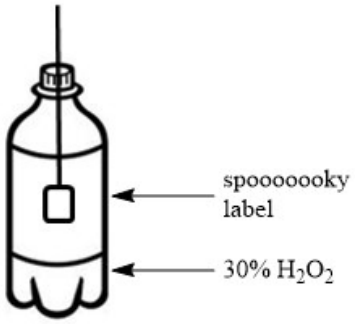
Genie in a Bottle

No need for rubbing

Chemicals and Equipment Needed

- 30% H_2O_2 – **K3**
- MnO_2 (small jar) – **F3**
- Empty 2L soda pop bottle – **A1**
- Tea bag – **L3**
- 50-mL graduated cylinder – **Q3**
- Stopper (size 3) – **U3**
- Microspatula – **U1**
- Gloves – **U2**



Hazards

- 30% H_2O_2 is a concentrated acid and can cause chemical burns and may dissolve or harm certain fabrics. If skin exposure occurs, flush area with large quantities of water. Wear goggles and gloves for preparation and presentation. A lab coat is recommended as well.

Preparation

- Cut slit in side of tea bag and dump out tea. Put a small amount (~¼-½ of a microspatula) of MnO_2 into the tea bag.
- Wearing gloves, measure out 40 mL 30% H_2O_2 and pour into the soda bottle.
- Pull the tag off of the tea bag and suspend it above the peroxide (the label should hide the bag from students' view). Secure by wedging the string in the opening of the bottle with the rubber stopper
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Presentation

- When you are ready for the ghosts to appear, remove the stopper so the bag of MnO_2 falls into the H_2O_2, catalyzing the release of oxygen and steam. It's a pretty vigorous reaction, so step back from the pop bottle after removing the stopper.
- Ghosts and goblins of years gone by will rise from the bottle and flow into the room. The reaction is very exothermic, causing the bottle to shrink "when the ghosts leave." This nice side effect is caused by a heat induced rearrangement of the bonds in the plastic bottle

$$2\ H_2O_2 \rightarrow 2\ H_2O + O_2 + \text{heat}$$

Clean-Up

- Remove the tea bag and put in the solid white waste container. Any liquid left should be rinsed into regular white waste. Recycle the bottle

NOTES: You really don't need much MnO_2, since it's acting as a catalyst.