

Prep Instructions

Snowflakes

The following items will be required for the prep of this activity:

- alum powder
- small plastic container
- hot water
- glass stir stick or plastic spoon
- tablespoon
- shallow plastic container

Step 1

Fill the plastic container with 1/2 cup (125 mL) of hot water.

Step 2

To ensure the formation of crystals, a supersaturated alum solution must be made. Add alum to the hot water 1/2 tablespoon at a time, while continuously stirring, until the hot water can no longer dissolve the crystals. Some alum should begin to settle on the bottom of the beaker. Approximately 2 1/2 tablespoons of alum will be added in total.

Step 3

Let the solution cool to room temperature. Some crystals may form at the bottom of the beaker. These are the seed crystals.

Step 4

Place a small amount of water around the inside edge of the plastic container and place it in a freezer (**Figure 1**). It will take a minimum of 24 hours for the water to freeze into ice. An alternative is to place the plastic container on an ice bath or on an ice pack in a cooler.



Figure 1



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The Stormy Day

The following items will be required for the prep of this activity:

- blue food colouring
- 4 resealable sandwich bags
- water

Step 1

Fill the bags with water. Add a few drops of blue food colouring to each bag.

Step 2

Shake and swirl the bags so that air bubbles will form in the ice slabs. The air bubbles help create a site along which the ice can crack. Place the bags in a freezer and let the ice freeze overnight.

A Windy City

Part I - Making the Pinwheels

The following items will be required for the prep of this part of the activity:

- sheet of coloured paper
- scissors
- glue stick
- 4 paper clips
- 4 bendable straws
- push pin

Step 1

Using the pinwheel template on page 5, cut along all four of the diagonal lines, while ensuring not to cut past the marked lines.

Step 2

Push the pin through the large dot in the middle of the pinwheel and through the smaller dots in each of the corners of the pinwheel (**Figure 2**).



Figure 2

Step 3

Take the pin out. Glue one of the corners to the centre dot, making sure the hole in the centre lines up with the hole on the corner. Do this for all four corners. Push the pin through the hole in the middle of the pinwheel in order to clean it up for the next step.

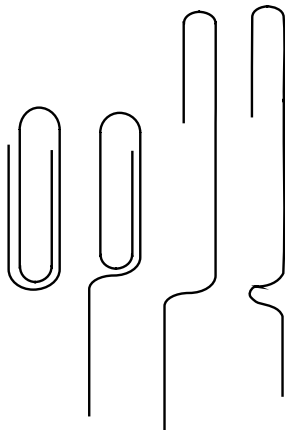


Figure 3

Step 4

Remove the pin. Unfold the paper clip as shown in **figure 3**. The dip in the paper clip allows the pinwheel to spin in the presence of wind, while preventing the pinwheel from falling off the back of the paper clip. The bend in the paperclip on the other end is inserted into a straw.

Step 5

Insert the paper clip into the pinwheel so that the pinwheel sits in the dip of the paper clip. The dip should keep the pinwheel from sliding off in the wind.

Step 6

Bend the straw so that a 90 degree angle is produced. Following **figure 4**, insert the bent end of the paperclip into the straw.

Step 7

Apply wind from a small fan onto the pinwheel to ensure that it will spin freely.

Step 8

Repeat Steps 1-7 to construct the other three windmills.

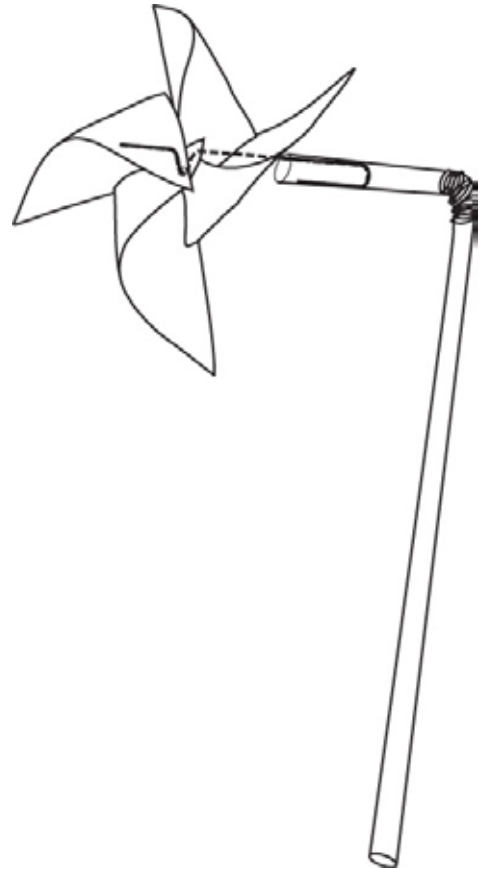
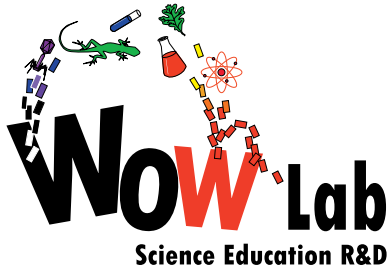


