

## Taste and Flavour

### *For Researchers*

The science of taste and flavour makes an ideal activity to engage young people and talk about your research. The information and activities on these pages will introduce participants to the science of the sensation of taste. The activities can be carried out in classrooms, at science fairs or other engagement activities. The topics cover food chemistry, the nervous system, genetics and a range of other areas of science and technology.

Activities take between 10 and 30 minutes depending on the age and ability of the participants.

The activities outlined below can be carried out in lessons with a small number of easy to obtain food items (see list below), some of these may be available from a food technology department in your school, magnifiers or digital microscopes, cotton buds, gloves, plastic cups or bowls, a mirror, spoons, knives and chopping boards, flavourings and genetic taste strips. Flavourings can be obtained from Sigma-Aldrich and genetic taste test strips from Blades Biological Ltd.

You will need to supply water for mixing taste solutions.

- Lemon juice or citric acid
- Sugar
- Salt
- Tonic water
- Coffee
- Monosodium Glutamate
- Tabasco sauce or other chilli sauce
- Mints
- Onions
- Parma violets
- Lemon jelly
- Red and Blue food colouring
- Marmite
- Honey or Maple syrup
- Glucose
- Table sugar (sucrose)
- Maltose
- Lactose
- Genetic taste test strips

### *Optional*

- Bag of jelly beans or highly flavoured sweets
- Vinegar
- Soy Sauce
- Clear still flavoured
- Flavouring solutions dissolved in propan-1,2-diol:
  - ethyl butanoate (1%)
  - 4-hydroxy-2,5-dimethyl-3(2H)-furanone (3%)
  - methyl 3-phenylpropenoate (0.03%)
  - 5-hexyloxolan-2-one (0.02%)

### **Health and Safety**

Risk assessments should be carried out for all activities and it is recommended that CLEAPPS guidelines are followed.

Food and drink should not be consumed in science laboratories. Therefore it is recommended that if the investigations are carried out in a school an alternative location such as food technology department or school canteen is used.

It is important that you check before carrying out these activities for any medical conditions such as diabetes, allergies or intolerances that young people or members of the public may have. It is essential that good food handling and preparation hygiene measures are employed. It is recommended that participants are made to wash their hands at the start and end of activities.

### **Further reading**

CLEAPPS guidelines 3.014 (Eating and Tasting), 3.022 (Handling Food), 3.021 (Purchase and Selection of Food) (COSHH Regulations)

CLEAPPS laboratory handbook – section 15.3

CLEAPPS Guidance G5p – pages 41 (food colouring), 67 (sugar, sweetness and threshold tests), 68 (bitter coffee taste test).

CLEAPPS HAZCARD 35 (PTC papers)

ASE be safe 4th Edition, 2011, page 15.

ASE Safeguards in the school laboratory 11th edition, 2006.

## Summary of activities

### Taste Basics:

Pupils 'taste' a set of compounds that represent the five basic tastes; sweet, salty, sour, umami and bitter. The taste solutions used are sugar, salt, citric acid, monosodium glutamate and flat tonic water. Subjects should be able to identify these equally well with or without holding the nose, because these flavours do not depend on smell.

### Taste and Flavour:

Participants are given parma violets to demonstrate the involvement of smell in flavour perception.

They will also be invited to sniff four individual chemicals, and then the four mixed together. The sniff solutions are ethyl butanoate (1%), 4-hydroxy-2,5-dimethyl-3(2H)-furanone (3%), methyl 3-phenylpropenoate (0.03%) and 5-hexylloxolan-2-one (0.02%) dissolved in propan-1,2-diol.

They will be asked to describe the smells and suggest the smell they would produce if mixed together.

Pupils then smell the four mixed together and describe the smell before it's supposed smell and use is described (artificial strawberry).

### Taste Buds:

Pupils identify taste buds by applying blue food colouring to their tongue to reveal their 'taste buds', which they can view in a mirror or on a TV monitor via a flexicam.

### Taste Genetics:

Pupils will be able to test their genetic sense of taste with, Phenylthiocarbamide, Thiourea and Sodium Benzoate taste test papers. The categorization as tasters, non-tasters or super-tasters will be recorded and the percentage proportions of each group calculated and compared to the general population.

Compare the members of the class who dislike marmite with the numbers who are super tasters.