**Sense of Taste**

Relationship between Taste and Smell

Think of all the wonderful sensations taste can impart to us - the delicious Thanksgiving turkey and gravy, mashed potatoes, cranberry sauce and pumpkin pie! Coffee, chocolate, lush strawberries - the list goes on and on! Receptors on our tongues bind to chemicals in our food and relay the information about the chemicals to our brain. Surprisingly, all those wonderful tastes are transmitted to our brains through only four types of receptors on our tongues - those for sweet, sour, salt and bitter. How can this be so?

**Materials:**

  Life Savers or other flavored candies

**Procedure:**

Students will work in pairs. One student closes their eyes and holds their nose, while another feeds them a lifesaver, without telling them the flavor. The student should try to guess what flavor the life saver is, without letting go of their nose. Observations should proceed for a minute or so as the candy dissolves in their mouth.

Is there any change in the taste of the candy from the beginning to the end of the experiment? Describe the tastes.

**What is going on?**

There are only four different types of true tastes - sour, sweet, salt and bitter. Each of these types of receptors bind to a specific structure of a "taste" molecule. Sweet receptors recognize hydroxyl groups (OH) in sugars, sour receptors respond to acids (H+), the metal ions in salts (such as the Na+ in table salt. Alkaloids trigger the bitter receptors - alkaloids are nitrogen containing bases with complex ring structures which have significant physiological activity. Some examples of alkaloids are nicotine, quinine, morphine, strychnine, and reserpine. Many poisons are alkaloids, and the presence of receptors for the bitter taste at the back of the tongue may help to trigger the vomiting response.  
  
Approximately 80-90% of what we perceive as "taste" actually is due to the sense of smell. Just think about how dull food tastes when you have a head cold or a stuffed up nose. At first students may not be able to tell the specific flavor of the candy, just perhaps a sensation of sweetness or sourness. If students are patient, some may notice that as the candy dissolves they can identify the specific taste. This is because some scent molecules volatilize and travel up to the olfactory organ through a "back door" - that is up a passage at the back of the throat and to the nose. Since we can only taste four different true "tastes", it is actually smell that lets us experience the complex, mouth watering flavors we associate with our favorite foods.