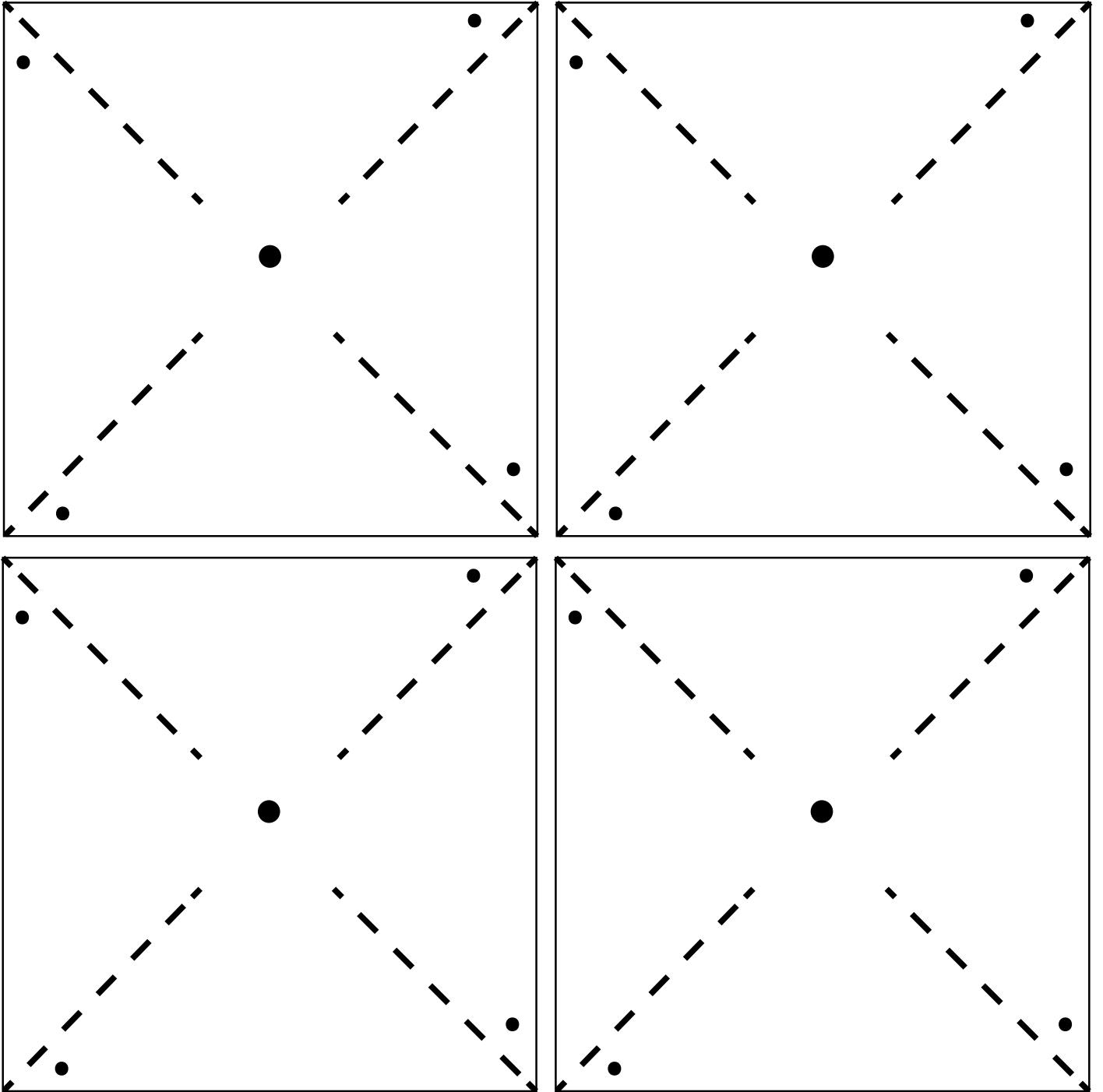
Figure 4



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Part II - A City of Buildings

The following items will be required for the prep of this part of this activity:

- 13 clean 2 L milk or juice cartons
- scissors
- glue gun and hot glue
- large cardboard box

Part IIa - The Wind Tunnel

Step 1

Cut the top end off of four cartons (**Figure 5**). Try to make the cut edge as straight as possible.

Step 2

Using a glue gun, glue two upright milk cartons together back-to-back. In **figure 6**, the two red sides demonstrate where the glue needs to be placed so that the two cartons stick together. Repeat this process so that there are two pairs of milk cartons attached to one another (**Figure 7**).

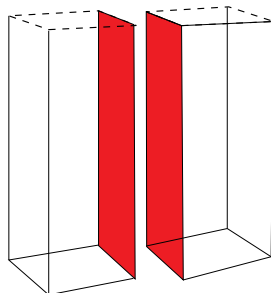


Figure 6

Step 3

Place the two pairs of milk cartons on a table with a small gap between them. Put the structure aside until all of the buildings have been assembled.



Figure 5



Figure 7

Part IIb -The Downwashing Effect

Step 1

Cut the top end off of three of the cartons.

Step 2

Lay two of the cartons horizontally and glue or tape them together along the cut edges, as in **figure 8**.

