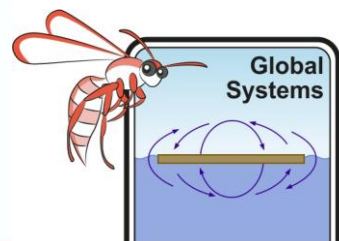
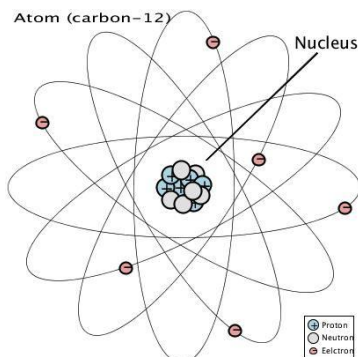


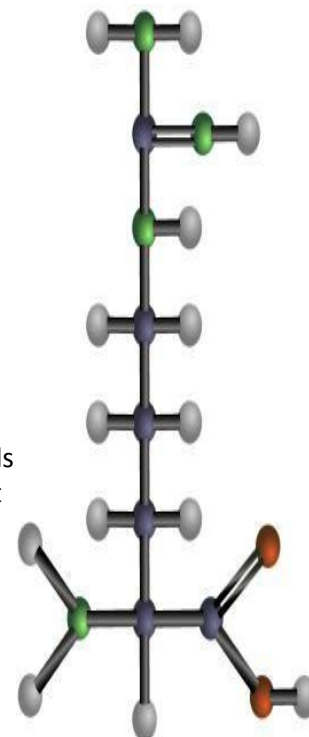
Carbon chains - Teachers' notes



Carbon atoms can form long strong chains



Because carbon has six electrons, two will fill its inner shell allowing the remaining four electrons in the outer shell to be active in forming compounds or more carbon atoms share their 4 outer electrons they can fulfil the "Octet Rule". They can then bond together in long chains creating molecules that are essential in the formation of living things. Carbon chains in our bodies make fats, carbohydrates and proteins. Our DNA is made of a particularly long molecules that if unwound would stretch all the way across the Solar System and back again. The ball and stick model is of a basic amino acid arginine. (Carbon is blue grey, oxygen is red, nitrogen is green and hydrogen is silver)



AIM to create slime and compare its characteristics with those of clay.



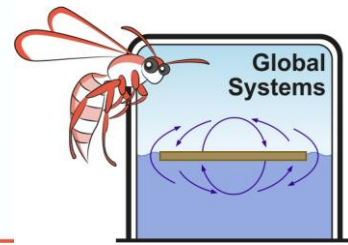
Slime is made from long chain carbon based molecules cross-linked by borax molecules. Clay is an aluminosilicate and does not contain carbon.

Materials

- Safety glasses
- Bench protector
- 2 beakers
- Option – food colouring
- Stirring rod
- Measuring cylinder
- Zip lock sandwich bag and pen
- A small piece of clay or plasticine

For the borax solution

- 240 mL water
- 5mL (one teaspoonful) borax (sodium tetra borate solution) $\text{Na}_2\text{BO}_4\text{O}_2 \cdot 10\text{H}_2\text{O}$
- Add a few drops of food colouring if required



Carbon Chains – Teacher Notes

For the PVA (polyvinyl acetate) solution

- 500mL water
- 125 mL PVA glue (about half a cup)
-

Method

Stir borax into water to dissolve.

Which substance is the solute, the solvent and the solution? **Solute is borax (solid), solvent is water (liquid) and borax solution forms**

Stir PVA into water to dissolve.

Which substance is the solute, solvent and solution? **In this case two liquids dissolve into each other to form PVA solution.**

Puzzler What is the difference between a solution and a mixture? **Mixtures and solutions consist of intermixed materials, but solutions have homogeneity (equal distribution of materials)**

As one student continues to stir the PVA solution another slowly adds the borax solution
As the slime forms, lift it out and knead it in your hands, working it until it is firm and dry.
Pull and twist the slime to discover how flexible and elastic long chains of molecules can be.
Compare this behaviour to clay in your observations.
Place the slime in a Zip lock sandwich to be placed in a cool place until the end of the day.

Observations

**The clay can bend a little but breaks easily. It needs to be worked to reform after breakage.
The slime is flexible and reconstitutes easily if broken.**

Conclusion

The characteristics of clay and slime are related to their chemistry.