

COSEE-West presents:

Make your own weather station

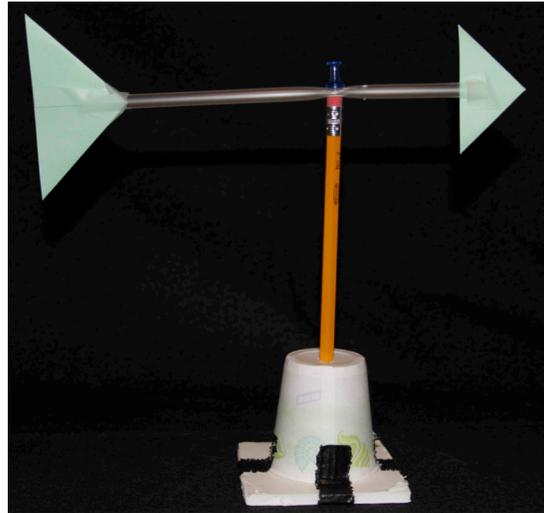
Building a Wind Vane (also called Weather Vane)

Tools needed:

sharpened pencil
scissors
razor blade/exacto knife to cut foam board

Consumable materials needed per vane:

1 3oz. Dixie cup
1 unsharpened pencil with eraser
1 straw (not bendable)
1 push pin/thumb tack
small amount of cardstock to make two different size triangles
foam board for base (at least 3" x 3")
tape (scotch tape and/or masking tape)



1. Cut a piece of foam board for the base of your weather vane – at least 3" x 3". It needs to be large enough to mount your Dixie cup (upside down) onto it and write the four directions on the foam board around the mounted cup. A larger base will be more stable, but you can also tape the bottom of the base to a flat surface for more stability.
2. Take the sharpened pencil and punch a hole through the bottom, center of the Dixie cup and then punch a hole in the center of your foam board. Twist the pencil until it turns freely in each hole.
3. Put a piece of tape across the bottom of the hole in foam board so that you have a depression (instead of a hole) for your unsharpened pencil to stand in.
4. Place the cup upside down on top of the foam board, put the unsharpened pencil through the hole in the bottom of the cup and into the depression in the foam board. Make sure your pencil is perpendicular to the foam board in all directions and tape the cup to the foam board. Make sure your pencil turns freely and the eraser side is facing up.
5. Write the four cardinal directions (N, E, S, W or North, East, South, West) on the foam board around the base of the cup.
6. Cut two triangles of different sizes from the cardstock. The smaller one will be the front of your weather vane and the larger will be the back of your weather vane. Right isosceles triangles work well.
7. To attach the 2 cardstock triangles to the straw, cut a slit on each end of the straw – a slightly larger slit to fit the larger triangle at the back. You want both your triangles to be in the same plane, so you must cut your slits in the same plane! Slide your triangles into the slits in the straw, the smaller one should point away from the straw and the larger one should point toward the straw. Tape the triangles to the straw.

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8. Find the middle of your straw, then move about 1” towards the smaller triangle/front. In the same plane as the two triangles, poke the push pin through the straw. Then push the push pin into the eraser end of the unsharpened pencil.
9. Use a compass to make sure the cardinal directions on the base of your wind vane are facing the correct directions. You may want to tape the base to a flat, level surface once aligned properly. The wind should catch the cardstock arrows on your straw, the pencil should twist freely in the cup and the foam board base, and, ideally, your wind vane will point in the direction the wind is coming from. That is the direction you would report for wind direction, e.g. northeasterly wind or wind from the northeast.

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Building an Anemometer

Tools needed:

sharpened pencil or pen
scissors
razor blade/exacto knife to cut foam board
stop watch or watch

Consumable materials needed per anemometer:

6 3oz. Dixie cups
1 unsharpened pencil
2 straws (not bendable)
1 push pin/thumb tack
4 paperclips
foam board for base (at least 3" x 3")
tape (scotch tape and/or masking tape)



1. Cut a piece of foam board for the base of your anemometer – at least 3" x 3". It needs to be large enough to mount your cup (upside down) onto it. A larger base will be more stable, but you can also tape the bottom of the base to a flat surface for more stability.
2. Take the sharpened pencil and punch a hole through the bottom, center of the Dixie cup and then punch a hole in the center of your foam board. Twist the pencil until it turns freely in each hole.
3. Put a piece of tape across the bottom of the hole in foam board so that you have a depression (instead of a hole) for your unsharpened pencil to stand in.
4. Place the cup upside down on top of the foam board, put the unsharpened pencil through the hole in the bottom of the cup and into the depression in the foam board. Make sure your pencil is perpendicular to the foam board in all directions and tape the cup to the foam board. Make sure your pencil turns freely and the eraser side is facing up.
5. Take 4 of the 5 remaining cups and punch one hole in each cup. The hole should be punched in the side of the cup, about half way between the rim and base of the cup.
6. Take the last cup and you will punch 5 holes in it. To help you line up the holes, find the center of the bottom of the cup and draw a line through it across the entire bottom of the cup. Then draw a second line that is perpendicular to the first, also through the center of the cup, so that you have four equal pie slices. Punch one hole in the bottom, center of the cup (where the perpendicular lines intersect). The other four holes will be through the side of the cup, but they

