# Matter – Evaporation and diffusion

**Name**_____ **Class**_____

**What you will need for this lesson:** a perfume or after shave of some kind, a container of some kind like a plastic or foil takeaway carton and a stopwatch. You will also need another person!
**You will also need a pen, a pencil and if you have it, access to a computer, tablet or iPad.**

## LESSON STARTER

You can hear someone cooking but you cannot smell anything. Why do you think that might be?

_____

_____

_____

In your own home, which room has the strongest smell when someone is cooking in the kitchen?

_____

_____

Which has the least strong smell of cooking? _____

_____

Which room is nearest the kitchen? _____

_____

How do you think the smell travels to different parts of the house? ____

_____

_____

_____

**When you've finished, watch the video to see whether you were right!**

## The Investigation

**We are going to investigate how quickly smells can travel!**

**Follow the instructions on the video. You will need another person to help you with this investigation.**


**What did you find out?**

Did some smells travel further than others?

## WORKING SCIENTIFICALLY

Our next focus is about working scientifically. All scientists apply these principles whenever they are investigating anything and we've divided them into different skill units.

**Find the section your teacher has asked you to focus on and answer the questions in the relevant section.**

**A. Planning or**

**B. Presenting and analysing data or**

**C. Evaluation**

## A. Planning

Every scientist wants to solve a problem and so takes the following steps:

1. **Decides on a question that needs answering.** e.g. Does the amount of perfume used affect the speed of diffusion?
2. **Decides what the independent variable (the thing that is changed) might be in order to work out the answer to the question** e.g. we will use 3 amounts of perfume.
3. **Decides what the dependent variable might be (how to measure the differences in each different example**) e.g. we would use our senses to establish how quickly the smell reaches another person
4. **Last of all decide what elements have to stay the same in order to make it a fair test** e.g. we will keep the distance between the sprayer and the one who smells the same in each investigation.

**Now using this knowledge, see if you can answer the questions below!**

**Years 3 and 4 –** Design the question you would ask if the following were your independent and dependent variables.

The Independent variable is **the type of perfume.**

The Dependent variable is the **time taken for the smell to travel 1 metre.**

My question is:

_____

_____

_____

**Years 5 –** Look at the following question:

**Does the number of drops or sprays of the perfume affect the time it takes for the smell to travel 1 metre?**

What do you think will happen? Write your **prediction** below.

Scientists will always write a **prediction** when they are carrying out an investigation.

## Planning continued..

My prediction is: _____

_____

_____

_____

**Year 6 –** Look at the following question:

**Does the number of drops or sprays of the perfume affect the time it takes for the smell to travel 1 metre?**

What do you think will happen? Write your **prediction** below.

My prediction is _____

_____

_____

_____

Now **justify your prediction**. Why do you think that will happen?

_____

_____

_____

_____

## B. PRESENTING & ANALYSING DATA

When scientists carry out investigations, it is really important that they capture data to make sure they can then answer the questions that they have set themselves.
The scientist on the video has asked you to complete the following:

**Year 3 pupils – You are carrying out experiments to answer the following question:**

**Does the number of drops or sprays of the perfume affect the time it takes for the smell to travel 1 metre?**

Think about how you would create a table to show your results? Draw your table in the space at the end of the Presenting and analysing data section and then record your results within it.

**Year 4 & 5 pupils – You are carrying out experiments to answer the following question:**

**Does the distance from where the perfume was dropped or sprayed affect the time it takes for the smell to travel 1 metre?**

Draw a table in the space at the end of the Presenting and analysing data section and then record your results within it.

**After you have recorded your data in your table, can you see if there is a pattern or trend in it?**

**Year 6** – Look at the following question:

**Does the type of perfume used affect the time it takes for the smell to travel 1 metre?**

Draw a table in the space at the end of the Presenting and analysing data section and then record your results within it.

After you have recorded your results, see if you can present your data in a graph of some kind, e.g. bar chart or line graph. There is some squared paper at the end of the Presenting and analysing data section to do this.

