

Do I Understand Density?

You put cold water colored blue into room temperature water. The cold water sank in the room temperature water. Use what you know about the motion and attraction of molecules and density to explain why this happened.

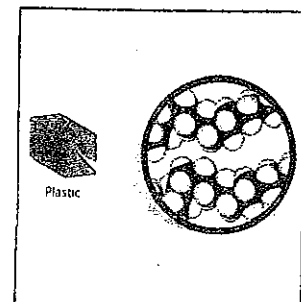


It might seem strange but hot water and ice both float on room temperature water. Explain why this happens.

If two substances have the same volume, but the first one has greater mass, which one will have the greater density?

Will different volumes of water always have the same density? Why or why not?

Glass jars are much more dense than plastic jars. What can you guess about the mass, size, and arrangement of the molecules that make up glass compared to the molecules that make up plastics?



In addition to their arrangement, what are two other properties of atoms that can affect density?

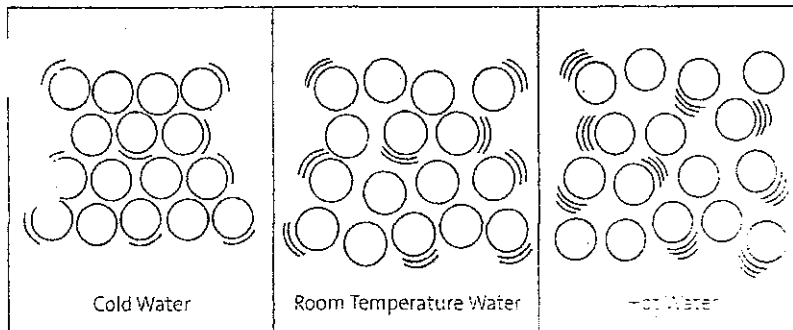
What is the mathematical equation for density?

What is the density of water?

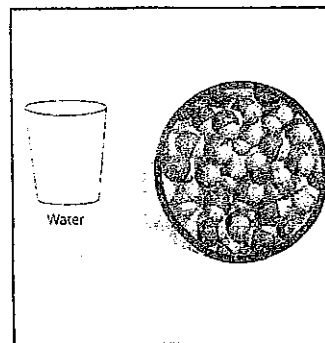
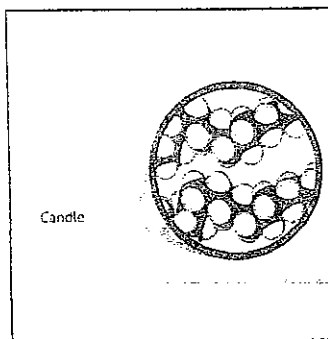
Will an object with a density of 0.86 g/cm^3 sink or float in water? How do you know?

A piece of ice floats on water. What does this tell you about the density of ice compared to the density of water?

Refer to the diagram below to explain why hot water will float on cold water?



Look at the drawings below and think about the size, mass, or arrangement of water molecules compared to the molecules of wax. Why does a candle float on water?



Name(s):
Core:
Date:

M&M Dissolving Rate

Directions: Please follow the Scientific Method procedures we learned to work through today's lab.

1. Question: Does the M&M candy shell dissolve faster in different liquids?
2. Hypothesis: (I believe... because)
3. Procedure: Place 50ml of 3 different liquids one into each bowl/cup. Place 1 M&M of one color into 3 different Styrofoam bowl/cups. Using the clock/stopwatch in the room record how much time it takes for the color shell to dissolve completely away from the chocolate. Record the results for each color twice.

List the materials you will need to gather?

4. Results: Please place your results in the data table below.

| Color of M&M | Liquid 1 (_____) | Liquid 2 (_____) | Liquid 3 (_____) |
|---------------|------------------|------------------|------------------|
| Trial 1: Time | | | |
| Trial 2: Time | | | |

5. Analysis: What does the data table show?

6. Conclusion: Summarize this lab in 3 or more sentences.

7. Further Questions: If the M&M Company was interested in your data, list 3 things you would tell them.

Name(s):

Core:

Date:

Racing M&M Colors

Directions: Please follow the Scientific Method procedures we learned to work through today's lab.

1. Question: Do some M&M colors dissolve in water faster than others?
2. Hypothesis: (I believe... because)
3. Procedure: Place 50ml of water into the bowl/cup. Place 1 M&M of one color into a Styrofoam bowl/cup. Using the clock/stopwatch in the room record how much time it takes for the color shell to dissolve completely away from the chocolate. Record the results for each color twice.

