Messing With Mixtures Teacher Notes

Part A: Hit the Trail!

Materials:

Small bag of trail mix for each group with 5 ingredients

Examples: Chex cereal, Cheerios, M&M candy, raisins, and peanuts

Caution: If any of your students has an allergy to nuts, be sure to substitute ingredients.

Balances for measuring mass

Notes:

• Each group gets only one bag! When they are finished with this part, they may eat the trail mix. They are not allowed to eat anything else except the M&Ms in Part B!

• The trail mix would be a heterogeneous mixture since you can see the parts of the mixture.

• When they find the mass of each item/part, the students need to weigh everything - this includes little pieces of cereal or the "skins" from the peanuts. If they don't, the final total will not equal 100%.

• They need to round their percentages to the nearest hundredth. I tell them to round it off so it is like money - dollars and cents. The final percentage should be close to 100% is they were accurate in measuring the mass of each part.

• Discuss products that provide information about percentages, such as canned juices and cocktail nuts.

Part B: Tasty Solution

Materials:

M&M Candy or other small candy - 3 pieces per student

Stop watch or other time piece

Notes:

• Have the kids tell you what they are going to do before you give them the M&Ms. Here's a summary:

1st piece - The candy should just sit on their tongue and dissolve. They may get extra spit built up to speed up the process, but cannot move the candy around.

2nd piece - They can flop the candy around with their tongue, but they are not allowed to chew it or smash it with their tongue.

3rd piece - They can chew the candy and move it around with their tongue. They shouldn't swallow it whole without breaking it up!

• Students will need a stopwatch, regular watch with a seconds hand, or a classroom clock. They should keep track of the time it takes to dissolve ONLY the candy shell and not the entire piece of candy.

• For #7, students should learn that if a substance is crushed or stirred it will speed up the dissolving rate. Have students brainstorm other methods for speeding up the dissolving rate.

Other Answers:

8 - Solute and solvents in solutions

Ocean water = Solute - salt, Solvent - water

Kool-Aid = Solutes - powder and sugar, Solvent - water

Antifreeze = Solute - ethylene glycol, Solvent - water
Lemonade = Solutes - lemon juice and sugar, Solvent - water
Soda Pop = Solute - syrup and CO_2 gas, Solvent - water
Air = Solutes - oxygen and other gases, Solvent - nitrogen
Gold jewelry = Solute - copper, Solvent - gold
Sterling Silver = Solute - copper, Solvent - silver

#9 - Water is called the "universal solvent."
#10 - A glass of very sweet Kool-Aid would have the most solute since it has the most sugar to dissolve.

Part C: Mystery Colors

Materials:

Several varieties of black markers - Must be water soluble
Coffee filters or filter paper
Pipe cleaners
Small beakers or glasses

Notes:

• Demonstrate the correct procedure as outlined on the student worksheet, then allow time for the students to test three different black markers.
• Students need to allow enough time for the water to reach the ends of the coffee filter or filter paper.
• If the ink spot touches the water, they need to redo that test.
• Once dry, hang up the filters and compare. Ask students to classify each chromatogram based on the colors they see.
• Discuss soluble vs. insoluble inks. Soluble inks are those that dissolve in water, while insoluble inks will not dissolve in water. Other solvents, such as rubbing alcohol and fingernail polish remover, may be used to separate the pigments in insoluble or permanent inks. Due to safety concerns, I do not recommend having students experiment with the other solvents.

Part D: See The Light

Materials:

Ziploc bags - 4 for each group
Salt
Flour
Kool-Aid powder
Dirt
Graduated cylinders
Flashlight(s)

Notes:

• Students should make sure they mix the materials thoroughly. The salt and Kool-Aid powder should dissolve. The flour and dirt particles should be spread throughout the water.
• They should be able to see that the light passes easily through the solutions (D-1 & D-3)), while it tends to scatter in the colloids (D-2 & D-4).
• One example of the Tyndall Effect is the scattering of headlights on a foggy night. The water molecules that are suspended in the air scatter the light to produce a hazy effect. Have the students identify other situations in which they can see the same effects.
• When they are finished, have them throw the bags away. The mixtures SHOULD NOT be dumped in the sink as the flour mixture and mud can cause clogs.