SUGGESTED ACTIVITIES

(*Basic Chemistry*)

From *Invitations to Science Inquiry 2nd Edition* by Tik L. Liem:

Activity	Page Number	Concept
• Make milk from water and oil	101	Mixtures

From *NSF/IERI Science IDEAS Project*:

Activity	Page Number	Concept
• Dissolving sugar	See following pages	Solutions
• Heterogeneous mixtures	" " "	Mixtures
• Soltns, mixt. and chem. rxs	" " "	Solutions & Mixtures

From *Harcourt Science* Teacher's Ed. Unit E: (For ALL grade levels)

Activity	Page Number	Concept
• Separating a mixture	E38-39 (3rd grade text)	Mixtures
• Mixture collage	E42-43 (3rd grade text)	Mixtures
• Observing solutions	E19 (4th grade text)	Solutions
• Separation strategies	E10 (5th grade text)	Mixtures
• Conductivity	E42 (5th grade text)	Elements
• Grouping elements	E44-45 (5th grade text)	Elements

MAKE MILK FROM WATER AND OIL

A. Question: *Can water and oil mix?*

B. Materials Needed:

1. A glass/plastic clear jar (or beaker)
2. Stirrer
3.Cooking oil
4.Detergent

C: Procedure:

1. Fill the jar about half way with water and pour half of that volume of oil over the water.
2. Stir the two liquids with a spoon of glass stirrer and leave it for a while and observe what is happening to the mixture.
3. Ask the students: "How can I make the two liquids to stay mixed?" Now add a few squirts of liquid detergent and stir thoroughly.
4. After mixing thoroughly, leave the jar alone and observe (if the emulsion separates again you may need more detergent or more vigorous stirring).

D: Anticipated Results:

Students should observe separation of water and oil.

E: Thought Questions for Class Discussion:

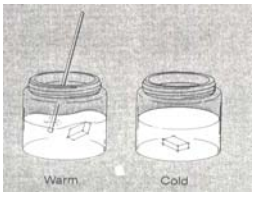
1. After stirring without detergent, what did you observe in the jar?
2. What made the two liquids stay mixed as an emulsion?
3. How would you define "emulsion"?
4. What is the term for a finely divided solid in a liquid?
5. Can you name some examples of finely divided solids in a liquid?
6. What is a finely divided solid in a gas? Examples?
7. What do we usually call fine droplets of liquid in the air?
8. What do we call finely divided gas bubbles in liquid?

F: Explanation:

When mixing oil and water, the oil will break up in small droplets and be dispersed in the water very temporarily. After leaving the jar with the mixture alone for a while, the two clear liquids will separate: oil forming a layer above the water because of its smaller density. After adding some liquid detergent (the emulsifier) and some vigorous stirring, the small droplets of oil will stay dispersed, forming an emulsion. Examples of an emulsion: milk, mayonnaise, salad dressings, butter ,etc.

Finely divided droplets of liquid in gas is called mist or fog, colloidal solid in liquid is called a suspension: muddy water; a slid colloid in gas is called smoke. An example of a colloidal dispersion of solid in solid is gold particles in ruby glass; gas bubbles in liquid is commonly called: foam.

DISSOLVING SUGAR



KEY OPENING QUESTION: Does heat affect how fast sugar dissolves in water?

MATERIALS: 4 baby-food jars
8 sugar cubes
Warm water
Cold water
Spoon or stirrer
Watch or clock
4 heavy plastic bags

PROCEDURE:

1. Put one sugar cube into each of the 4 baby-food jars.
2. Half fill 2 of the jars with warm water.
3. Half fill the other 2 jars with cold water (*Try to put the same amount of water in all 4 jars)
4. Make a note of the time.
5. Stir the warm water in one jar.
6. Stir the cold water in one jar. (*Do not stir the water in the other jars)
7. Record how long it takes for each sugar cube to dissolve completely.
8. Clean up and start again, but this time crush the sugar cubes by putting each cube in a plastic bag and stepping on the cube.
9. Repeat steps 1, 2, and 3.
10. Place one crushed sugar cube into each jar.

OBSERVATIONS AND DATA:

In which jar did the sugar dissolve the quickest and why?

In which jar did the sugar dissolve the slowest and why?

CONCLUSION: (Answer the question)

NSF/IERI Science IDEAS Project Grant #0228353

HETEROGENEOUS MIXTURES

KEY OPENING QUESTION: How are heterogeneous mixtures alike?

MATERIALS: Group 1 – plastic container with marbles and beans
Group 2 – plastic container with marbles and water
Group 3 – plastic container with foil pieces and paper clips
Group 4 – plastic container with sand and water
Group 5 – plastic container with salt and sand
Group 6 – plastic container with various colors of paper squares
Magnet
2 funnels
Filter paper
3 beakers
Miscellaneous containers
Water

PROCEDURE:

1. Observe the filled container for your group.
2. Discuss how you could separate the items in the container.
3. Get other materials listed to help, as needed.
4. Record the steps you used to separate the mixture.

OBSERVATIONS AND DATA:

How did you separate each mixture?

Which mixture was the easiest to separate and why?

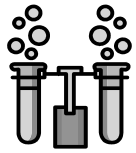
Which mixture was the hardest to separate and why?

What do all these mixtures have in common?

CONCLUSION: (Answer the question)

NSF/IERI Science IDEAS Project Grant #0228353

SOLUTIONS, MIXTURES AND CHEMICAL REACTIONS



KEY OPENING QUESTION: What is the difference between a solution, a mixture and chemical reaction?

MATERIALS: Balance
1 graduated cylinder
6 beakers
Stirring rod
3mL of water
3mL of vinegar
3g of baking soda
3g of antacid tablet
3g of salt crystals

PROCEDURE:

1. Label 3 beakers A, B, and C.
2. Measure 2mL of water using the graduated cylinder and place into beaker A.
3. Do the same for beakers B and C.
4. Label the remaining 3 beakers D, E, and F.
5. Measure 2mL of vinegar using the graduated cylinder and place into beaker D.
6. Do the same for beakers E and F.
7. Using the balance measure 3g of salt crystals, 3g of antacid tablet and 3g of baking soda.
8. Place the measured salt crystals into beaker A
9. Place the measured antacid into beaker B
10. Place the baking soda into beaker C.
11. Note what happens.
12. Using the balance measure 3g of salt crystals, 3g of antacid tablet and 3g of baking soda.
13. Place the measured salt crystals into beaker D
14. Place the measured antacid into beaker E
15. Place the baking soda into beaker F.
16. Note what happens.

NSF/IERI Science IDEAS Project Grant #0228353

OBSERVATIONS AND DATA:

	A	B	C	D	E	F
Water						
Vinegar						

Explain your observations

CONCLUSION: (Answer the question)