

## Dog's Sense of Smell

This activity is a good opportunity for students to design and test an experiment on their dog at home.

This activity represents how a dog finds prey by using its sense of smell (in addition to sight and hearing). It relates to the *Eaten Alive* exhibit Sniff a Snack.

### **What you need**

- Two or more clean glass jars of similar size, labelled A, B, etc. If glass jars are not available, clean aluminium cans may be used instead.
- One pair of gloves (rubber or latex).
- Meat juice (from a meat tray) or one small piece of chuck steak.
- Two days or so to complete the experiment.

### **What to do**

Students smear meat juice on glass jars, possibly treat the glass jars differently (to represent environmental conditions in Nature) and present the jars to their dog to see if it pays more attention to any particular jar.

**Primary school students** can simply use two jars (one un-smearred as a control and one smearred with meat juice). Before they present the jars to their dog, they would need to form a hypothesis or prediction about what they think will happen, then watch the dog and record how it behaves.

**Secondary school students** can design slightly more complex experiments by treating the jars with meat juice, then exposing them to sunlight, water, high temperatures, etc before presenting the jars to the dogs.

In Nature, scents become more difficult to detect the longer they are exposed to sunlight, wind, humidity and rainfall. This is because scent molecules diffuse into the air over time and become diluted, so the scent is harder to detect.

### **Example method for secondary students**

1. While the dog is not in the room, put on gloves and smear meat juice on Jars B, C and D.
2. Leave Jar A untouched by meat. This is a 'control' jar which is compared with the experimental jars. Avoid touching Jar A while wearing the gloves smearred with meat juice.
3. Leave Jar A and Jar D inside for one day.
4. Leave Jar B in a dry area in the sunshine (and out of reach and sight of the dog) for one day.

5. Rinse Jar C under tap water for 20 seconds and leave to dry in the sunshine for one day.
6. Collect all four glass jars and place them on an old tray (equally spaced apart).
7. Place the tray with glass jars on the ground while your dog is not close by.
8. Wait until your dog approaches and watch how your dog inspects the jars.

### **What to notice**

Which jar did the dog pay most attention to?

Did your dog seem to use other senses? How many senses did they seem to use?

Did your results confirm or contradict your hypothesis or prediction?

Could you improve the way you conducted the experiment?

How do your dog's results compare with other dogs?

Could you design a similar experiment for humans?

### **What is happening**

Dogs have a better sense of smell than humans, because:

- they have up to one hundred times more receptors to detect smells and
- the area of their brain controlling smell (olfaction) is fifteen times larger.

Scents such as meat juice or blood become harder to detect the longer they are exposed to wind, water and sunlight.

When temperatures are high, scent molecules tend to evaporate faster. Wind and water also dilute scents, making it more difficult to smell the scent.

Humans use the dog's excellent sense of smell to sniff out bombs, illegal cargo and people trapped in rubble. It has been reported anecdotally that several dogs have:

1. sniffed out human skin cancer/melanoma cells or
2. notified their owners of upcoming epileptic fits by paying constant attention to their owners, or acting in an unusual way. Scientists are unsure whether dogs can detect these things through smell, human body language or electrosensory changes.

### **More information**

Scientific information about a dog's and a wolf's sense of smell, go to:

<http://www.questacon.edu.au/html/assets/pdf/Sniff%20a%20snack.pdf>

<http://www.nhm.org/exhibitions/dogs/formfunction/smell.html>

Introduction to the scientific method:

[http://teacher.nsrj.rochester.edu/phy\\_labs/AppendixE/AppendixE.html](http://teacher.nsrj.rochester.edu/phy_labs/AppendixE/AppendixE.html)