

# Going bananas!

## Background

Bananas offer students a lot of opportunities to learn about the chemistry of ripening and the role of different enzymes in this and other biochemical processes. Students are asked to investigate: Why is a ripe banana sweet, soft and tasty, whereas an unripe fruit is hard, sour and starchy. Why does the colour change from green to yellow to brown as it ripens?

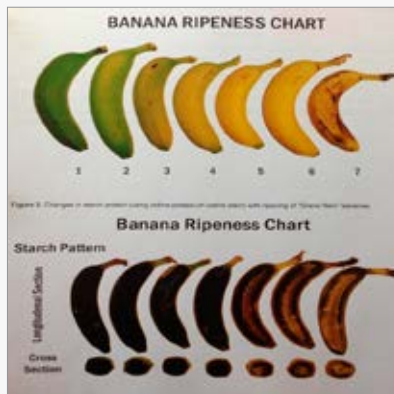
## You will need...

- ✓ Bananas of different ripeness
- ✓ Light microscope and microscope slides
- ✓ Refractometer
- ✓ Lugol's iodine
- ✓ Boiling water

## Follow these steps

1. Use a refractometer to measure the sugar content and a graph is drawn showing sugar content versus ripeness
2. Stain, with Lugol's iodine, longitudinal and transverse sections of bananas at different stages of ripeness. Compare the results with the sugar content measurements.
3. Examine thin sections of stained banana and examine under the light

Starch	amylase	Maltose
Chlorophyll	hydrolase	Anthocyanin
Pectin	pectinase	'Softer' substances
Acids	kinases	Neutral substances
Large molecules	hydrolases	Flavour substances



Starch grain

microscope. Take photos of the images using the camera on a tablet or smart phone.

4. Dip one half of a banana into boiling water. Note the colour change

## So what happened?

The sugar and starch content of bananas changes with ripeness.

Chlorophyll and other compounds are broken down by hydrolases changing colour and flavour.

Heat from boiling water destroys the cells on the edge of the banana peel. The enzyme tyrosinase is released

which starts the production of melanin. The peel isolates the inner tissue cells and prevents the heat denaturation of the enzyme

## What next?

- ✓ Investigate catalase activity.
- ✓ Isolation of DNA.
- ✓ Chromatography and/or extraction of colour compounds.
- ✓ Links to biogeography, business, fair trade, colonialism.