



## TAKE AND MAKE: Homeschool: Hurricane Building Challenge (Ages 7-12)

Your challenge: construct a house that can stand up to high hurricane-like winds *and* the heavy rains that come with a hurricane.

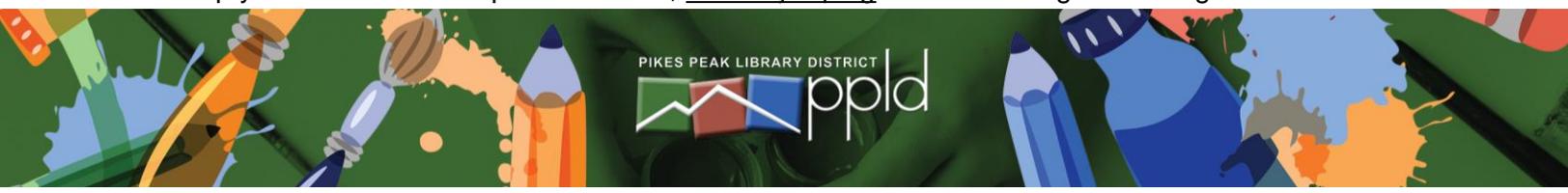
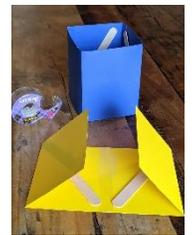
Find the video at: <https://ppld.librarymarket.com/homeschool-take-shelter>

**Supplies Included:** 2 half sheets of cardstock; 4 craft sticks; 1 gable roof template; 1 hip roof template; 1 sheet of aluminum foil; 1 “plate of fortune cookies” (photo on cardstock)

**Supplies from Home:** glue; scotch tape; packing tape; shallow jar lid; sheet for foundation (cardboard, foamboard, or cardstock); flat bake sheet (optional); leaf blower, electric fan, or hair dryer; squirt bottle or watering can with sprinkle spout; baking rack (or similar object); plastic dishpan tub (optional)

### Directions

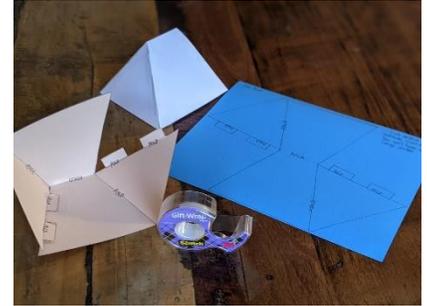
1. Carefully fold both half sheets of cardstock in half, creasing the middle. Open both pieces and place them end-to-end, fit snugly without overlapping, and tape together on both sides. **\*Decorate your house walls now if desired (doors, windows, etc.). Only one side of walls will show.**
2. Place a craft stick diagonally across each section (on the side without any drawing) and glue or tape in place. Alternate the diagonal of each stick to get a pattern that looks like mountains. \*This framework will make your house sturdy.
3. Fold the end pieces toward the center, fit snugly without overlapping, and tape together on both sides. Open the flat shape and reinforce all crease lines to reveal the walls of your house.
4. **GABLE roof:** Cut out the rectangular “roof” piece and fold it in half, creasing in the middle. Open it flat, center it on the foil, then fold over the excess foil and tape the edges in place. Now carefully refold the roof using the crease already created. Be sure that the foil is on the topside of your roof.
5. Cut out the 2 gable ends with tabs. Fold each tab under on the fold lines.
6. With one side of your roof lying on a flat surface and the other side sticking up, place one side of a gable end piece along the flat surface, about ½” in from the outside edge of the roof, with the center point of the piece meeting the center crease. The folded tabs should be facing to the inside of the roof. Secure the tabs with 2 layers of tape. Rock your roof from one side to the other to secure the folded tabs on the other half of the gable piece in the same way. Repeat this procedure, using the second gable piece, on the other end of the roof.
7. Slip your roof onto the top of the house, securely taping the bottom edge of each gable to the house.





8. Similarly, cut out and construct the hip roof. It goes together with tabs in the same way except you won't need to add any foil. This roof will only need to survive wind forces. Use if for Trial 2!

Now, you're ready to secure your house in place on its cardboard, etc. foundation. Use plenty of tape. (The house *and* foundation can be secured to a flat baking sheet for more stability.)



**YOUR CHALLENGE:** Test your roof designs and construction under "hurricane force" winds and rains.



**To test for high winds:**

If you use a desk or box fan, you might test indoors. If you use a leaf blower ... outdoors! Both methods should be supervised by an adult.



1. Secure your house/foundation about 20 feet from your wind source. \*Adjust the wind source and house/roof so that they are aligned. If using a leaf blower, you/an adult can hold the blower at the appropriate level as you approach the house with the increasing "wind."

\*Be sure to secure your foundation/baking sheet to a flat surface. You can hold down the sides of the foundation/baking sheet using a couple of heavy rocks or books, or you can ask for some help to hold the foundation edges down through the high winds.

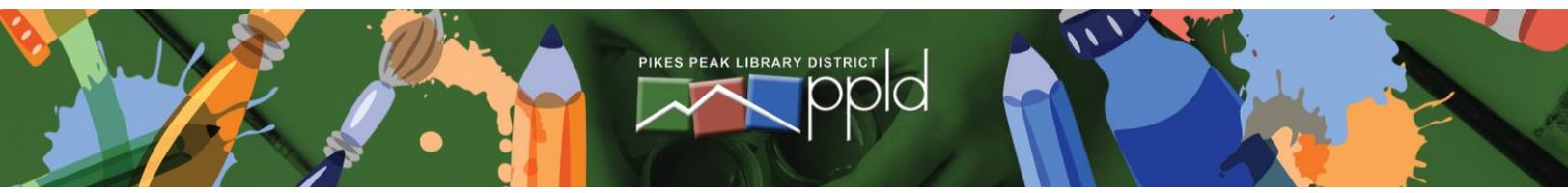
**Hurricane Categories:**

To find out how strong your house is, begin testing at 20 feet; if your roof and house remain intact, they have survived a Category 1 storm.

- 15 feet ... Category 2
- 10 feet ... Category 3
- 5 feet ... Category 4
- Any closer ... Category 5!

The testing is complete when your house/roof comes apart/is blown away OR remains intact!

\*If you made a hip roof, rebuild, adding this roof with new angles. Test again. Which roof stood up to the highest winds? If you lived in a hurricane area, which kind of roof would you like to be under?





**To test for heavy rains:**

1. Replace the foil-covered gable roof on your house structure. Be sure to re-tape it securely. Place your house somewhere you will be able to spray or sprinkle lots of water over the roof. Remember to secure the jar lid with the fortune cookies taped to it, centered under the house, before the test begins.

\*Suggestion: Place a baking rack in a plastic tub or sink, setting the house (over the jar lid/cookies) on top of the rack. The idea is to keep the house/cookies out of the accumulating water below. Remember, you're testing the roof for leaks!

2. It's time to heavily spritz/sprinkle away on top of the roof, simulating a heavy rain. Wet cookies ... LEAKS! Dry cookies ... SUCCESS!

How did your house and roof stand up to the tests? How could you improve your structure so that it would withstand higher winds and lots of rain?