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need to be equally spread around the cup, so you can extend the lines you just made up the side of the cup for a short distance. Two of the holes (directly across from each other) should be made in the side of the cup about one quarter of an inch from the bottom of the cup. The other two holes, also across from each other (but in a line perpendicular to the other two) should be half an inch from the bottom of the cup.

7. One straw should be placed through each pair of holes and centered.
8. Attach each of four cups to the end of each straw using paperclips. Put the end of one of the straws through the single hole in the cup, fold the end of the straw about 1" and paperclip to the edge of the cup opposite the hole. Turn the cup to face directly to the left or the right (not up or down). Put the other end of that straw into another cup. Bend the straw in the exact **opposite** direction that you bent the straw on the other side and paperclip to the opposite side of the cup. Repeat this with the other straw and other two cups. Make sure that when you look at all the cups from above, they all face clockwise or counterclockwise (see photos below).
9. With the center cup facing up, put the push pin through both straws where they intersect and then push into the top of the eraser of the pencil.
10. You may want to tape the base to a flat, level surface. The wind should catch the Dixie cups and turn clockwise or counterclockwise and the pencil should twist freely in the base cup and the foam board base.
11. Mark one of the cups (you can color it). Count how many times the colored cup goes around in one minute. Calculate the circumference of the circle created by the spinning cups. This will help you convert revolutions per minute to miles per hour or kilometers per hour.



top view



side view, close up

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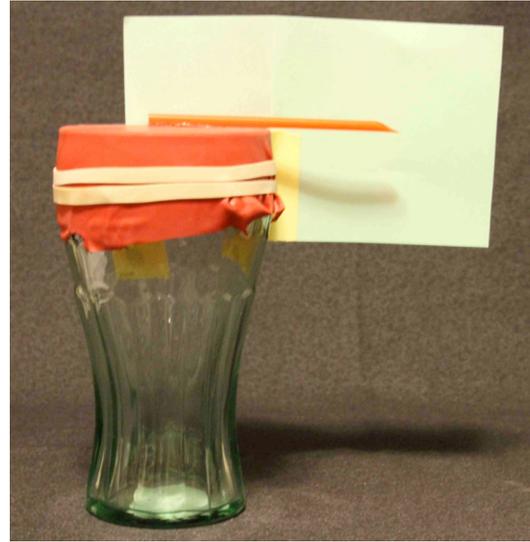
Building a Barometer

Tools needed:

scissors
white glue

Consumable materials needed per barometer:

1 inflexible container with a single, wide opening, such as a coffee can, ceramic mug, glass jar, etc.
half a straw (not bendable) or coffee stirrer (you may want to cut coffee stirrer shorter)
1 balloon or latex glove
1 or 2 rubberbands
piece of cardstock that is longer than your straw by about 2 or 3 inches and about 3 inches tall (3" x 5" index card may work)
tape (scotch tape and/or masking tape)



1. If your container has a rough edge, cover it with tape, so that it doesn't cut your balloon or latex glove. Seal the opening of the container by stretching the latex glove or balloon over the opening. Make sure the balloon is flat across the top of the container. Use a rubberband or two to make sure the balloon or glove stays put. You will probably have to cut off the filler hole (and maybe more of the balloon) to be able to stretch the balloon over the opening.
2. Cut a point on end of the straw or coffee stirrer. Glue the other end of it to the center of the balloon/latex glove by putting a drop of white glue in the center. The pointed end should stick off of the container.
3. Tape the cardstock or 3" x 5" index card to the side of the container. The 3" side of the card should be the height of the card and about half should be above the rim and about half below the rim of the container. The longer side of the card should stick off the container to one side so that when you look at the straw or coffee stirrer from the side, the card is behind it. You will create a relative scale on the card by writing on the card and using the pointed end of the straw/coffee stirrer as your indicator.
4. The top of the card at the end of the pointer should be labeled high and the bottom of the card should be labeled low. As the pressure on the outside of the container increases, the balloon will cave in a bit, making the pointed end of the straw/coffee stirrer point upward. As the pressure on the outside of the container decreases, the balloon will bulge outward, making the pointer point downward. You

can mark the index card where the pointer indicates at various points in time over a period of the day or week.

