

Pure Substances and Mixtures

CURRICULUM CORRELATION

1. Relating Science and Technology to Society and the Environment		Section(s)
OVERALL EXPECTATION	SPECIFIC EXPECTATIONS	
1. evaluate the social and environmental impacts of the use and disposal of pure substances and mixtures	1.1 assess positive and negative environmental impacts related to the disposal of pure substances (e.g., uranium) and mixtures (e.g., paint, sewage)	1.4, 1.7, 2.1, 3.4
	1.2 assess the impact on society and the environment of different industrial methods of separating mixtures and solutions	3.4, 3.7

2. Developing Investigation and Communication Skills		Section(s)
OVERALL EXPECTATION	SPECIFIC EXPECTATIONS	
2. investigate the properties and applications of pure substances and mixtures	2.1 follow established safety procedures for handling chemicals and apparatus (e.g., wash hands after handling chemicals, take note of universal warning symbols)	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8
	2.2 use scientific inquiry/experimentation skills to investigate factors (e.g., temperature, type of solute or solvent, particle size, stirring) that affect the solubility of a substance and the rate at which substances dissolve	1.4, 2.2, 2.4, 2.5
	2.3 investigate processes (e.g., filtration, distillation, settling, magnetism) used for separating different mixtures	1.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8
	2.4 use scientific inquiry/experimentation skills to investigate the properties of mixtures and solutions (e.g., the amount of solute required to form a saturated solution; differences between pure substances and mixtures)	1.5, 1.6, 2.2, 2.4
	2.5 use appropriate science and technology vocabulary, including "mechanical mixture," "solution," "solute," "insoluble," "saturated," "unsaturated," and "dilute," in oral and written communication	1.1, 1.6, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
	2.6 use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes (e.g., using appropriate mathematical conventions, make a scatter plot to show the relationship between solute, solvent, and temperature)	1.1, 1.3, 1.5, 1.6, 1.7, 2.1, 2.4, 2.5, 3.1, 3.3, 3.5, 3.6, 3.7, 3.8

3. Understanding Basic Concepts		Section(s)
OVERALL EXPECTATION	SPECIFIC EXPECTATIONS	
3. demonstrate an understanding of the properties of pure substances and mixtures, and describe these characteristics using the particle theory	3.1 distinguish between pure substances (e.g., distilled water, salt, copper pipe) and mixtures (e.g., salad dressing, chocolate chip cookies)	1.4, 1.5, 1.7, 3.3
	3.2 state the postulates of the particle theory of matter (all matter is made up of particles; all particles are in constant motion; all particles of one substance are identical; temperature affects the speed at which particles move; in a gas, there are spaces between the particles; in liquids and solids, the particles are close together and have strong forces of attraction between them)	1.1, 1.2, 1.3
	3.3 use the particle theory to describe the difference between pure substances (which have identical particles) and mixtures (which have different particles)	1.4, 2.2
	3.4 distinguish between solutions and mechanical mixtures	1.6, 3.5, 3.7
	3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes (e.g., use of cheesecloth to separate seeds and skins from juice and pulp to make fruit jellies; use of evaporation in maple syrup production; use of different sizes of sieves to separate wheat grains in white bread production; use of strainers in industries to separate slurry into solids and liquids)	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
	3.6 identify the components of a solution (e.g., solvent, solute)	2.1, 2.2, 2.3, 2.4, 3.5
	3.7 identify solutes and solvents in various kinds of solutions (e.g., copper and tin in bronze; iodine and alcohol in iodine solution)	2.1
	3.8 describe the concentration of a solution in qualitative terms (e.g., dilute, concentrated) and in quantitative terms (e.g., 5 grams of salt in 1000 ml of water)	2.3, 2.4
	3.9 describe the difference between saturated and unsaturated solutions	2.3, 2.4
	3.10 explain why water is referred to as the universal solvent	2.1