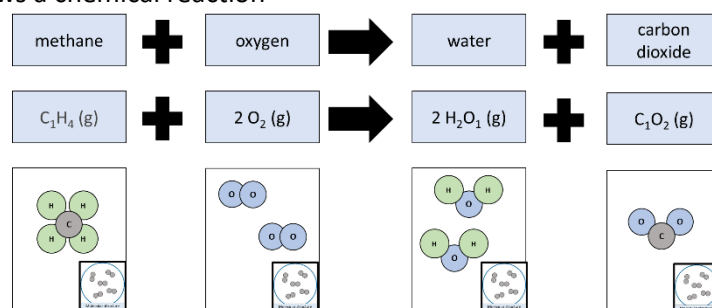
Task - Draw a spider-diagram summarising the information in the text above

## Knowledge Practise & Application:

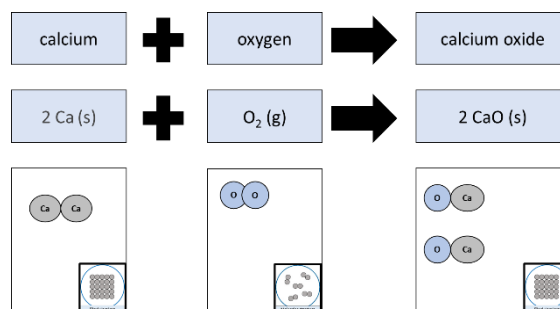
Practise questions to test your recall of important knowledge and ability to apply this knowledge. *Italics note relevant self-study packs to refer to should you get stuck.*

### Part A: C6 Topic self-study pack – Lessons 01 – 08.

1. What happens in a chemical change?
2. What symbol means “changed into” in a chemical reaction?
3. What are “the reactants” in a chemical reaction?
4. What are the “the products” of a chemical reaction?
5. What is added to atoms in a fuel during combustion?
6. What is transferred to the surroundings during combustion?
7. What is an oxidation reaction?
8. What is a displacement reaction?
9. What happens to the reactant in a thermal decomposition reaction?
10. What is used to make a thermal decomposition reaction occur?
11. What is the chemical test for carbon dioxide?
12. The diagram below shows a chemical reaction



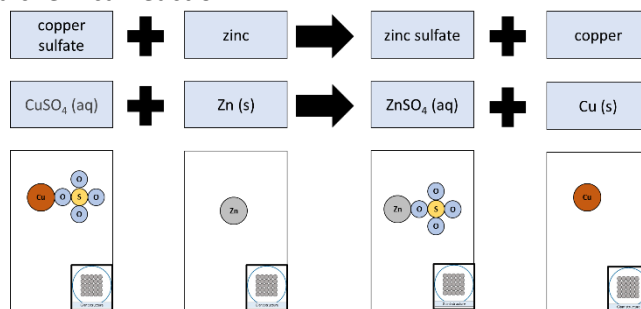
- a. Name the type of reaction
  - b. Explain your answer to part A.
  - c. What does the circle diagram above show you about the conservation of mass?
  - d. Explain your answer to part C.
13. The substance  $\text{C}_2\text{H}_6$  can also react with oxygen
    - a. Name the two products of this reaction
    - b. What is released to the surroundings when this substance reacts with oxygen?
    - c. Give the formula of an oxygen molecule
    - d. Write a word equation for the reaction of sulfur with oxygen.
  14. The diagram below shows a chemical reaction



- a. Name the type of reaction
- b. Explain your answer to part A.
- c. What does the circle diagram above show you about the conservation of mass?
- d. Explain your answer to part C.
- e. A scientist measures the mass of the reaction on a top pan balance before and after. What will her results show about the mass in the reaction?
- f. Explain your answer to part E.

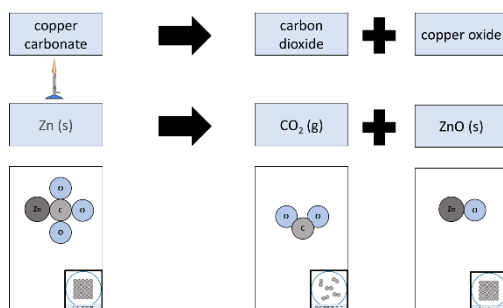
- g. The combustion of fuels and the corrosion of metals are two examples of oxidation reactions. Give one difference between these two reactions.

