### Lesson 3 - Diffusion (Part 2) (Downloadable Student Document)

Science - Key Stage 3

Cells, Organs and Tissues

Miss Wickham



# **Recap questions on diffusion**

- 1. Complete the definition of diffusion: the movement of particles from an area of \_\_\_\_\_\_ concentration to an area of \_\_\_\_\_ concentration.
- 2. In which two states of matter can diffusion take place?
- 3. Name 4 factors affecting the rate of diffusion.
- 4. In which two places in the human body does diffusion take place?
- 5. If the temperature of the particles increase, how does this affect the rate of diffusion?



# Answers

- 1. Complete the definition of diffusion: the movement of particles from an area of **higher** concentration to an area of **lower** concentration.
- 2. Factors affecting the rate of diffusion include: temperature, concentration gradient, surface area and thickness of lining.
- 3. Liquids and gases
- 4. Lungs and small intestine
- 5. The rate of diffusion will **increase**



1. The temperature of water affects the mass of sugar that will dissolve

Independent:

Dependent:



# Identify the variables in the following experiment (Answers)

- 1. The temperature of water affects the mass of sugar that will dissolve
  - Independent: The temperature of the water
  - Dependent: Mass of sugar that dissolves
  - Control variables: Volume of water, size of the sugar crystals, type of sugar, number of stirs





2. The harder the exercise the faster the breathing rate

Independent:

Dependent:



2. The harder the exercise the faster the breathing rate

Independent: Type of exercise

Dependent: **Breathing rate** 

Control variables: **Exercise time length, pre-exercise breathing rate,** person completing the exercise



3. The volume of water affects the time taken for it to boil

Independent:

Dependent:



3. The volume of water affects the time taken for it to boil Independent: Volume of water

### Dependent: Time taken for water to boil

Control variables:

Temperature, material of water container, size/shape of water container



4. The larger the sugar cube the longer it takes to dissolve in the water

Independent:

Dependent:



4. The larger the sugar cube the longer it takes to dissolve in the water The size of sugar cubes Independent: **Time taken to dissolve** Dependent: Type of sugar, volume of water, temperature of Control variables: water



# Investigating how temperature affects the rate of diffusion

Independent variable:

Dependent variable:

Control variables:

Conclusion:

### Investigating how temperature affects the rate of diffusion (Answers)

Independent variable: Temperature of water

Dependent variable: Time it takes for diffusion to happen

Control variables: Volume of water, size of skittles, number of skittles



# Investigating how temperature affects the rate of diffusion

### Equipment

- 2 different temperature water
- Kettle
- Skittles
- Plate
- Timer
- Measuring jug

### **CAUTION: MAKE SURE AN** ADULT IS SUPERVISING AND HANDLING THE HOT WATER

### Method

- diffused and the food colouring is equally spread throughout the water on the plate.
- 1. Boil the kettle and give it some time to cool.
- 2. Place the skittles around the edge of the plate. 3. Pour 100ml of water over the skittles. 4. Press to start the timer immediately. 5. Stop the timer once the skittles has completely 6. Repeat steps 2-5 again with cold water.

- 7. Record results into table.



### **Collecting data**

<b>Temperature of water (degrees)</b>	Time taker (seconds)
hot	
cold	

### n for diffusion



# TASK - writing a method and identifying variables

### 'A student wants to investigate how the thickness of the lining of the tea bag affects the rate of diffusion'

- 1. Write the variables for the experiment
- Independent variable:
- Dependent variable:
- Control variables:
- 2. Write a method for the student

Support: firstly think about the equipment the student will need, ensure to use imperative verbs (doing words) to start each step, include values, make sure not to use the word 'amount'



### Mark your answer

### <u>Variables</u>

Independent variable: The thickness of the lining of the tea bag Dependent variable: the time it takes for diffusion to happen Control variables: the temperature of the water, the volume of water

### Method

- 1. Place 3 different tea bags into 3 separate mugs
- 2. Add boiled water from the kettle into each mug
- 3. Press to start the timer
- 4. Stop the time once the tea bag has diffused
- 5. Record data into a table

