

Needle Through a Balloon

Concept: To show the characteristics of polymers, using the balloon as an example of large polymer chains.

Materials:

Two Balloons

One Skewers or sharpened piece of coat hanger or sharpened knitting needle

Cooking Oil

Q-tip

Directions:

Inflate both balloons and tie them off. Do not blow them up too big. Use one balloon for first part but keep the other one on the side. Dip the tip of one skewer in cooking oil and use a q-tip to spread oil up and down the skewer. Using a gentle twisting motion push the skewer into the nipple end of the balloon (the rubber is thickest here). Keep twisting the skewer until it comes out the tied end. If possible use yellow or clear balloons. The students can see the skewer going in and so can you. After the skewer comes out, show students that it went all the way through. Then pick up the second balloon and skewer. Pierce the other balloon on its side and the balloon will pop. Note: if two skewers are not available, you can use one. The balloon might loose a little air when you take the skewer out to pierce the side.

Introduction: How many of you have ever popped a balloon? It doesn't take much to pop it; a needle or something sharp does the trick. Well, today I am going to show you a way to get a sharp object through a balloon without popping it.

Explanation: The word poly- means many of something. A polymer means molecules with many atoms. A balloon is made up of lots of polymer chains. These polymer rubber chains are may exist isn random loose clups in the unstretched state. The reason I was able to get the skewer through the balloon had to do with where I put it in. At the nipple end of the balloon, there is lots of rubber and therefore many, many polymer chains - still loosely coiled. These chains are very close together. They can be pierced without popping the balloon because the the chains can still be stretched. This is because they allow the skewer in between the chains without breaking the chains or the bonds that connect them. But on the sides of the balloon, these chains are stretched almost to their limit and very far apart. The piercing is too much for the stretched chains and they break apart., and the balloon pops.

Safety Precautions: Don't pop balloons near children faces.

Waste Disposal: Throw balloons away and wash off skewer cleanly.