15. The diagram below shows a chemical reaction



- Name the type of reaction
- Explain your answer to part A.
- What does the circle diagram above show you about the conservation of mass?
- Explain your answer to part C.
- A scientist measures the mass of the reaction on a top pan balance before and after. What will her results show about the mass in the reaction?
- Explain your answer to part E.
- The scientist repeats the experiment this time with gold instead of zinc. They observe nothing happening. Explain why.

16. The diagram below shows a chemical reaction



- Name the type of reaction
- Explain your answer to part A.
- What does the circle diagram above show you about the conservation of mass?
- Explain your answer to part C.
- A scientist measures the mass of the reaction on a top pan balance before and after. What will her results show about the mass in the reaction?
- Explain your answer to part E.

## Knowledge Practise & Application:

Practise questions to test your recall of important knowledge and ability to apply this knowledge. *Italics note relevant self-study packs to refer to should you get stuck.*

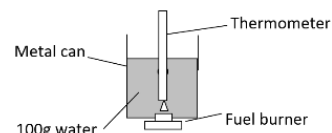
### Part B: C8 Topic self-study pack – Lessons 01 – 05.

1. What happens to energy during a chemical reaction?
2. What is an exothermic reaction?
3. What store is energy transferred from in an exothermic reaction?
4. What store is energy transferred to in an exothermic reaction?
5. How does an exothermic reaction change the temperature of the surroundings?
6. What happens to energy during a chemical reaction?
7. What is an endothermic reaction?
8. What store is energy transferred from in an exothermic reaction?
9. What store is energy transferred to in an exothermic reaction?
10. How does an endothermic reaction change the temperature of the surroundings?
11. Chemical reactions result in a transfer of energy
  - a. Compare the amount of energy stored in the products and reactants in an exothermic reaction
  - b. Which of the following types of reactions is an example of an endothermic reaction? Copy the correct answer into your book.

*Combustion                      Oxidation                      Neutralisation                      Thermal Decomposition*

12. During a reaction between solutions of citric acid and sodium hydrogen carbonate, the temperature of the reaction mixture fell from 18 °C to 4 °C.
  - a. Is this reaction exothermic or endothermic?
  - b. Where is energy being transferred from in the type of reaction
  - c. What happens to the amount of energy in the universe after the reaction?
  - d. Give a practical use of this type of reaction.
13. This question is about endothermic and exothermic reactions
  - a. For each of the following reactions state whether they are endothermic or exothermic
    - i. *Thermal decomposition*
    - ii. *Citric acid with sodium hydrogencarbonate*
    - iii. *Neutralisation*
    - iv. *Combustion*
  - b. Define an exothermic reaction
  - c. Iron oxide reacts with aluminium to produce aluminium oxide and iron. The reaction occurs at high enough temperature that the iron produced is molten. Identify whether the reaction is exothermic or endothermic.

14. The following experiment was used to compare how much heat energy three different fuels gave out when they were burnt. The results for when 1.0 g of each fuel was burnt are shown in the table:



fuel	temperature of water at start	temperature of water at end
ethanol	19°C	36°C
paraffin	20°C	47°C
white spirit	18°C	41°C

- a. For all the reactions state whether they are exothermic or endothermic?
- b. Calculate the temperature change when 1.0 g of ethanol was burnt?

