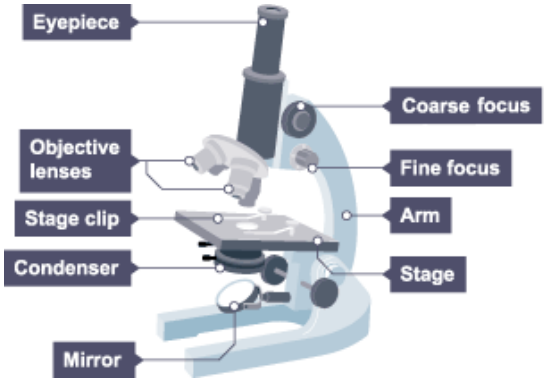
Required practical – Microscopes:



Steps to practical:

1. Place slide onto stage and use the clips to hold it in place
2. Select the lowest power objective lens
3. We need to turn the coarse focus to move the objective lens closer to the slide
4. We look into the eyepiece and then turn the coarse focusing dial until it comes into focus
5. We use the fine focusing dial to make it more clear to see the slide
6. Magnification = Eyepiece magnification x Objective lens magnification
7. We need to adjust the objective lens by selecting a higher power lens
8. We need to again adjust the fine focusing to bring it back into focus

9. When drawing the cell on the stage, make sure to include a magnification scale:
- Get a ruler and place the ruler on the stage
- Draw the scale bar when drawing the image

Required practical – Culturing microorganisms:

How to perform:

1. Prepare an agar gel plate and ensure there is no contamination
2. Sterlise all equipment (agar, petri dishes, inoculating loop etc)
3. Transfer bacteria into the agar gel plate using an inoculating loop and pass the inoculating loop through a flame to sterilise it
4. Attach the lid using adhesive tape
5. Place agar plate upside down in an incubator which stops moisture from dripping onto bacterial colonies
- Incubator kept at 25^{o}C to stop harmful bacteria from growing

Effect of antibiotics:

1. Clean bench with disinfectant solution

2. Sterlise inoculating loop by passing it through a flame
3. Open a sterile agar gel plate near a Bunsen burner
4. Spread bacteria evenly using the inoculating loop
5. Place filter paper discs containing antibiotics onto the plate
6. Incubate the plate at 25^{o}C
7. Measure the effect of the antibiotic by calculating the area of the zone of inhibition using area of circle

Required practical – Effects on osmosis on a plant tissue:

Steps to do practical:

1. Peel the potato, this is because the skin can affect osmosis
2. We get a cork borer to produce three cylinders of potato
3. Use a scalpel to trim the cylinders to 3cm
4. Measure the length of each cylinder and the mass of each
5. Place each cylinder into a test tube

6. Add 10cm^3 of 0.5 molar sugar solution in the first tube
7. Add 10cm^3 of 0.25 sugar solution to the second tube
8. Add 10cm^3 of distilled water to the third tube
9. Leave these overnight
10. Paper dry these gently
11. Remeasure and weigh the cylinders

Required practical – food tests:

How to perform:

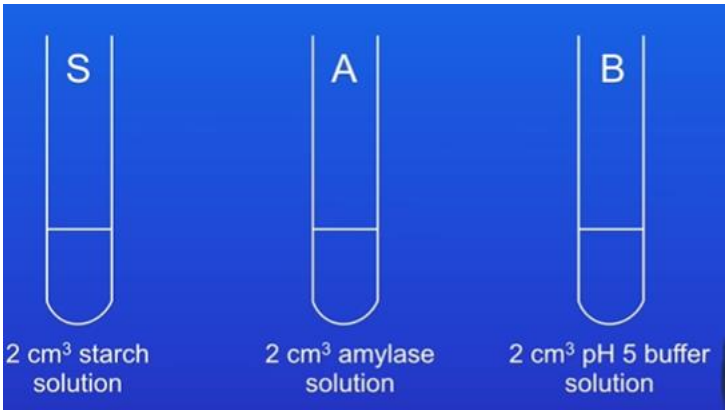
1. Take food sample and grind with pestle and mortar
2. Transfer the paste into a beaker and add distilled water and stir so chemicals are dissolved in water
3. Filter the solution to remove suspended food particles
4. Place 2cm^3 of food solution into test tube and add a few drops of iodine. Blue-black if starch
5. Place 2cm^3 of food solution into a test tube and add 10 drops of benedicts solution
6. Place test tube into beaker half filled with hot water

