

Week 1-2Rates of Dissolving**Day by Day pg. 86-90**

The rate of dissolving is a way to find out how fast a solute takes to dissolve in a solvent.

V – **Rate of Dissolving** – the **speed** at which a solute will dissolve in a solvent.

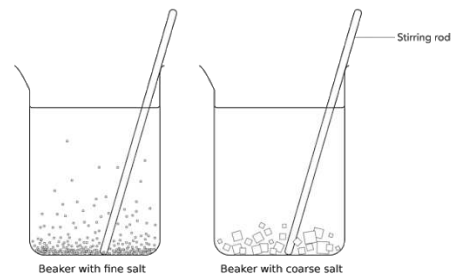
There are factors/things that will affect how fast a solute will dissolve in a solvent: **agitation** (stirring/shaking), **surface area** (grain size) and **temperature**

**Agitation**

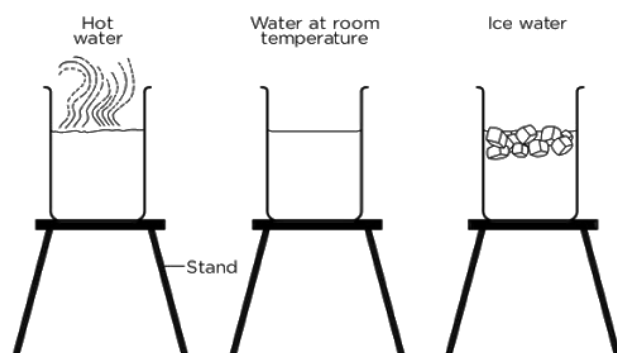
- **stirring / shaking** are both ways of mixing a solute with a solvent. Stirring is better at mixing the solute with the solvent than shaking the solution. When you stir or shake the mixture it shifts the particles that have started dissolving which allows the solvent to touch other solutes that may have not started dissolving yet. This helps the solute to dissolve **FASTER**.

**Surface Area**

- This is how much of the solute gets in contact with the solvent at a time. This is seen from the **size of the grain of the solute**. A **large grain** of solute will **take longer to dissolve than a small grain**. This is because a grain is made up of particles of the solute. It takes time for the particles in a grain to break apart. The larger the grain, the slower the rate of dissolving will be. The large grain has a small surface area whereas the smaller grain has a larger surface area, so the solute that has smaller grains will have more parts in touch with the solvent at a time.

**Temperature**

- The **temperature** is how hot or cold the solvent is. Substances will dissolve faster in warmer water than in colder water. In **warm water** there are **more spaces between the particles** of water. This means there is **more space for solute particles** to fill up. When you increase the temperature of a solution the particles move much faster and this will increase how fast the solute dissolves in the solvent.

**TERMINOLOGY and NOTES:**

- A mixture whereby you **CAN** still see the different parts that make it up is called **HETEROGENOUS**
- A mixture whereby you **CANNOT** see the different parts that make it up is called **HOMOGENOUS**

- If a solution is **saturated**, if you heat it, you will be able to add more solute because hot solvents have more spaces between the particles.

**Helpful Links:**

- <https://goo.gl/y72oK6> [Factors that affect dissolving]
- <https://goo.gl/tEMx7R> [Rate of dissolving]

**Difference between melting and dissolving**

Dissolving and melting may appear to be the same thing, but they are different **processes**.

**Dissolving** happens **when you add a solute to a solvent and forms a solution**. So, the solute needs the solvent so that it can dissolve. The resulting solution is a new blend of the two combined substances. In a solution the solute is still present in the solvent.

**Melting** is a **transformation of a solid substance** that happens **because of an increase in temperature**. When a substance has melted it is no longer present. For example, when you put a block of ice out in the sun, it starts to melt because of the increased temperature, this cause the ice to change from **solid** to **liquid**. Once the ice has melted, we no longer have ice, instead we have water now.



**Conducting an investigation**

When conducting an investigation there are some things that you need to know:

- **Aim** – the reason for the investigation.
- **Hypothesis** – an educated guess of the outcome/results of the investigation.
- **Independent variable**: the one substance/variable that you keep changing or that is different throughout the investigation.
- **Dependent variable**: the substance/variable that you are observing, measuring or calculating throughout the investigation. This is influenced by the effects of the independent variable.
- **Controlled variable**: the substances that must be kept the same they must not be changes throughout the investigation.
- **Fair Test** – an investigation where there is only one variable that is being changed and everything else is kept the same

**PRACTICAL Activity 1 (Rate of Dissolving)****INVESTIGATE HOW GRAIN SIZE AFFECTS THE RATE OF DISSOLVING**

Click on the link below and watch the video to answer the questions

- <https://drive.google.com/open?id=15rlf30vLirkFGjPnxQcXYhvg6xoj5u8i>

**MATERIALS:**

- two beakers / glasses of the same size
- watch / clock with a second hand or stopwatch
- normal sugar
- fine sugar (castor sugar)
- teaspoon
- water (lukewarm)

**METHOD:**

1. Pour exactly 200 ml of water into each of the two beakers/glasses.
2. Measure a flat teaspoon (5 ml) of fine sugar (castor sugar).
3. Add it to the first beaker/glass.
4. Stir the solution **5 times** and then time how long it takes for all the salt to dissolve.
5. Record the time in seconds.
6. Repeat the above four steps for castor sugar then twice with the normal sugar.
7. Copy and complete the table in your workbooks.

**Results and Observations:**

Type of Sugar (Grain size)	Time 1 (sec)	Time 2 (sec)	Average time (sec)
Fine sugar (castor sugar)			
Coarse sugar (normal grain sugar)			

8. Use the results to draw a **BAR GRAPH** to represent the results in the table of results.
9. What is the Aim of the investigation?
10. Name the following:
  - a. Independent variable
  - b. Dependent variable
11. Write a conclusion to the investigation.

**PRACTICAL Activity 2 (Rate of Dissolving)****INVESTIGATE THE RATE OF DISSOLVING AT DIFFERENT TEMPERATURES***You will do this on your own***MATERIALS:**

- three beakers / glasses of the same size
- cold water
- watch / clock with a second hand or stopwatch
- fine salt
- warm water
- teaspoon
- hot water

**METHOD:**

1. Label the beakers COLD, WARM and HOT.
2. Add 200 ml of cold water to the beaker marked COLD.
3. Add one flat teaspoon (5 ml) of salt to this beaker.
4. Stir the mixture (**3 times**). Then record the time it takes to dissolve fully.
5. Repeat steps 2 to 5 with warm water and hot water, doing it twice for each temperature.  
Work carefully and safely with the hot water.  
Fill the results in on the table.
6. Record how long it takes for all the salt to dissolve.

**Results and Observations:**

Type of Sugar	Time (1) sec	Time 2 (sec)	Average time (sec)
Cold water			
Warm water			
Hot water			

7. Use the results to draw a **BAR GRAPH** to represent the results in the table of results.
8. What is the aim of the investigation?
9. Name the following:
  - c. Independent variable
  - d. Dependent variable
10. Is this a Fair test? Explain
11. Write a conclusion to the investigation.

**Activity 2: Rate of Dissolving**

Answer the following questions:

1. What are the 3 factors that affect solubility? (3)



2. Gina is trying to dissolve bath salts in her bathwater. How could she speed up the rate of dissolving? (3)

**TOTAL: 6**

**Revision: Dissolving (Day-by-Day, pg. 93)**

Do the revision activity in your books.

**TOTAL: 6**