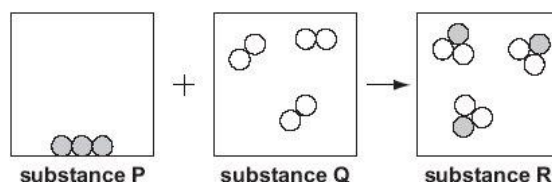
## Knowledge Practise & Application:

Practise questions to test your recall of important knowledge and ability to apply this knowledge. *Italics note relevant self-study packs to refer to should you get stuck.*

### Part C: C9 Topic self-study pack – Lessons 01 – 05.

1. What chemical property do all acids have in common?
2. What colour does litmus turn in an acidic solution?
3. What colour does litmus turn in an alkali solution?
4. What pH values mean a solution is acidic?
5. What pH value means a solution is neutral?
6. What pH means a solution is alkaline?
7. What is a base?
8. What types of bases can form alkaline solutions?
9. What is a neutralisation reaction
10. What is always produced in a neutralisation reaction?
11. What happens to the pH of an acidic solution if it is neutralised?
12. State three problems caused by acid rain?
13. How does the pH of acid rain compare to the pH of normal rain?
14. What two gaseous pollutants cause acid rain?
15. What is produced when a metal reacts with an acidic solution?
16. What is the chemical test for hydrogen gas
17. Which acid can form metal sulphate salts when it reacts?
18. Which acid can form metal chloride salts when it reacts?
19. Which acid can form metal nitrate salts when it reacts?
20. Name the salt formed when sodium reacts with sulfuric acid
21. Name the salt formed when magnesium reacts with hydrochloric acid
22. Name the salt formed when lithium reacts with nitric acid
23. Name the salt formed when nitric acid reacts with lead.
24. Name the salt formed when potassium reacts with sulfuric acid
25. The diagram below shows a model of a chemical reaction between two substances.

- a. How can you tell from the diagram that a chemical reaction took place between substance P and substance Q?
- b. How does the diagram show that mass has been conserved in this reaction?



26. Write a word equation for the reactions between:
  - a. Aluminium and hydrochloric acid
  - b. Magnesium and hydrochloric acid
  - c. Calcium and nitric acid
  - d. Beryllium and sulphuric acid
  - e. Iron and sulphuric acid
27. Sulfur is a non-metal. Sulfur burns in the air to produce sulfur dioxide,  $\text{SO}_2$ 
  - a. Why is it important that sulfur dioxide is not released into the atmosphere?
  - b. Sulfur dioxide dissolves in water. What colour is universal indicator in a solution of sulfur dioxide? Give a reason for your answer.
- 28.

## Answers:

### Part A:

1. Atoms are rearranged to form new substances
2. An arrow
3. The substances which are reacted away during the reaction.
4. The new substances that are produced by a reaction.
5. Oxygen atoms
6. Large amounts of energy
7. A reaction where atoms of oxygen are added to a substance
8. A reaction where a more reactive element pushes a less reactive one out of a compound.
9. It is broken down into two or more simpler substances
10. Heat (reactant needs to be heated)
11. Bubble through limewater  
Limewater goes cloudy
12.
  - a. Combustion (accept exothermic)
  - b. Oxygen atoms are rearranged (and added to atoms in the other reactant (the fuel)).  
The products of a combustion reaction are "oxidised" or products have had oxygen atoms added to them from the oxygen in the air.
  - c. The mass has stayed the same.
  - d. Number of atoms is the same before and after.  
Type of atoms is the same before and after
13.
  - a. Carbon dioxide and water
  - b. Energy
  - c. O<sub>2</sub>
  - d. sulfur + oxygen -> sulfur dioxide
14.
  - a. Oxidation
  - b. Oxygen atoms are added to another substance.  
Iron has gained (added) oxygen to it.
  - c. The mass has stayed the same.
  - d. Number of atoms is the same before and after.  
Type of atoms is the same before and after
  - e. Mass has increased
  - f. This is because one of the reactants was in the gas state and it is hard to measure the mass of gases.  
After the reaction oxygen atoms are added to the iron (metal) so its mass appears to increase.
  - g. Combustion of fuels are much faster reactions than corrosion of metals
15.
  - a. Displacement
  - b. Zinc has push out / displaced the copper atoms from the solution  
This is because zinc is more reactive than copper.
  - c. The mass has stayed the same.
  - d. Number of atoms is the same before and after.  
Type of atoms is the same before and after
  - e. Mass has stayed the same
  - f. All the reactants and products are in their solid (s) or aqueous (aq) states.  
This means all atoms are pressing down on the chemical balance (and makes it easy to show that mass is conserved).
  - g. Gold is less reactive than copper so is cannot displace/push around the copper atoms

