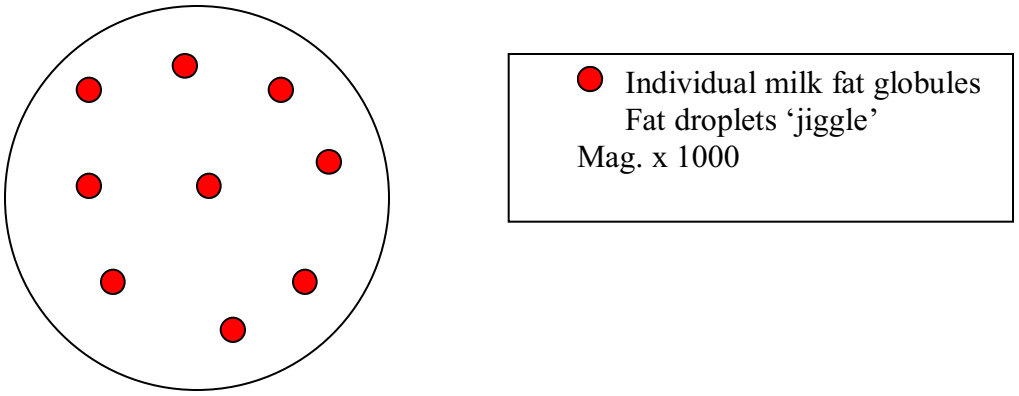
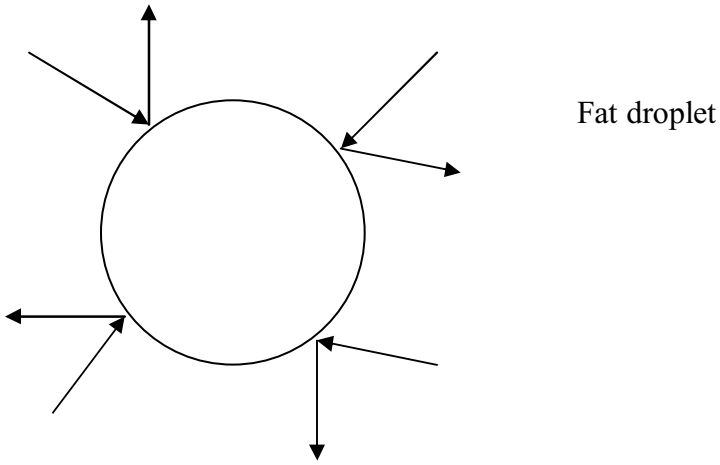
Osmosis and Diffusion
Aim: To examine the process of osmosis and diffusion.
Part A:
Step 1:
Q1.

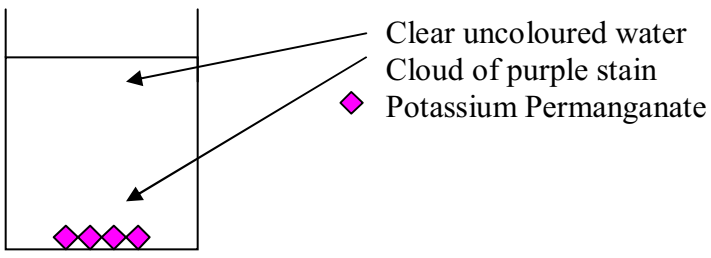


Q2. The jiggling motion is visible because the fat globules are constantly being bombarded by smaller particles.

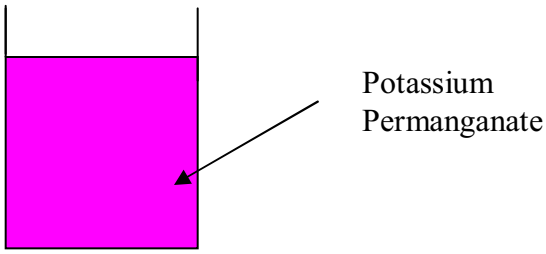


Q3. The Brownian motion is the 'jiggling' motion of the milk fat globules. All matter is in constant motion.

Step 2:
Q4. a) After 5 minutes

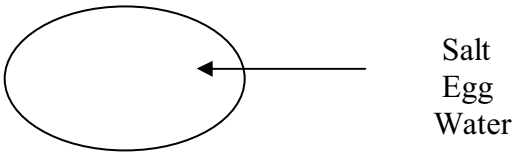


b) After 24 hours



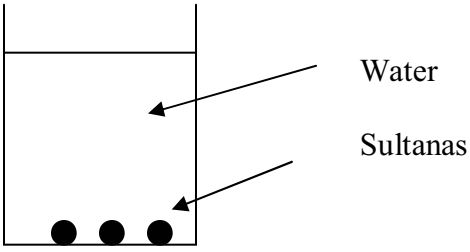
The potassium permanganate will have spread throughout the beaker as the water molecules are constantly moving around.

