No Leak

**Purpose**
To demonstrate that the physical property of a material depends on how its chemicals are organized.

**Materials**
Baking pan  Clear plastic sandwich bag  Pencil
Water

**Procedure**
1. Place the baking pan on a table and fill the plastic sandwich bag three-fourths full with water.
2. Position the bag over the baking pan. Holding the bag at the top, push the pointed end of the pencil through one side of the bag and out the other side.
3. Leave the pencil in place and observe any leakage around the pencil.
4. Remove the pencil and observe any leakage.
5. Note the size and shape of the hole made by the pencil in the plastic bag.

**Results**
The plastic bag does not leak when the pencil is pushed through it. Removal of the pencil shows that the hole left by the pencil appears stretched around the edges (not torn) and is slightly smaller in diameter than that of the pencil. Water is able to stream out of this hole.

**Why?** The plastic bag is made of polyethylene, which is a polymer. Ethylene is the monomer used to make polyethylene. The physical organization of polyethylene is like a ball of fuzzy yarn with fibers intertwined and sticking out in all directions.

When the pencil enters the plastic bag, the polyethylene molecules move out of the way, but they remain entangled and pull together around the pencil. The plastic is prevented from leaking as long as the pencil remains in place.