Biology AQA Practicals

Microscopy Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves using a light microscope to observe, draw and label a selection of plant and animal cells.

- Place a thin sample of tissue, e.g. onion epidermis, onto a microscope slide (the sample must be thin enough for light to pass through).
- Add a few drops of a suitable stain, e.g. iodine. The stain will give contrast to the features of the cell, enhancing their visibility.
- Place a coverslip on top of the tissue and place the slide onto the microscope stage.
- Use the lowest power objective lens, and focus on the sample.
- Increase the power and refocus.
- Sketch some of the cells that you see.
- Ensure you draw a scale line, which can be done by focusing on the millimetre divisions of a ruler viewed through the microscope.

Osmosis Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves investigating the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.

- First, cut cylinders of potato, of equal length, and then record their mass.
- Place the potato cylinders into beakers containing the chosen solutions and leave for about 30 minutes. Ensure that there is enough solution to completely immerse the potato cylinders. This time must be long enough to allow the potato to lose or gain a noticeable amount of water.
- Record the mass of the potato cylinder at the end of this period of time. Any change in mass is due to water lost or gained by osmosis.
- The independent variable is the concentration of the sugar/salt solution, and the dependent variable is the mass change of the potato cylinder.

The percentage gain or loss of mass of the plant tissue is useful for interpreting the results of this experiment. If the answer to this is negative, then mass has been lost.

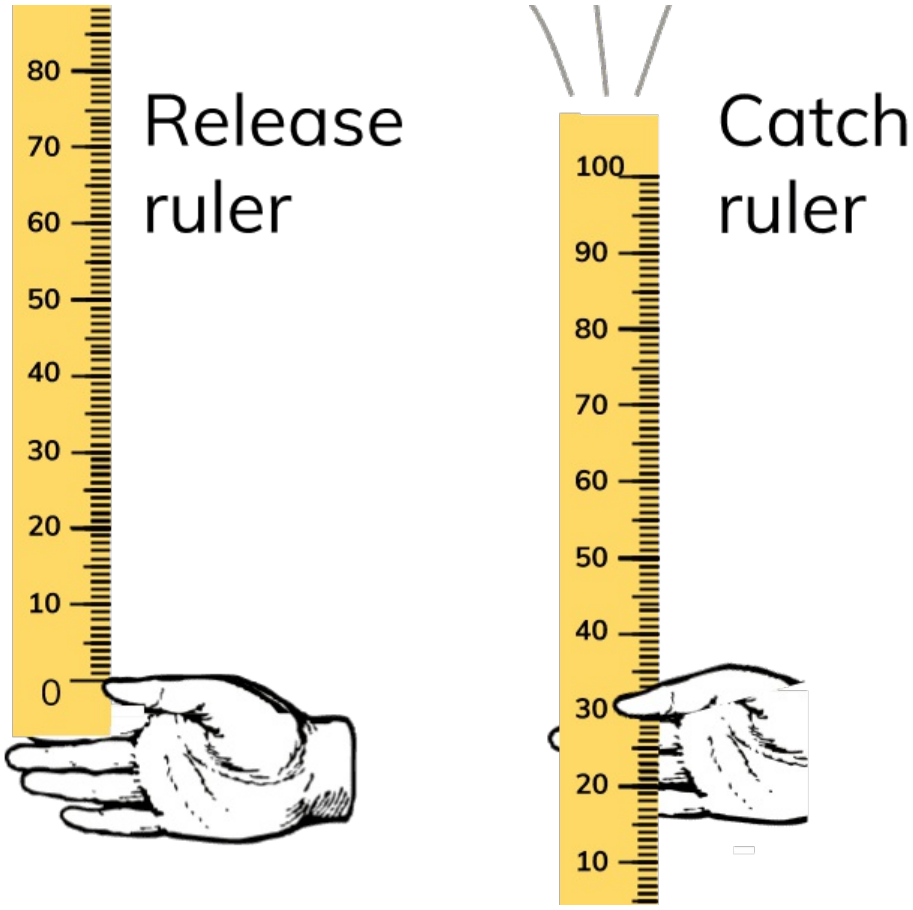
Reaction Time Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves investigating the effect of a factor on human reaction time.

- Caffeine and exercise are factors that could affect human reaction time. Their effect can be tested by dropping and catching a ruler:
- Hold a ruler vertically from one end. The test subject should have

their thumb and finger either side of the ruler at the 50cm mark.