List the materials you will need to gather?

4. Results: Please place your results in the data table below.

| | Color 1 () | Color 2 () | Color 3 () |
|---------------|-------------|-------------|-------------|
| Trial 1: Time | | | |
| Trial 2: Time | | | |

Name(s):

Core:

Date:

Thermal M&M

Directions: Please follow the Scientific Method procedures we learned to work through today's lab.

1. Question: Does the temperature of the water affect how fast the colored coating dissolves from an M&M?
2. Hypothesis: (I believe... because)
3. Procedure: Place 50ml of different temperature water into each container. One container fill with cold water, one with room temperature water, and one with hot water (from the teacher). Return to your seat. Measure the temperature of each liquid and record these in the data table. Then, at the same time place 3 (same color) M&M's into those containers; one M&M into each! Using the clock/stopwatch in the room record how long it takes for the colored shell to completely dissolve from the chocolate inside.

List the materials you will need to gather:

4. Results: Please place your results in the data table below.

| | <u>Cold (C)</u> | <u>Room Temp. (R)</u> | <u>Hot (H)</u> |
|---------------------------|-----------------|-----------------------|----------------|
| <u>Water Temperature:</u> | | | |
| <u>Time:</u> | | | |

5. Analysis: What does the data table show?

6. Conclusion: Summarize this lab in 3 or more sentences.

7. Further Questions: If the M&M Company was interested in your data, list 3 things you would tell them.



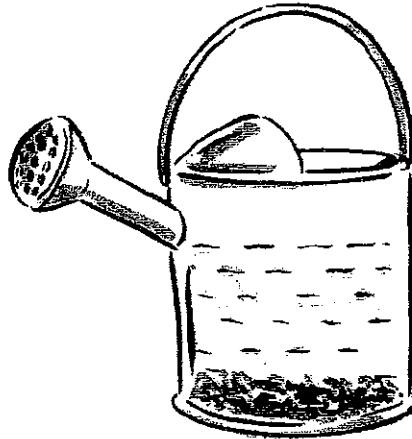
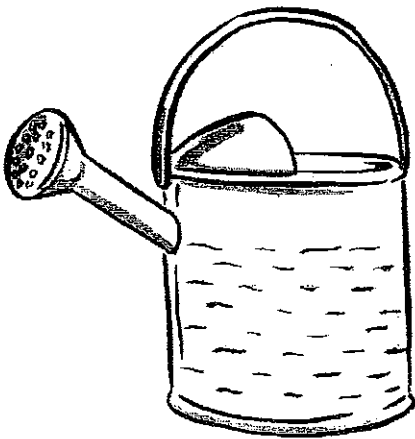
Dissolving matter

Background knowledge

Substances that can be dissolved in a liquid are said to be *soluble*. Substances that do not dissolve are *insoluble*. The liquid in which a substance dissolves is called the *solvent*. The substance that dissolves is called the *solute*. When mixed together, they make a solution. Water is an excellent solvent. It dissolves many substances. Sugar and salt are very soluble in water, while substances such as sand and chalk are insoluble.

Science activity

Rosa collected two different plant fertilizers from a garden center. The directions said to mix each fertilizer with water and to sprinkle the solution on her plants. When she mixed the first fertilizer in the water, it seemed to disappear. However, when she mixed the second fertilizer, she noticed it sank to the bottom of the watering can.



Which fertilizer should Rosa use for her plants? Explain.

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Directions : Title your Notebook Page using the information at the top. Read the "background Knowledge" to record definitions for the words in your Notebook. Answer the question using a complete sentence under your

How soluble is it?