7. Leave for five minutes and if sugars are present, colour will change (green>small amount, yellow>more sugar, red>a lot)
8. To perform for proteins we add 2cm^3 into test tube
9. Add 2cm^3 of biuret solution
10. If protein is present, colour will change to purple or lilac
11. To test for lipids, we do the same thing when grinding but do not filter the solution
12. Add 2cm^3 of food into tube and add few drops of distilled water and ethanol
13. We gently shake the tube and colour change if present will be cloudy white

Required practical – Effect of pH on amylase:

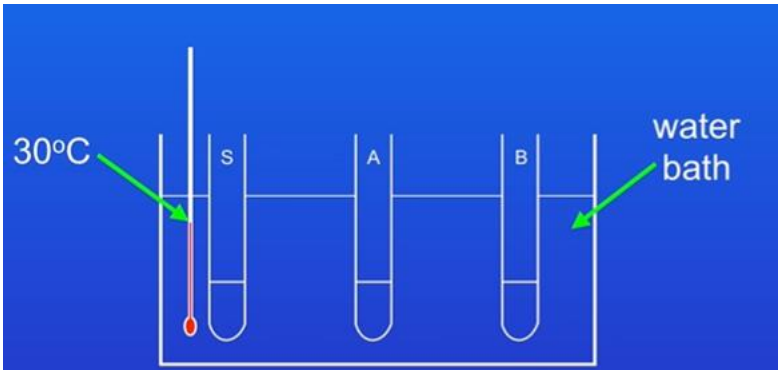
How to perform:

1. Place one drop of iodine into each well in a spotting tile
2. Add the solution into 3 different test tube



- The buffer solutions control the pH

3. Put three of the beakers into a water bath at 30 degrees and leave for 10 minutes



4. Combine the three solutions into one and stir it and put it back into the water bath and start a stopwatch
5. We use a stirring rod every 30s to transfer one drop of solution into the iodine
6. When the iodine turns blue-black, starch is present. We continue this until starch is no longer present (reaction is done)
7. We repeat experiment with different pH buffer solutions (6, 7, 8)

Problems:

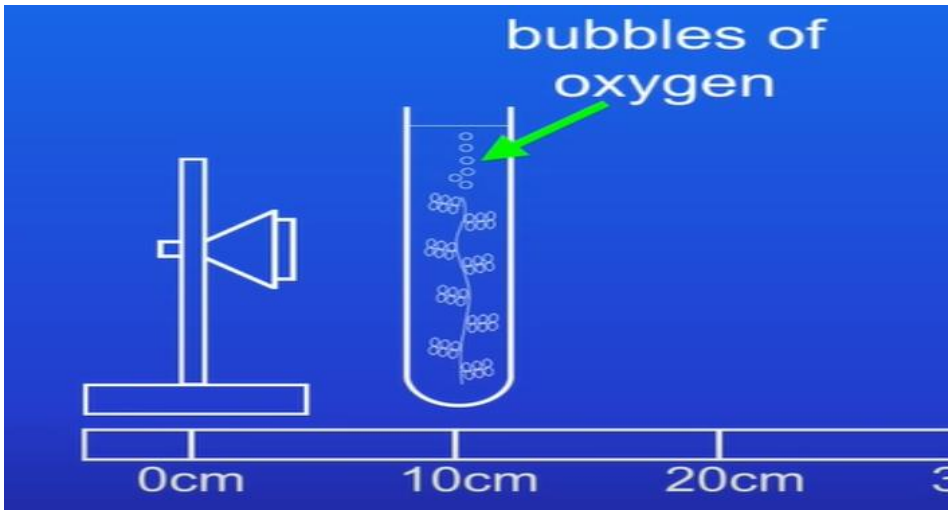
- We take samples every thirty seconds, so we only have an approximate time. We can change this by taking it every ten seconds.
- When the iodine doesn't go blue-black, it is not always obvious because the colour change happens gradually. We can ask several people to decide if the reaction has completed.