- Drop the ruler and the subject should try to catch it between their thumb and forefinger as fast as possible.
- Note down the distance from the 50cm mark that the subject catches the ruler - a table can be used to convert this distance into a reaction time.
- Repeat the experiment on a subject who has just had a coffee, or who has just done exercise.
- The independent variable is whether the subject has had a coffee/done exercise, and the dependent variable is the subject's reaction time.



Microbiology Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves investigating the effect of antiseptics or antibiotics on bacterial growth using agar plates, as well as measuring zones of inhibition.

- You will be provided with an agar plate that has a culture of bacteria, e.g. E. Coli.
- Without removing the lid, mark the underside of the plate with lines that divide the plate into three equally sized sections, and a dot in the middle of each of these three sections.
- Put different antiseptics or antibiotics on to three equally sized filter paper discs, either by soaking the discs in the liquid, or pasting cream onto the disc.
- Carefully lift the lid of the agar plate, and place the discs above the dots.
- Minimise the amount of time that the lid is open to minimise contamination.
- Incubate the plate at 25°C for 48 hours - this provides ideal growing conditions for the bacteria
- After incubating there should be a clear zone around each disc. Measure the diameter, across two perpendicular directions, with a ruler.
- This clear zone is the region where the bacteria have been killed by the antiseptic/antibiotic.
- The larger the clear zone, the more effective the

antiseptic/antibiotic is against the bacteria present.

- The independent variable is the choice of antibiotic/antiseptic, and the dependent variable is the diameter of the clear zone.

Food Tests Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves using qualitative reagents to test for a range of carbohydrates, lipids and proteins.

- The first step is to grind up the food and add distilled water, so that some of the food dissolves.
- To test for starch, add iodine solution. It will turn blue-black if starch is present.
- To test for sugar, add Benedict's reagent and heat for about two minutes. It will turn any of green, yellow or red if sugar is present. The colour depends on the concentration.
- To test for proteins, add Biuret solution. It will turn mauve or purple if proteins are present.
- To test for lipids, add Sudan III. If lipids are present, a red-stained oil layer will float on the water surface.

Enzymes Practical

You are also required to carry out the following practical - which involves investigating the effect of pH on the reaction rate of amylase.

- This practical uses a buffered pH solution which will resist a change in pH. In this case, it is used to hold a constant pH throughout the experiment.
- Warm a buffered pH solution, an amylase solution and a starch solution to 25°C in a water bath.
- Mix measured amounts of the warm starch, amylase and buffered pH solution and start a timer.
- Remove a drop of the mixed solution every 30 seconds, and test it with the iodine solution.
- If the starch reaction has finished, the iodine solution will stay clear when added. Once this has happened, note down the time the reaction has taken.
- Repeat the experiment using different buffered pH solutions.

Plant Responses Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves investigating the effect of light or gravity on the growth of newly germinated seedlings.

