

# GCSE



PRACTICAL BOOKLET  
**SINGLE AWARD SCIENCE:**  
**BIOLOGY**



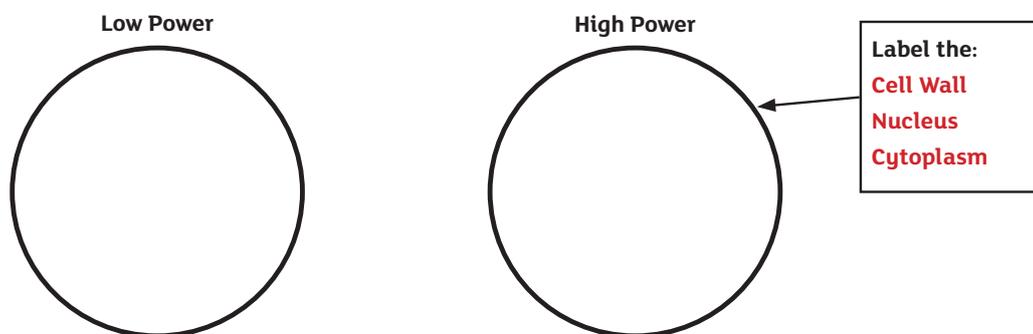
# Prescribed Practical B1 – Making a temporary slide to show animal and plant cell ultrastructure.

## Preparing onion epidermal cells

### Method

1. Cut open an onion with a scalpel. A red onion can be used to view the cells more easily.
2. Use forceps to peel a thin layer of epidermis from the inside. This is the thin skin that can be seen between the layers of the onion.
3. Place the layer of epidermis on a microscope slide. Try to keep it from rolling up using the forceps.
4. Add a drop of iodine solution to the layer to stain the cells.
5. Carefully place a cover slip over the layer. Do this at a 45 degree angle to prevent air bubbles.
6. Place the slide on the microscope stage and view under the lowest magnification first.
7. When you have an overview of the cells turn the objective lens to a higher magnification.
8. Draw a sample of the cells you can see.

### Results



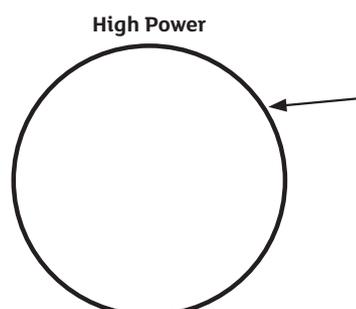
### Risk Assessment

Take care when cutting the onion with a scalpel.  
Take care with iodine, this will stain your skin.

## Preparing cheek cells

1. Gently scrape the inside of your cheek with a cotton bud, or a soft ended stick such as a coffee stirrer.
2. Rub the cotton bud on to a microscope slide turning as you do so, place used stick into 1% Virkon disinfectant.
3. Add a drop of 0.1% methylene blue stain on the slide.
4. Place a cover slip on the cells at a 45 degree angle to prevent air bubbles.
5. Place the slide on the microscope stage and view under low magnification.
6. Turn the objective lens and view under higher magnification until cells are clear enough to draw.
7. Draw some of the cells you see.

### Results



### Risk Assessment

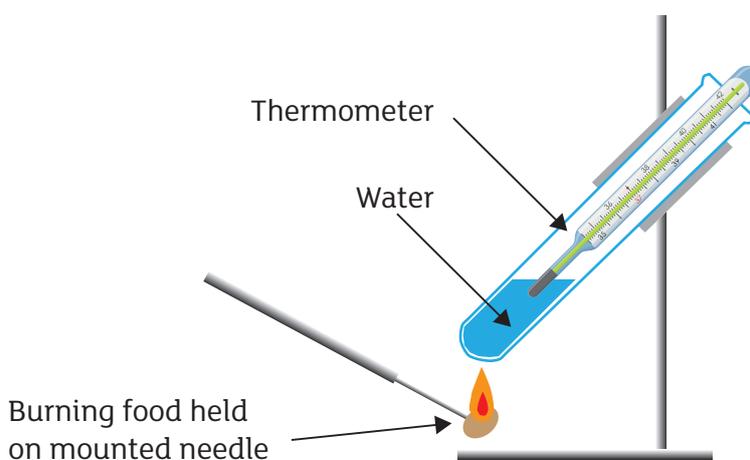
- Ensure you follow CLEAPPS guidance on this practical in relation to disposal of contaminated materials as approved by the Education Authority.

## Prescribed practical B2 – Energy in food

It is possible to work out how much energy there is in different foods. We can do this by burning those foods and using the heat released to determine the energy content.

### Method

1. Use a measuring cylinder to add 20cm<sup>3</sup> of water to a boiling tube
2. Clamp the tube in a vertical position
3. Use a thermometer to record the temperature of the water
4. Weigh a piece of food and record its mass
5. Carefully push the food onto a mounted needle
6. Ignite the food, and as soon as it is burning hold it under the boiling tube of water
7. Try to get as much of the food to burn as possible- if it falls off then you must go back to step 5
8. Record the HIGHEST temperature reached by the water



### Results

Food	Starting temperature/oC	Final temperature/oC	Rise in temperature/oC

1. To work out the energy given out (in Joules) by the food sample use the following equation:

$$\text{Energy/J} = \text{Rise in temperature} \times \text{Mass of water} \times 4.2$$

(1 cm<sup>3</sup> of water has a mass of 1g)

Food 1	Food 2	Food 3

2. To convert this to kJ, divide by 1000.

Food 1	Food 2	Food 3

3 To find the energy in kJ per 100g of food

$$\frac{\text{Energy in kJ per 100g} \times 100}{\text{Mass of food}}$$

# Prescribed Practical B3 Showing how light and chlorophyll is needed for photosynthesis

Light energy is required for photosynthesis as it is absorbed and used to convert carbon dioxide and water into glucose and oxygen. The glucose made by the plant can then be used for respiration or stored as starch. It is possible to show that light is necessary using the following experiment.

## Method

1. De-starch a plant in a dark cupboard for 48 hours prior to the experiment being carried out. This is to ensure no starch remains in the plant and that any starch made has been made during the experimental period.
2. Take the plant out and cover one of the leaves with tin foil. Allow the plant to stay in bright light for 24 hours.
3. After 24 hours the covered leaf and any other leaf can be tested for the presence of starch.

## Testing a leaf for starch

### Method

1. Dip the leaf in boiling water using forceps to kill it.
2. Place the leaf on ethanol and place in a water bath. Leave for ten minutes. This will remove the chlorophyll.
3. Take the leaf out using forceps and dip it back in the warm water to soften it.
4. Place the leaf on a white tile and put a few drops of iodine on the leaf.
5. The leaf with starch will turn Blue Black. If there is no starch present the iodine will remain yellow brown.

### Results

Describe your observations.