# PRESENTING & ANALYSING DATA continued

My Table

EMPIRIBOX
Primary School Science

## C. EVALUATION

Evaluating how an investigation went as well as the data that comes from a science experiment is a really important part of science. It may be that you feel your experiment could have been done better or more thoroughly and it is important to understand this.

Answer the questions below:

**Year 3, 4, 5 and 6 pupils:** You are going to carry out an investigation. It might be that you want to ask this question:

**Does the number of drops or sprays of the perfume affect the time it takes for the smell to travel 1 metre?**

Or you might want to choose your own question. **Record the data carefully in a table or by writing the results down. Us the space below to do this.**

## EVALUATION continued

**Can you see any anomalies or odd results? Circle or underline any you see. If there are none then just say that there weren't any.**
**Anomalies are results that stand out because they don't fit into a pattern.**

**Year 4,5 and 6** Can you work out why there were any anomalies? Explain below what you think caused those anomalies.

**Year 5 and 6** Can you explain what you could do to prevent any anomalies? Think about how to carry out a fair test.

# The science behind the investigation

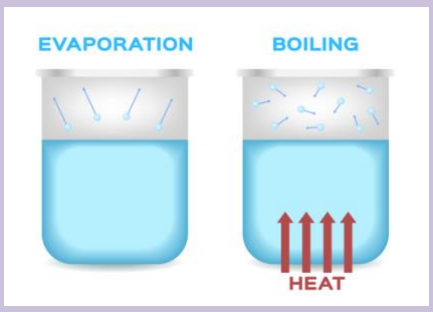
**Evaporation is when a liquid changes into a gas. This happens around us all the time.**

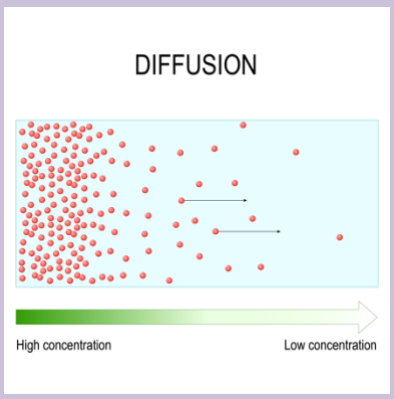
When wet washing is hanging on the line it dries because the water in the clothes evaporates into the air.

A puddle in the road dries up because the water evaporates.

**The rate of the evaporation increases as the temperature increases.**

This happens because as the liquid particles warm up they start to vibrate and eventually break free and escape into the air. **This is called EVAPORATION.**

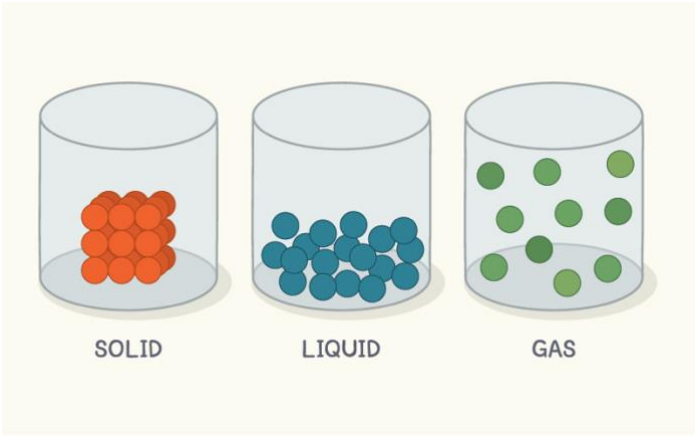



Gas particles will always move from a place of high concentration to a low concentration. When we cook in the kitchen the smell is the gas particles that are created during the process of cooking. These gas particles move away to areas of lower concentration and so the smell spreads. **This is called DIFFUSION.**

## Your challenge!

**Using the particle model in the picture below, can you explain how a liquid changes into a gas?**




**How does a gas (or smell) diffuse or spread throughout a room?**

## What was your score?