Answers Mixtures

Year 7 Science Chapter 4

p75

1 A pure substance has a definite and consistent composition. Pure water is a pure substance consisting only of water atoms (H_2O).

2 Pure salt is a pure substance because it consists only of salt atoms (NaCl).

Pure gold is a pure substance because it consists only of gold atoms (Au).

3 A mixture is a mix of two or more substances.

- The substances can be solid, liquid, or gas.
- The substances can be mixed together in any proportion.
- When the substances are mixed there is no chemical reaction to make new substances.
- A mixture can be separated into its substances.

4 Salt water is a mixture because it is a mix of two or more substance (salt and water).

Smog is a mixture because it is a mix of a number of substances suspended in air .

5 Smog may be separated from air by using filters (eg face masks). Smog may also be separated from air by bubbling the poluted air through water.

p77

1 a) The solute is coffee.

b) the solvent is hot water.

2 A solution of sugar and water is an example of a homogeneous mixture. A **homogeneous** mixtures is well mixed. The particles that make up a homogeneous mixture are very small and do not settle out when allowed to stand.

3 A mixture of sand and water is an example of a heterogeneous mixture. **Heterogeneous** mixtures are the least mixed. The particles of a heterogeneous mixture are large enough to be seen. The particles will settle out on standing.

4 A solution is a homogeneous mixture.

5 When a solution is passed through a filter no residue (solute) is left behind.

6 If a solution is left to stand, no solid particles (solute) settle to the bottom.

7 A stirred mixture of coffee and hot water is a solution. The coffee will not settle to the bottom if left to stand. If the coffee and water is passed through a filter no residue is left behind.

8 Other solutes such as sugar are often added to a cup of coffee.

p79

1 A suspension is a heterogeneous mixture from which particles will eventually settle.

2 A suspension has solid particles that be left on filter paper.

3 A suspension has solid particles that will settle.

4 A colloid is between a solution and a suspension. A colloid is a heterogeneous mixture. A colloid has particles larger than that of a solution but smaller than that of a suspension.

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6 A colloid will show the beam of light.

7 Water in flood - suspension, water in a swimming pool - solution, sea water - colloid, milk - colloid, orange juice - suspension, jelly - solution, beer - colloid.

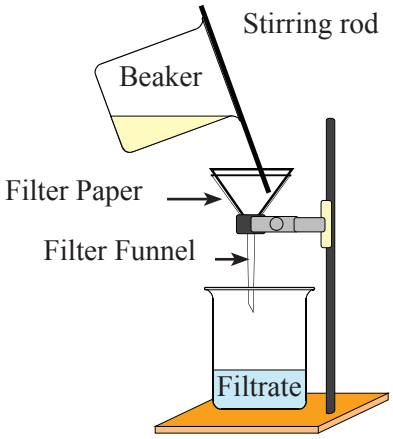
p82

1 A **suspension** has solid particles that do not dissolve. If the particles settle out quickly, they can be separated by **decanting**. Particles will settle out faster if a **centrifuge** is used. A common way of separating the particles in a suspension is to use a filter (**filtration**).

2 The material left in the filter paper is called the **residue**.

3 The material that passes through the filter paper is called the **filtrate**.

3 A centrifuge **spins** and forces the heavier particles to the ends of the spinning container.



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p90

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2 **a)** oxygen is a pure substance consisting only of oxygen atoms (O_2)

b) air is a mixture consisting of many substances (water vapour, nitrogen, oxygen, carbon dioxide, smog etc.

c) a biscuit is a mixture consisting of many substances (flour, sugar, water).

d) carbon dioxide is a pure substance consisting only of carbon dioxide atoms (CO_2)

p91

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2 Decanting: Solid particles that have settled to the bottom can be separated from suspension by **pouring off** the liquid. The heavier particles and some of the liquid is left in the container.

3 Examples of decanting at home: Boiling vegetables and then pouring off the water before eating the vegetables. Decanting the oil from the top of a meat soup.

4 Filtration: Solid particles can be separated from suspension by pouring the mixture through filter paper. Liquid is able to pass through the small holes in the filter paper, leaving the larger particles behind.

5 Examples of filtration at home: A filter is used to filter out the dust and dirt in the vacuum cleaner. The use of an oil filter in the car.

6 Centrifuge: Solid particles still in suspension can be forced to the bottom in a centrifuge. A centrifuge **spins** and forces the heavier particles to the ends of the spinning container.