- 16.
- Thermal decomposition
  - The reactant (copper carbonate) is broken down into (two) simpler substances.  
Using heat
  - The mass has stayed the same.
  - Number of atoms is the same before and after.  
Type of atoms is the same before and after
  - Mass has decreased.
  - This is because one of the products is in the gas state.  
The solid product will weigh less than the solid reactant did as some atoms have become part of a gaseous product and are not pushing down on the top pan balance.

**Part B:**

- It is transferred
- A reaction that transfers energy to the surroundings
- The chemical store of the substances in the reaction
- The thermal store of the surroundings
- It increases it
- It is transferred
- A reaction that transfers energy from the surroundings
- The thermal store of the surroundings
- The chemical store of the substances in the reaction
- It decreases it
- The products have less energy than the reactants
  - Thermal decomposition
- Endothermic
  - From the surroundings
  - It stays the same
  - Sports injury pack
- Thermal decomposition – endothermic
    - Citric acid with sodium hydrogencarbonate – endothermic
    - Neutralisation – exothermic
    - Combustion – exothermic
  - Exothermic reaction is a reaction that transfers energy to the surroundings
  - Exothermic
- All exothermic
  - 17 °C
  - Paraffin
  - So you can compare the results of each fuel

**Part C:**

- They all react with alkalis in neutralisation reactions
- red
- blue
- pH less than 7
- pH of 7

6. pH greater than 7
7. A substance that can react with an acid and neutralise it.
8. Soluble bases
9. A reaction between an acid and a base that produces a salt and water
10. A salt and water
11. Changes (to pH 7)
12. Damage plants, animals and buildings
13. pH is lower (more acidic)
14. sulphur dioxide & Nitrogen monoxide
15. A salt and hydrogen gas
16. Lit splint goes out with a squeaky pop
17. Sulphuric acid
18. Hydrochloric acid
19. Nitric acid
20. sodium sulfate
21. magnesium chloride
22. lithium nitrate
23. lead nitrate
24. potassium sulfate
25.
  - a. The atoms have been rearranged to form new substances
  - b. The same numbers of each type of atom are present
26.
  - a. aluminium + hydrochloric acid → aluminium chloride + hydrogen
  - b. magnesium + hydrochloric acid → magnesium chloride + hydrogen
  - c. calcium + nitric acid → calcium nitrate + hydrogen
  - d. beryllium + sulphuric acid → beryllium sulfate + hydrogen
  - e. iron + sulphuric acid → iron sulfate + hydrogen
27.
  - a. Sulfur dioxide causes acid rain.
  - b. red / orange / yellow  
because sulfur dioxide (when in solution) is an acid

# How does chemistry effect our world?

*(A short summary of what we have learnt this year in answer to the big question above)*

The atmosphere is a thin layer of gases that surrounds the earth. The atmosphere is a mixture of different substances which give the atmosphere its properties. Water is a substance that is vital for life. Water is found on the Earth's surface in different stores. Water moves between these different stores by physical processes including evaporation and condensation. Water is constantly circulating the Earth in a massive planet wide "water system". Human activities pollute our atmosphere and stores of water and changes their properties. Human activities pollute our air, oceans, lakes, rivers and ground water stores

Task - Draw a spider-diagram summarising the information in the text above

## Knowledge Practise & Application:

Practise questions to test your recall of important knowledge and ability to apply this knowledge. *Italics note relevant self-study packs to refer to should you get stuck.*

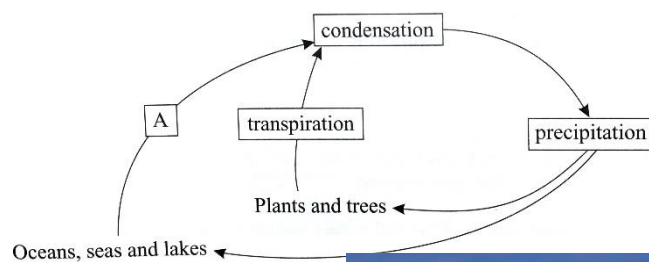
### Part A: C8 Topic self-study pack – Lessons 01 – 09.