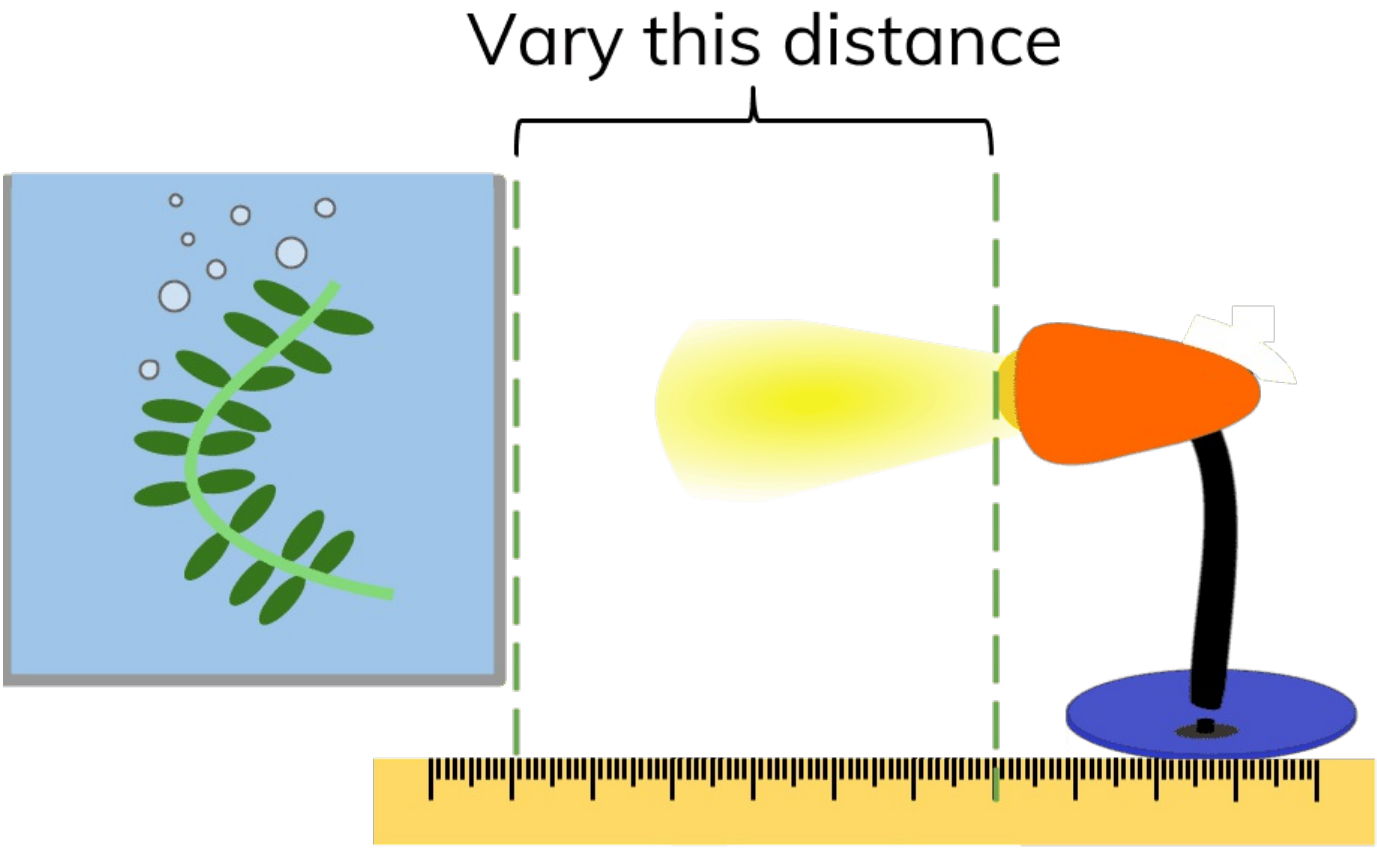
- The effect of light on seedlings can be demonstrated with mustard or cress seeds.
- Place the seeds in petri dishes with damp cotton wool, and leave them in a warm place to germinate.
- Randomly divide the petri dishes into three groups and assign each group to one of the following light conditions - a windowsill in full

sunlight, darkness and partial light.

- Measure the height of the plants daily for a week, and draw/label biological drawings to show the effects.
- The independent variable is the lighting conditions, and the dependent variable is the growth of the plant.

Photosynthesis Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves investigating the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.



- Changing the distance between a light source and a plant, whilst

keeping the temperature and CO_2 concentration constant, can be used to assess the effect of light intensity on photosynthesis:

- Count and record the number of gas bubbles that come from the pondweed.
  Change the distance from the light and repeat.
- In this experiment, the light intensity is the independent variable.
  The number of bubbles of gas per minute is the dependent variable.

It is useful to be able to see how light intensity (rather than distance between light and the plant) affects the rate of photosynthesis. Doubling the distance between the lamp and the plant will reduce light intensity by one quarter. This is known as the inverse square law.

