COSI ON WHEELS
IT'S SIMPLY CHEMISTRY
Program Description

It's Simply Chemistry is designed to enhance students' knowledge of the chemistry in their daily lives. The program consists of a 45 minute interactive assembly followed by exciting hands-on activities that engage the students and encourage the development of Science Process Skills.

During the assembly, the following concepts and more will be explored:

- Experimenting with solutions to determine if they are acids or bases
- Identifying an unknown substance by examining its properties
- Producing light, heat, and sound with a chemical reaction

The hands-on activities are presented in 30-45 minute sessions with each session accommodating 62 or fewer students. Hands-on activity session times are scheduled by your school's COSI On Wheels coordinator. Students will have the opportunity to discover more about solving mysteries with chemistry. In the hands-on sessions students interact informally with the activities, spending as little or as much time as they like at each station. While many students will try all of the activities, some may choose to have a more in-depth experience with only a few.

To prepare you and your students for **It's Simply Chemistry**, we suggest familiarizing yourselves with the Hands-On Activities descriptions and vocabulary list provided. Also, for extension activities go to www.cosi.org and click on 'Extension Activities' under **It's Simply Chemistry**.

NOTE: *Students should be reminded never to eat or drink their chemistry experiments—nor to eat or drink near them—even when they experiment with food items.*

IT'S SIMPLY CHEMISTRY HANDS-ON ACTIVITIES:

A Closer Look: Students use microscopes to identify powders based on their external structures.

Chemical or Physical?: Students compare and identify a variety of chemical changes with physical changes.

It's a Secret: Students write secret messages in two different ways: one using phenolphthalein and washing soda, the other using ultraviolet ink and a black light.

Solid-Liquid-Gas: Students mix solids with a liquid to produce a gas. The reaction gives results they can see, feel and hear.

pH: With a variety of diluted household chemicals and Universal Indicator solution, students explore the full range of pH: acid to neutral to base.

Light the Night: Students experience a chemical reaction that produces light without heat.

Sink or Float: Students will investigate density and see how density determines if something will float or sink.

Super Slime: Students use Polyvinyl Alcohol, Sodium Tetraborate, and food coloring to create great non-Newtonian substance to explore and take with them.

Way Cool: Students mix chemicals with water to cause exothermic (heat-producing) and endothermic (heat-absorbing) reactions they can feel.

IT'S SIMPLY CHEMISTRY
VOCABULARY

ACID: A chemical with a pH between 1 and 6 that is sour. Examples are vinegar, lemon juice, and vitamin C.

BASE: A chemical with a pH between 8 and 14 that is bitter. Examples are soaps, ammonia, and baking soda.

CHEMICAL CHANGE: A process in which elements or compounds change to form different elements or compounds. The change may be permanent or reversible, and may or may not be seen.

CHEMILUMINESCENCE: The production of light from a chemical reaction.

ENDOTHERMIC: A type of chemical reaction that feels cold because it absorbs heat.

EXOTHERMIC: A type of chemical reaction that feels warm because it produces heat.

GAS: One of the states of matter in which the molecules are far apart from one another.

INDICATOR: A chemical that changes color when added to acids or bases. It indicates the presence of an acid or base.

LIQUID: One of the states of matter in which the particles move almost independently of each other but are not as free as the particles of a gas.

NEUTRAL: A chemical with a pH of 7. An example is water.

pH: Measurement of how strong of an acid or a base a substance is. The pH scale is a numerical scale ranging from 1-14.

PHYSICAL CHANGE: A type of change that does not produce a new substance and that can be reversed easily. Examples are boiling and melting.

SOLID: One of the states of matter in which molecules are packed closely together, allowing very little movement and giving greater density than liquids or gases.

VOLUME: The amount of space taken up by a solid, a liquid, or a gas.

SCIENCE PROCESS SKILLS

On the day of the program students will have the opportunity to participate in a variety of hands-on activities. The activities are intended to create a fun and stimulating environment which encourages the development of Science Process Skills. The skills include:

OBSERVING: Using the senses and/or appropriate tools to gather information. Observing may also include the skills of: **Measuring**, **Comparing**, and **Classifying.**

INFERRING: Making preliminary conclusions by assessing what is already known. Inferences are what you reason to be true, but have not observed or tested.

QUESTIONING: Raising questions about objects, events, or phenomena. This includes recognizing and asking *investigable* questions, often beginning with phrases like 'What causes,' 'How does' or 'What makes.'

HYPOTHESIZING: Offering a possible explanation or testable statement. A hypothesis can be a good reference point for further investigation.

PREDICTING: Using ideas or evidence to foretell the outcome of a specific future event. Often involves an action and a reaction or an if/then statement.

PLANNING: Designing one's own investigation using procedures to obtain reliable data. *Planning is <u>not</u> always formal.*

INVESTIGATING: Carrying out a planned experiment based on your hypothesis. Investigation uses many of the previously stated Process Skills.

INTERPRETING: Drawing conclusions by assessing the data. Finding patterns or other meaning in the data.

COMMUNICATING: Expressing observations, ideas, conclusions, or models by talking, writing, drawing, etc.

RELATING & APPLYING: Relating makes parallels to similar concepts, and applying uses the knowledge gained to help solve a challenge.