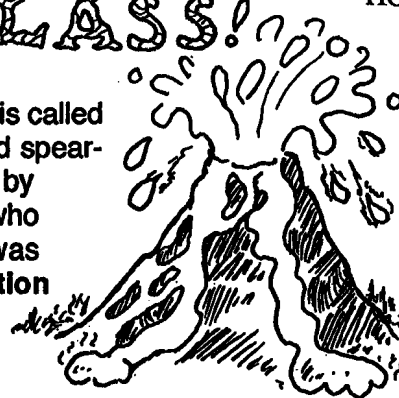


# From SAND to GLASS!

HO 20

Nature made the first glass in volcanoes. This volcanic glass is called **obsidian**. Ancient man used obsidian to make arrow tips and spearheads. It is believed that man discovered how to make glass by accident. A story told 2,000 years ago tells of hungry sailors who used **soda ash** to hold their kettle over a fire. When the fire was out, they discovered that the heat from the fire caused a **reaction** between the soda ash and the sand, and glass was formed. We don't know if the story is true, but we do know glass is made from heating sand with soda ash or other **chemicals**.



Different chemicals make different kinds and colors of glass, depending on its use. Glass is used for mirrors, eyeglasses, **magnifying lenses**, decoration, dishes and many other items.



The mixture for glass must be heated in clay pots or **platinum-lined tanks**, because the fire is too hot for iron pots. Glass items can be made several ways. Glass blowing is the oldest and most difficult, used mostly for decoration. When casting, melted glass is poured into a mold, or it can be pressed into a mold. It can be drawn out of the furnace in a tube while air blows a hollow center down the tube. It can also be rolled into a sheet between two rollers. The good news is that glass is fireproof, waterproof, and can't be destroyed by insects or rodents. The bad news is that glass can break!

Glass makers have continually made glass better. Adding boron has made it stronger when heated for oven dishes. Adding a layer of plastic between two pieces of glass has made it shatterproof for cars. Putting a layer of air between two sheets of glass has made better window insulation. A thin thread of glass can be woven into fabric. Photo sensitive glass is used in printing and reproducing processes. It can be used for electrical or heating insulation. Fiber optic glass and laser glass are the newest scientific discoveries. An art as well as a science, glass will continue to be studied for new and better uses.

Glass is made from sand, and sand is not an easily renewable resource. Therefore, we must protect our limited supply of sand. People must work to find ways of replacing the use of glass with items made from manufacturing methods that do not involve the use of sand.



**On the back of this paper, write your answers to the following questions.**

1. What natural resource is the basic ingredient of glass?
2. What is most likely to happen if glass is made in an iron pot?
3. In what way does glass exist in a natural state?
4. List as many items made of glass as you can think of.
5. Next to each item you listed for question 4, list what you would use if there were no such thing as glass. For example, a glass flower vase could be made of metal.