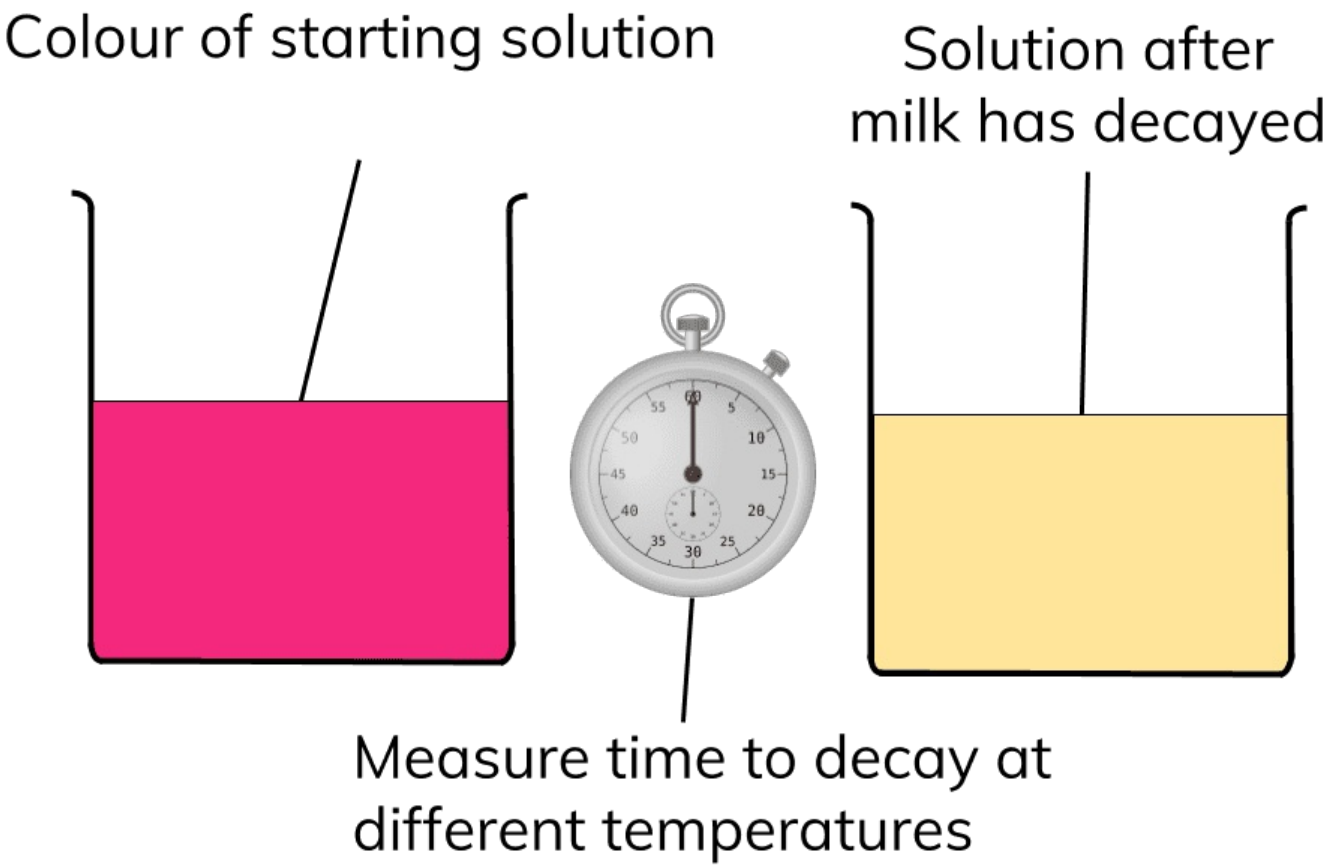
Decay Practical

You are required to carry out the following practical as part of the AQA Biology course - it involves investigating the effect of temperature on the rate of decay of fresh milk by measuring pH change.

The effect of temperature on the rate of decay can be observed using milk. As milk takes a long time to decay, lipase and sodium carbonate are added to speed up the decay.
As milk decays, its pH reduces. This can be observed with an indicator called Cresol red.

The steps required to carry out this experiment are as follows:

- Use a water bath to heat all of the components to a given temperature.
- Mix the milk, sodium carbonate and Cresol red. The resulting solution should be purple.
- Add lipase to the solution and start timing.
- When the solution turns yellow stop timing.
- Repeat using different temperatures.
- The independent variable is the temperature, and the dependent variable is the time taken for the solution to turn yellow.



Field Investigations Practical

You are required to carry out the following practical as part of the AQA

Biology course - it involves measuring the population size of a common species in a habitat.

Quadrats (square frames), can be used to estimate a population size.

- Divide the habitat up into a series of quadrat-sized cells. Randomly select a given number of cells, then go out into the habitat and place the quadrat in these positions.
- To evaluate the contents of the quadrat, either count the number of individual organisms of interest or record the percentage of the quadrat taken up by an organism.

  The samples from the quadrat are used to estimate the total population in a given area, using the formula estimated population = number counted × total survey area.