



Glass Fixer-Upper

Getting Ready

What if you could fix glass with a new product called *Glass Fixer-Upper*?

Stuff to Make it Happen (Materials)

“*Glass Fixer-Upper*” liquid* large wide container* unbroken test tube
broken test tube* long handled tongs*

Making it Happen *(Demonstration Only!!!)*

1. Tell the kids this “*Glass Fixer-Upper*” can fix broken glass!
2. Show the kids the broken test tube you prepared. Carefully pour these pieces into the oil. *Be careful around broken glass, it doesn't even like teacher's fingers!*
3. Observe the broken glass seems to “dissolve” in the “*Glass Fixer-Upper*”?
4. Fish around dramatically with the test tube holder or the long handled tongs and proudly display the “fixed” test tube. Have a second unbroken test tube hidden, encourage them to ask for a repeat performance. Now show them what is going on.

Understanding the Science

Nah, it didn't really **Dissolve** the glass and reassemble it, did it? The broken glass seemed to disappear because the “fixing” liquid is really just mineral oil. Mineral oil lets **Light** through it just about as well as glass does. When light goes through materials it slows down, and this speed change causes it to bend. The bending of light caused by this speed change is called **Refraction**. This amount of bending has a math measurement attached to it called the **Index of Refraction**. The mineral oil and glass have about the same index of refraction, meaning the light is bent about the same amount. The more light is refracted, the more we can see an object in a liquid. Since the light was bent the same amount, you couldn't see the whole and unbroken test tube very well in the bottom! Isn't this en**LIGHT**ening?? Don't get all **BENT** out of shape at the answer!!

Let's Check the View!

(Questions and Assessments)

1. Look very closely into the container of mineral oil, you can just barely see the broken glass. Why couldn't you see it very well earlier?