Photosynthesis required practical:

How to perform:

1. Start by taking a boiling tube and placing it 10cm away from an LED light source
2. An LED is used because it doesn't release much heat. Too much heat would change the temperature of the experiment
3. If we use a normal light source, then we need to place a test tube with water in between so this test tube absorbs the heat released from the light
4. We fill the test tube with sodium hydrogen carbonate solution which is needed for photosynthesis
5. We put a piece of pondweed into the boiling tube with the cut end at the top

6. We leave this for five minutes to adapt to the environment (acclimatise) in the boiling tube
7. We should see bubbles forming at the top end of the pondweed
8. We start a stopwatch and count the number of bubbles produced in one minute
9. We repeat this two more times and then calculate the mean number of bubbles produced
10. We repeat the whole experiment again but this time from different distances such as 20cm, 30cm, 40cm

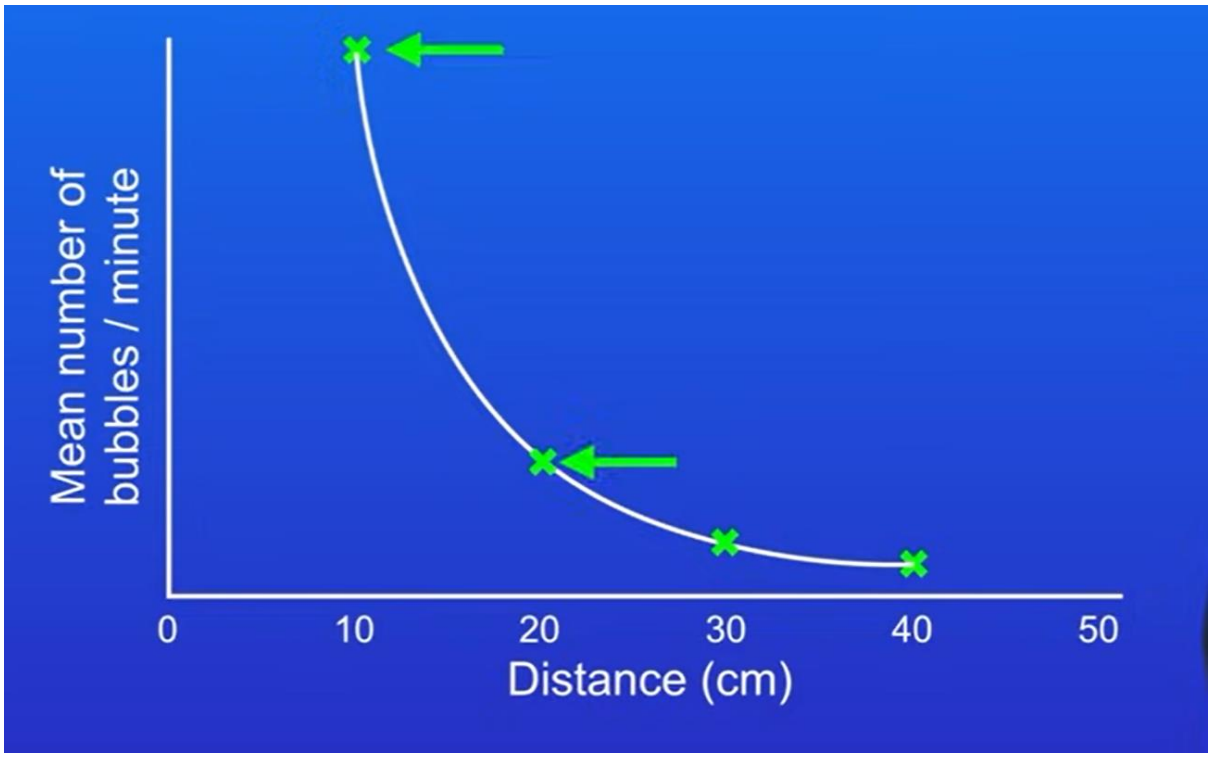


Problems with this practical:

- The bubbles can be too fast to count: Get more people to count the bubbles
- The size of the bubbles differ which means that they all count the same

We can solve this by measuring the volume of oxygen produced:

1. Place a funnel on top of the pondweed and place a measuring cylinder on top of the funnel
2. We use the measuring cylinder to measure the volume of oxygen produced



If we double the distance, then the number of bubbles per minute falls by a factor of 4 times

This is called the inverse square law