7 Examples of a centrifuge at home: The washing machine acts as a centrifuge when drying clothes during the spinning cycle. Some vacuum cleaners use a centrifuge action to separate dust and dirt.

8 Decanting: Separate the fat by scooping it from the top of the soup with a spoon when the soup is cool (The fat has solidified).

9 Filtration. Use mosquito screens to allow air into the house but not the mosquitos.

10 Filtration: Pour the tea through a tea filter - leaving the tea leaves as residue in the filter.

11 Filtration: Use a sieve to filter the spaghetti - letting the water pass through the sieve.

12 Condensation: Change of state of water from a vapour (gas) to a liquid. Condensation happens when warm air rises in the atmosphere and cools. The water vapour condenses into water (rain).

13 Dew point: The dew point is the temperature at which the water vapor in a sample of air condenses into liquid water at the same rate at which it evaporates. Water leaves the air below the dew point and will condense on a solid surface.

p93

1 Number the balls from 1 to 12. Put balls 1,2,3,4 together - group A
Put balls 5,6,7,8 together - group B
Put balls 9,10,11,12 together - group C

a) Put group A and group B on each side of the balance.
If unbalanced then the odd ball is in either group A or group B: **go to b)**
If balanced then the odd ball is in group C
Weigh 6,7,8 with 9,10,11
If balanced **then 12 is the odd ball**
If unbalanced then the odd ball is either 9,10,or 11 - (also note if heavier or lighter)
Weigh 9 with 10
If balanced **then 11 is the odd ball**
If unbalanced then the odd ball is either 9 or 10
depending on which is heavier or lighter as noted in the previous weighting.

b) Determine the odd ball using a similar method to above.

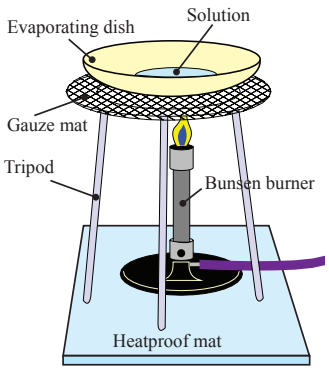
2 Olivia owns the goat, Mia owns the calf, Ethan owns the horse.

3 The fourth child is Chloe.

p94

1 Salt may separated from a solution of water and salt by evaporating the liquid. When all of the liquid has been evaporated, the solid remains.

2



3 **Distillation** is a process in which the evaporated liquid is collected and condensed.

4 **Chromatography** is the separation of colours in a substance.

5 **a)** Oil from water: Scoop the oil from the top of the water as oil is lighter than water.
b) Gold from river gravel: Gold is heavier than the surrounding gravel.
Swirl the materials in a gold pan and gold will sink to the bottom.
c) Red and yellow inks used to make orange: **Chromatography** is the separation of colours.
The orange mixture is dissolved in a solvent and placed on absorbant material.
The red and yellow inks then travel at different speeds through the material.
d) Stains from clothes: A liquid that dissolves the stain, a solvent, is used to wash the clothes.

6 There is no residue when filtering a solution, thus **a)**

7 Froth flotation is used to remove fats from waste water. Froth flotation is also used in the mining industry to extract valuable minerals.

p95	**1** **b)** mix, centrifuge, filter, filter, visually sort. **2** **d)** salt and iron **3** **b)**
p96	**1** **d)** increase the size of the solute. **2** **c)** filter the mixture. **3** The shirt has pigments b and c. **4** A temperature between 78°C and 100°C. At this temperature, enthanol would boil and evaporate and separating from water. **5** Strain the mixture through a tea strainer, a filter. **6** Shovel the gravel onto the top of two sieves. The smaller stones, including topaz, passes through to the second sieve. The smaller stones, including sand pass through the second sieve leaving the topaz in the second sieve. The topaz is then selected by eye. **7** Shovel the mix into a sieve with small openings. The larger stones are removed by hand. The clumps of clay are ground by hand. The sieve is then swirled and agitated in a tub of water letting the smaller stones to pass through the sieve and the sapphire to settle to the bottom. The sieve is then upended and the sapphire picked by hand from the top of the wash. **8** Mix with water, pour off the water and then evaporate leaving the sugar. Mix the remains with water and filter to leave the marbles as residue. Dry the filtrate and pass a magnet over the dry filtrate to separate the iron filings from the sand. **9** **a)** The 90°C experiment introduces an extra variable - stirring of the solution which isn't used in the 40°C experiment. There should only be two variables: temperature of water and rate at which sugar dissolves. All other variables should be kept constant.