

# HURRICANE HOUSE CHALLENGE

## PURPOSE

Students design, build, and test a house to withstand high winds in a hurricane simulation.

## MATERIALS

For planning (teacher provides)

- 3 sheets of white paper
- pencil
- ruler
- calculator

For construction

- 4 sheets of construction paper, 8 ½" X 11"
- 4 straws
- glue stick
- ½" cellophane tape
- Styrofoam plate

For testing (teacher provides)

- A wind source— leaf blower, hair dryer, very strong fan, etc. (A leaf blower will give you a Force 5 hurricane! It is recommended you use blower in an open gym or outside, not your class! ☺)

## PROCEDURE

### PLANNING

1. You must plan your house on paper before you begin construction. Draw a top and side view of the house (2 sheets of white paper). Your house can be any shape.
2. (Teachers: optional, for advanced students or if you want to add math to activity) Your home must have 2,000 cubic centimeters of space inside. Calculate the volume of the house after you create your plan on paper, and then adjust the dimensions of your design to meet this requirement.

Formulas you may need are below:

- Formula for a rectangular solid or cylinder: Area of base x height.
  - Formula for a cone or pyramid:  $(1/3) \times 3.14 \times r^2 \times h$
  - Formula for a sphere:  $(4/3) \times 3.14 \times r^3$
3. (Teachers: optional) Carefully record all of your calculations on one of the three sheets of white paper. (They will be reviewed as part of the competition.)
  4. After you have created your house plan on paper, add notes that describe those features you feel will make your house better able to resist a strong wind and what materials you will use for each part.

### CONSTRUCTION

1. Construct your house using just the materials you have been provided.
2. Follow your plan.
3. Make sure your house is securely fastened to the Styrofoam "platform." (the plate)
4. Remember, the wind will blow on your house from all sides, just like a hurricane would as it passes by.

### THE CHALLENGE!

1. To test each house you should have a stopwatch and a significant source of wind.
2. Time how long each house stands at each distance of the wind source, and wind direction. Enter the time in each column. A house passes the test if it can stand for 5 seconds for each wind distance and direction. RECORD YOUR DATA IN YOUR DATA TABLE.
3. Start with the wind source at 10' (especially if it is a leaf blower). Move it gradually closer to the house at 2-foot intervals.
4. To change wind direction, simply turn the Styrofoam base. You may hold the Styrofoam base in place with your hands, but don't get in the way of the wind. (Optionally, duct tape the plates down to a desk or the floor and move wind source.)
5. If you are competing, the house that stands the longest with the closest wind source will be the winner!