Flubber

Procedure:

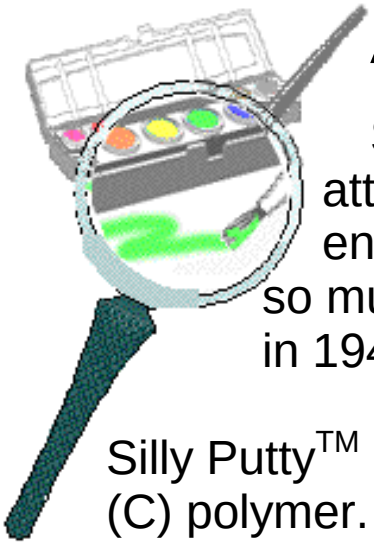
1. Always wear safety goggles.
2. Rinse the spoons and beaker in the sink.
3. Carefully fill the large metal spoon with glue solution. Pour the glue into the beaker.

   (Wipe up any glue spills with a damp paper towel.)
4. Carefully fill the small plastic spoon with sodium borate ($Na_2B_4O_7$) solution. Pour it into the beaker and stir it with a stick. You have made Flubber!
5. Try the following tests:
   - Break it apart quickly, then stretch it very slowly.
   - Bounce it gently.

   How does Flubber behave?
6. Put the Flubber into the funnel. Wash the beaker, the stick, the spoons, and your hands in the sink.

   How does Flubber compare to Silly Putty™?
7. Take a piece of the Silly Putty™ and break it, drop it, and stretch it like you did with the Flubber. How does it compare to Flubber?
8. Return the Silly Putty™ to the container.

What makes Silly Putty™ stretch, break, and bounce?



A Closer Look:

Silly Putty™ was discovered in 1943, during attempts to create synthetic rubber. A practical engineering application was not found, but it was so much fun to play with that it was marketed as a toy in 1949. Flubber is a similar compound.

Silly Putty™ is a silicon (Si) polymer. Flubber is a carbon (C) polymer. A polymer is a compound made of small molecules linked together in long chains.

These polymers have the properties of both a liquid and a solid. They flow like a liquid or can be stretched slowly. This is because the molecular chains are loosely arranged and can slide past each other. If pulled quickly, the molecular chains break away from each other instead of sliding.

The zig-zag shape of the molecules allows the putty and the flubber to bounce like a spring.

Flubber may *not* be taken from the Chemistry Lab.
Ask for a recipe to make Flubber at home!