

# Activity- enzymes at work

## What you'll need:

- a slice of white bread
- a mouth to put it in

## What to do:

Take half of the slice of bread and chew it, chew it some more, keep on chewing it! Chew it until it becomes disgusting mush – don't swallow or you'll spoil the experiment

- Note how the flavour of the bread changes as you're chewing it
- Once you think you have the answer, you can spit out the bread (or swallow it, whatever you prefer!)

## What you may notice:

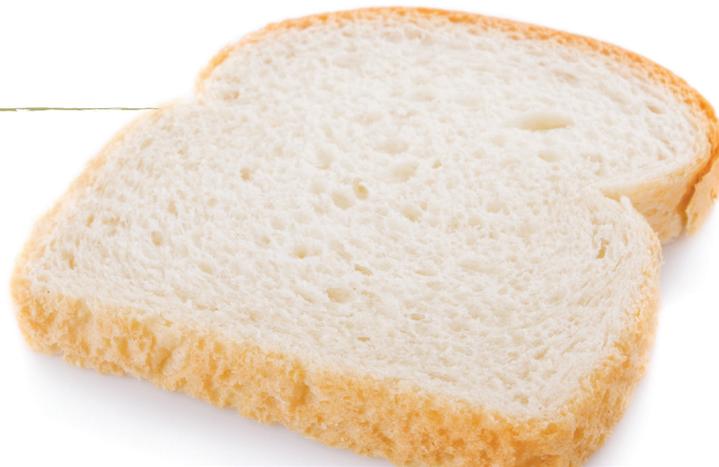
As you chew the bread, it begins to taste sweeter!

## The science behind it all:

Bread is mostly made up of starch, a molecule made up of long chains of glucose (sugar). Plants use starch to store energy.

Digestion is the chemical process of breaking down large molecules into smaller ones that can be used by the cells in our bodies. Before starch can be of use to

these cells, it must be digested. Your saliva contains an enzyme called amylase which cuts up starch into smaller pieces. Starch doesn't taste sweet but the small pieces it is broken down into do. These small sugar molecules (glucose and maltose) are responsible for that sweet taste.



## Beyond the science:

Enzymes are commonly used for industrial purposes, in products ranging from laundry detergent to contact lens solutions to food – they are even used to clean up oil spills! Amylase is one of

the most commonly used industrial enzymes. Scientists use the bacterium *Bacillus licheniformis* to produce amylase on an industrial scale. Alpha ( $\alpha$ )-amylase is used in the production of

high-fructose corn syrup, a popular ingredient that can be found in many products, particularly fizzy drinks and fruit drinks. The production of high fructose corn syrup begins with corn (surprise!)

to produce corn starch.  $\alpha$ -amylase is then added to break down the corn starch into smaller chains of glucose. It is the first of three enzymes used to produce high-fructose corn syrup.