Step 3:
Q5. The salt that was placed on the egg turned into 'sweat' like beads on the egg.
Q6. There is a higher water concentration inside the egg, causing the water to travel through the egg to the salt. The salt creates osmotic pressure on the water molecules in the egg. This causes the 'sweat' like beads on the egg.

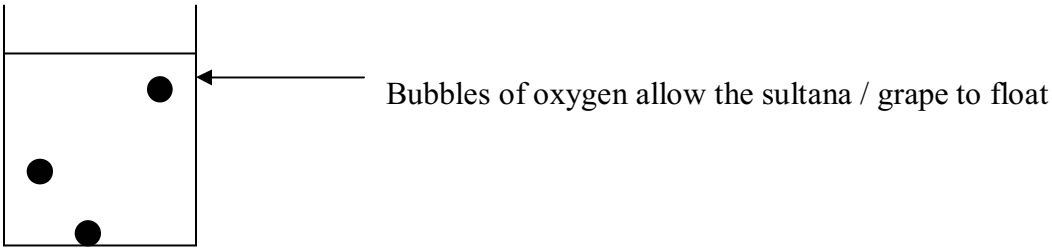


Step 4:
Q7.

Before:



After 24 hours:

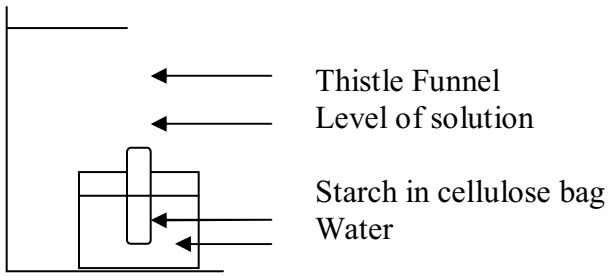


Q8. There is a higher water concentration on the outside of the sultana than the inside. The water flows into the sultana fairly quickly which starts to push the sultana back into a 'grape shape.' The water concentration is now even on the inside and out. This process is called osmosis.

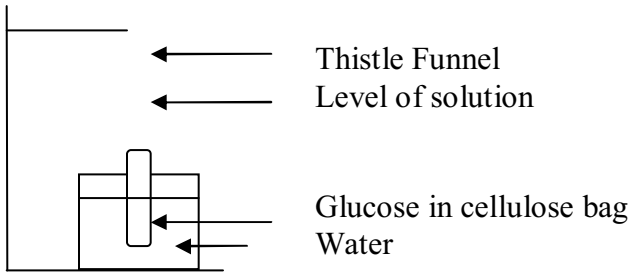
Part B:

Aim: To investigate the action of a differentially permeable membrane.
Method: See attached.
Apparatus: See attached.

Q1.



The water level in the cellulose bag rose because of the higher concentration of water outside the bag; this caused the water to flow into the bag. As the starch molecules are too large they can't fit through the bag.



The water level also rose in the cellulose bag containing the glucose solution. The glucose passed through the bag as they are smaller than the starch molecules.

Q3. The iodine molecules in experiment A passed through the membrane, because there is a higher concentration of starch inside the bag than outside and the iodine turned a blue colour which was found in the bag.

Q4. The starch molecules did not pass through the cellulose bag. This is because the starch molecules are too large to fit through.

Q5. From the reaction of the test tape and experimental results, the glucose molecules in experiment B passed through the cellulose tubing bag reaching equilibrium.

Q6. Letting experiment B stand over night the other substance that passed through the bag was the iodine. We can tell this by the blue colour and iodine is small enough to pass through the cellulose bag.

Q7. If a molecule is small enough they will be able to diffuse across the semi permeable membrane and will be found on the other side.

Q8. Due to the high concentration of water outside the cell, this would cause the water molecules to pass through the membrane and make the cell to expand.

Q9. As the sausage-like 'organism' is in the water, the water will flow in due to the process of osmosis but the sucrose will not be able to flow out as it is too large. If sufficient water filled the bag, it would expand and possibly burst.

Q10 a) If a freshwater fish was washed out into the ocean it would lose water from its body and dehydrate then die.

b) If a marine jellyfish was placed in a bucket of freshwater, the water will enter the jellyfish's body, it will then become swollen and it or its cells mould burst.

Q11. A shark can move from freshwater into salt water and vice versa because of three adaptations/features. These features are gills, urine and its skin. The shark's skin is thicker; this restricts the water molecules from entering. The shark can regulate the flow of water by urinating, if it takes in too much water.

Q12. By using a strong solution of malasses, the gardener would be able to kill only the nematodes. If the gardener were to use the salt solution (NaCl) it would do the same job but in the process, would kill the plants causing them to shrivel.

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Year 11 Biology

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