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## "Honey, I Broke the Capsule!"

**Concept:** Novel uses of polymers

**National Science Standards:**

A	B	C	D	E	F	G

**Background:**

Microencapsulation is a process in which one substance is contained within a small, protective, usually spherically-shaped material. It is used extensively in time-release medicines and many products such as carbonless paper. In carbonless paper, dyes are contained within microcapsules which break upon pressure from a pen.

The following activities show encapsulation on a larger scale (macroencapsulation?). When the Freshen-Up™ gum (or other gum with a liquid center) is chewed, the capsule breaks, allowing the liquid center to merge with the rest of the gum. This illustrates the concept of encapsulation by demonstrating that the liquid was encapsulated by the rest of the gum. The ketchup and mustard packets and the Pixie Stix™ are other examples of encapsulation.

**Objective:** Through the use of the senses and polymer examples, students will gain an understanding of microencapsulation found in their everyday life.

**Suggested grade levels:** All

**Estimated time:**

- Teacher prep: 15 minutes
- Activity: 30-45 minutes

**Materials needed:**

- Freshen Up™ gum or other gum with a liquid center (one piece per student)
- Pixie Stix™ (one per student)
- ketchup and mustard packets (at least one packet of each per group)
- plastic to protect floor
- paper and pencil or teacher-generated data sheet (optional)

- baggies and rubber bands to go over shoes (optional)

**Safety/Disposal:**

Be aware of students who may have allergies or diabetes.

Baggies over shoes are useful for prevention of soiling from splattering liquids.

The clean-up area should be used for splattering to avoid slippage.

**Procedure:**

1. Choose the gum, the Pixi Stix™, or the condiment packets to introduce the idea of encapsulation and pose the question, “What do you think the term ‘encapsulation’ means?”
2. Distribute the items to each student and/or group.
3. Break open the capsule in appropriate manner. (Open the gum with your mouth, the Pixi Stix™ with your hand, and the ketchup and mustard packets with your feet.)
4. Observe/Draw/Write/Discuss the results by using teacher generated-data sheet or journal entry.

**Wrap-up:**

- Expected results: This activity designed to show that when a force was applied to a capsule, substances were released.
- Summarize by defining the term “encapsulation.” Revisit introductory Activities A, B, and C and identify each capsule and its substance.
- Follow-up question: “Now that you know what the term ‘encapsulation’ means, what do you think the term ‘microencapsulation’ means?”
- Notes: See the below extensions for continuation activities of “Honey I Shrunk the Capsule!”

**Extensions:**

- “Honey, I Shrunk The Capsule!” is a collection of activities to help explain the meaning of “microencapsulation.” Activities: Smelly Bags, The Scratch-and-Sniff Challenge

**Resources/Bibliography:**

Sarquis, Jerry L., Mickey Sarquis, and John P. Williams. Teaching Chemistry with Toys. Miami University, Middletown, OH: Terrific Science Press, 1995.