

# Engineering Family Guide



## Build at Home: Daylight in a Bottle

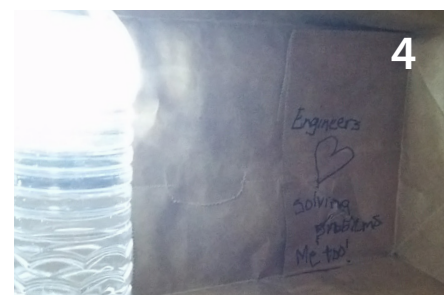
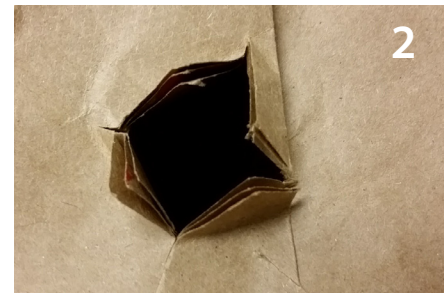
Explore how a water bottle can help you read a secret message from a friend, or light up a room with free, clean energy from the Sun.

### You'll need:

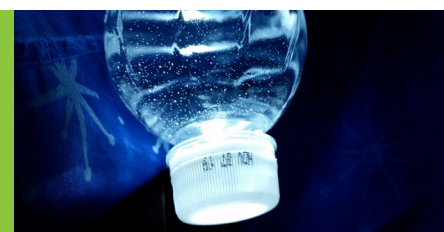
- Large paper grocery bag
- Scissors
- Flashlight
- Clear plastic bottle, filled with water and tightly capped
- Missing an item? Use your engineering creativity to come up with a replacement!

### What to do:

1. Open the grocery bag and have a friend make a secret message or drawing on the bottom, in a corner.
2. Cut a small hole in the bottom of the bag – at the opposite corner.
3. Find a dark location. Shine your flashlight into the bag and look inside the bag for your friend's secret message or drawing.
4. Next, try using the water bottle. Put the water bottle inside the bag and shine the flashlight through it. Is it easier to see your friend's secret message or drawing?
5. Use your water bottle to capture daylight. See ideas below:
  - a) Outside, build a fort out of large cardboard boxes and use your water bottle to light up the inside. With help from an adult, cut a 2 ½ inch hole in the "ceiling" of a cardboard box and put the water bottle half in/half out of the hole.
  - b) Put your water bottle on a window sill in a room with darkening curtains. Some light will come in through the bottle, but the curtains will keep out the heat and cold.



The water bottle solves the problem of glare from the flashlight. The water scatters, or spreads, the light all over the inside of the bag so that you can see better.



# Engineering Family Guide



## You Are the Most Important Role Model Your Children Have!

- Nurture your child’s curiosity.
- Grow your child’s ability to persist and maintain a “can do” attitude.
- Explore engineering with your child to help them build life skills and to seek out new learning opportunities...and eventually, diverse career possibilities.
- Develop your child’s critical thinking and problem-solving skills by doing hands-on activities or household improvement projects together – and iterating on your solutions to make them even better!

## What You Can Do: Watch, Play, and Learn Online!

### Dream Big: Engineering Our World

<http://www.dreambigfilm.com>

Engineers help shape our future. Explore how engineers are working to capture clean energy from the Sun, ocean tides, wind, and more to power our homes and cars. Watch video clips about how engineers are using new technologies and try more hands-on activities from this website.

### DiscoverE

<http://www.discovere.org>

This website has engineering activities, as well as career profiles, career facts, and news in the engineering world.

### A Liter of Light

<http://sculptthefuturefoundation.org/portfolio/my-shelter-foundation-global-lighting-project/>

See how families in the Philippines are using recycled plastic bottles to light their homes, thanks to the My Shelter Foundation.

## Engineers and Makers Use Daylight to Light Up Building in Real Life:

- The My Shelter Foundation installs water-filled recycled bottles inside the roofs of homes in the Philippines. The families can’t afford electric lights, but the water bottles give them free, clean light inside.
- Engineers design structures to let in as much natural light as possible. This is called “daylighting.”



A product of the Science-Technology Activities and Resources for Libraries (STAR Net) program. Visit our website at [www.starnetlibraries.org](http://www.starnetlibraries.org) for more information on our educational programs. December 2017



This material is based upon work supported by the National Science Foundation under Grant No. DRL-1657593. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.