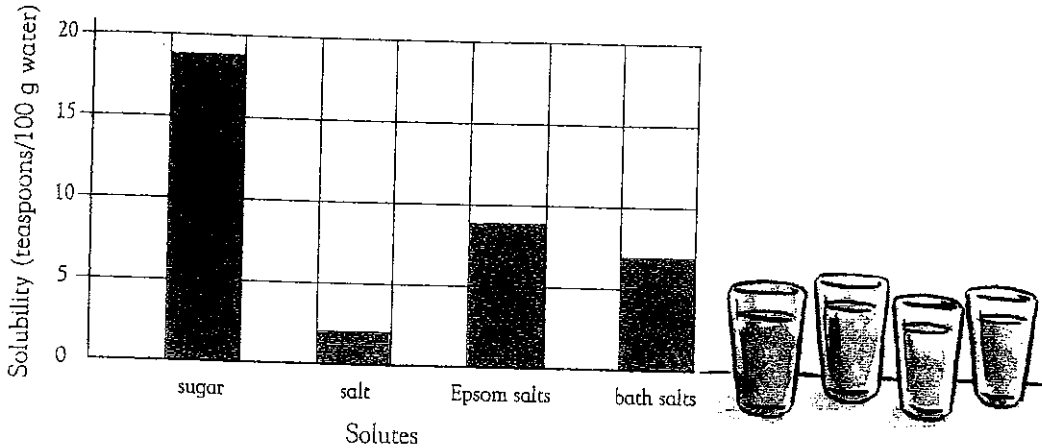


Background knowledge

All soluble substances do not dissolve equally well. Sugar dissolves very easily, while other substances, such as salt, dissolve less easily. The amount of solute that will dissolve in a solvent is a measure of its *solubility*.

Science activity

Below is a graph showing the solubility of different substances.



1. About how many teaspoons of salt dissolve in the water?
2. About how many teaspoons of bath salts dissolve in the water?
3. Another substance is more soluble than bath salts but less soluble than Epsom salts. What range of teaspoons would you expect to dissolve?
4. List the solutes in the bar graph in order of their solubility.
Write the name of the most soluble substance first.

Directions: Title your Notebook page as before. Record any information you believe important and then answer the questions. All four!!! Make sure you refer to the graph.



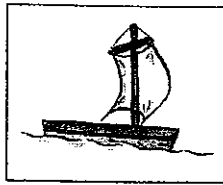
Floating on salt water

Background knowledge

Mixing substances together can cause their properties to change. Adding salt to water makes the water salty. Salt water boils at a higher temperature than fresh water and freezes at a lower temperature. *Buoyancy* is the upward pushing force of a fluid. Objects float more easily in salt water than in fresh water, because salt water is more buoyant. This is also why it is easier to swim in salt water than in fresh water.

Science activity

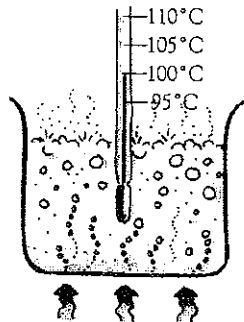
Look at the pairs of pictures. Which picture in each pair shows sea water and which shows fresh water?



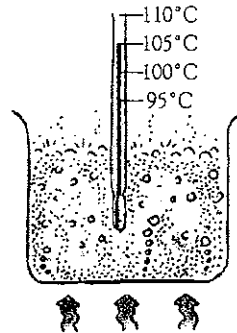
A.....



B.....



C.....



D.....

If you added sand to water, would it boil at a higher temperature? Explain.

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Directions: You know what to do.

Really think about the question in terms of the properties of matter.

Hypothesize !!

Temperature and solubility



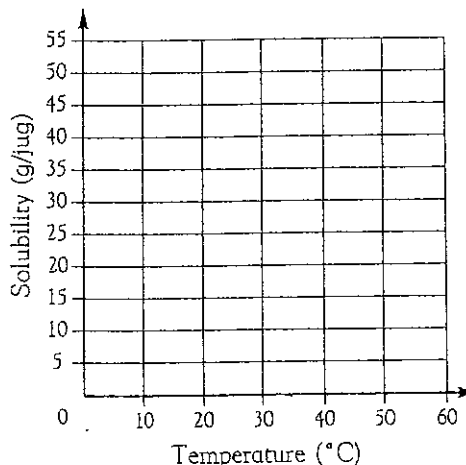
Background knowledge

It is easier to dissolve soluble substances in warm water than in cold water. However, heat increases the solubility of some substances more than of others.

Science activity

Make a line graph to plot the data from the table. Be sure to connect all the points after they are plotted. The data shows the solubility of table salt and of Epsom salts as temperature increases.

| Temperature (°C) | Amount dissolved per jug (in grams) | |
|------------------|-------------------------------------|-------------|
| | Salt | Epsom salts |
| 20 | 10 | 20 |
| 30 | 12 | 30 |
| 40 | 14 | 40 |
| 50 | 16 | 50 |
| 60 | 18 | 55 |



1 Do you see a relationship between temperature and the solubility of table salt? Explain.

2 Is this relationship the same for Epsom salts? Explain.

3 Describe any differences temperature has on the solubility of Epsom salts as compared to table salt.

Directions : Title your Notebook page as you have in the past. Record any "background" information you think is important. SKETCH a data table like the one shown & plot the data. Answer the questions using your science knowledge.