1. What is the atmosphere?
2. Is the atmosphere a thick or thin layer?
3. What gas makes up 78% of the atmosphere?
4. What gas makes up 21% of the atmosphere?
5. What property does carbon dioxide give the atmosphere?
6. What is air pollution?
7. What temperature will a liquid evaporate at?
8. What is the boiling point of a substance?
9. How can you observe a substance is boiling not evaporating?
10. Where does evaporation of a liquid happen?
11. Why can a small number of particles in a liquid always evaporate?
12. How does temperature effect the rate of evaporation?
13. Why does evaporation happen faster at higher temperatures?
14. hat are clouds made of? Tiny droplets of liquid water
15. What is water vapour?
16. How is water transferred into the atmosphere?17
17. What physical process forms clouds?
18. What is the hydrosphere made of?
19. Where is ground water stored?
20. What are the main stores of salt water?
21. This question is about percentage change.
  - a. What is the equation for measuring a percentage?
  - b. Why are percentage change measurements reproducibly?
  - c. What does a result being reproducible mean?
  - d. A rock had 0.4 g of water stored in it. After a storm 0.6 g of water is stored in it. Calculate the percentage change in mass.
22. What is potable water?
23. What does a water supply becoming “contaminated” mean?
24. Why can a source of pollution contaminate large areas of ground water?
25. Copy and complete the following paragraph:

Water ... from the surface of the .... Heat from the ... speeds up this process and so does the .... Water vapour in the atmosphere cools down and ... to form billions of tiny water droplets. Some of the droplets join together and fall as ... ..

***Boils, Condenses, Evaporates, Freezes, Melts, Rain, Sea, Sun, Wind.***

26. The figure represents the stages in the water cycle.
  - a. Name the process represented by A in the diagram
  - b. What is meant by the term ‘precipitation’?
  - c. Explain why precipitation is an important stage in the water cycle
  - d. Suggest how the water in plants can be passed on to animals.



27. All life on Earth depends on water. The figure below shows an iceberg floating on the sea. Explain how the water molecules in the iceberg could end up as water in a lake. (4 marks – ensure you explain two ways water molecules could end up in the lake)



## Answers

### Part A:

1. A mixture of substances which are mostly in their gaseous states
2. Thin layer
3. nitrogen
4. oxygen
5. (ability to) trap heat
6. When substances are added to the air that are not normally there (or only there in small amounts)
7. Any temperature
8. The temperature it boils at
9. Bubbles for all the though the liquid
10. At its surface
11. A small number of particles always have enough energy to break their holds
12. Evaporation happens faster at higher temperatures
13. More particles have enough energy to break the holds between them
14. Tiny droplets of liquid water
15. Water in its gaseous state
16. By evaporation
17. Condensation
18. All the water on or near a planets surface
19. In gaps inside rock, soil and sediment
20. Seas and oceans
21.
  - a.  $\text{Percentage change} = (\text{change in mass} / \text{original mass}) \times 100$
  - b. Because they can be reproduced by other teams
  - c. Other teams can reproduce the experiment and get similar results
  - d. 50 %
22. Water that is safe to drink.
23. A substance harmful to humans is added to natural resource.
24. Ground water flows slowly
25. Evaporates / Sea / Sun / Wind / Condenses / Rain
26.
  - a. Evaporation
  - b. Precipitation is water that falls from the clouds
  - c. It provides fresh water for plants and animals
  - d. When animals eat plants
27. Water in the iceberg is in its solid state  
When the iceberg melts water is in its liquid form  
And the water molecules go into the sea  
Water evaporates from the surface of the sea  
So the water molecules go into the air as vapour  
As the air rises it cools  
So water vapour condenses into droplets in clouds  
Clouds can be moved around the world by winds  
Droplets then fall as rain / snow / hail / precipitation into a lake