Step 3

Glue the third carton behind the other two cartons. The taller carton behind the shorter cartons is what causes the downwash effect. Put the structure aside until all of the buildings have been assembled.



Figure 8

Part IIc - The Gap Effect

Step 1

Cut the top end off of three cartons.



Figure 9

Step 2

Cut a rectangular hole through the centre of each of the three cartons.

Step 3

Glue the three cartons together so that they are arranged side by side (**Figure 9**). The final product demonstrates the gap effect of wind. Put the structure aside until all of the buildings have been assembled.

Part IId - The Side-Stream Effect

Step 1

Cut the top end off of three cartons.

Step 2

Lay two of the cartons horizontally and glue or tape them together along the cut edges.

Step 3

Glue or tape the third carton vertically on the end the horizontal cartons, as in **figure 10**. The taller carton beside the row of shorter cartons is what creates the side-stream effect. Put the structure aside until all of the buildings have been assembled.



Figure 10

Part IIe - Assembly of the Overall City

Step 1

Unfold the large cardboard box so it acts as a flat rectangular base on which the other buildings can be glued. Label the corners 1 through 4, as shown in **figure 11**.

Step 2

Place the four separate wind effects on the four corners of the flattened rectangular cardboard box. Place the wind tunnel on corner 3 and the downwash effect on corner 4, with both structures facing South. Similarly, place the gap effect on corner 1 and the side-stream effect on corner 2, with both structures facing North.

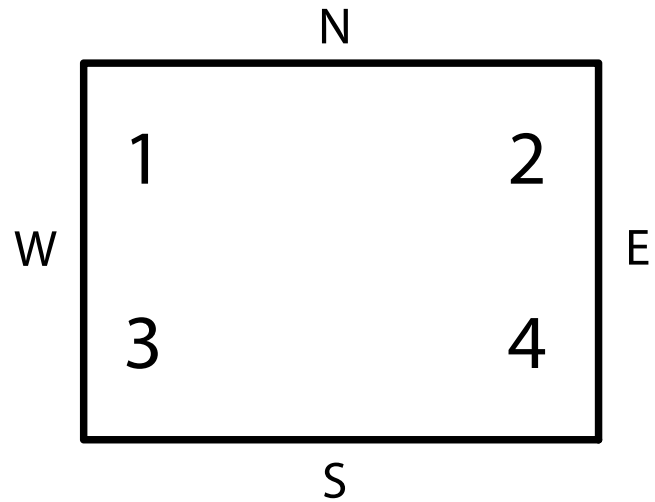


Figure 11



Figure 12

Step 3

Decorate the city or have the students decorate it (**Figure 12**). Trees and toy cars can be added, as well as the pinwheels made in Part I.

Homemade Thermometer

The following items will be required for the prep of this activity:

- rubbing alcohol
- water
- 500 mL plastic bottle
- red food colouring
- drill
- glue gun and hot glue
- long, transparent straw
- 2 straightened-out paper clips

Step 1

Pour equal parts of water and rubbing alcohol into the bottle, filling about 1/8 to 1/4 of the bottle.

Step 2

Add a few drops of red food colouring to the bottle, cap the bottle and mix the solution by swirling it around.

Step 3

Drill a hole in the cap of the bottle. The hole should be close to the size of the straw so that there is not too much empty space for air to escape.

Step 4

Insert the straw through the hole in the bottle cap, but do not let the straw touch the bottom of the bottle.

Step 5

To secure the position of the straw, poke the first paper clip through the straw and balance it on the cap of the bottle. Poke the second paper clip through the straw at a 90 degree angle from the first paper clip. The two perpendicular paperclips should be balancing on the cap of the bottle in an 'X' formation, as shown in **figure 13**.

Step 6

Seal any small openings or holes using the glue gun and hot glue. The hot glue should be placed around the straw to seal it tightly. Let the hot glue dry overnight.

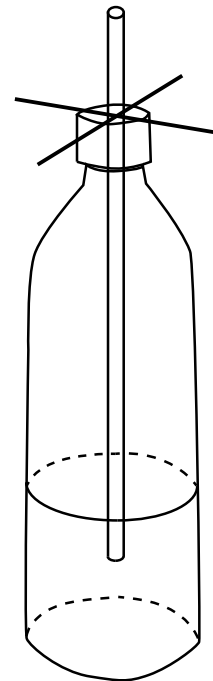
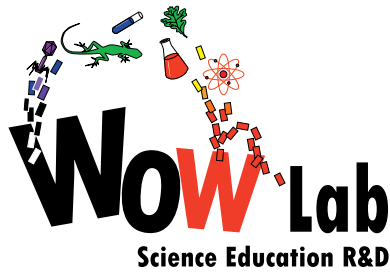


Figure 13



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The Twist

The following items will be required for the prep of this activity:

- water
- 2 plastic bottles (2 L)
- Tornado Tube
- drill
- food colouring or glitter (optional)

Step 1

Cut the plastic rings off of the bottle necks and fill one of the bottles 3/4 full with water. If desired, add food colouring or glitter.

Step 2

Screw the Tornado Tube onto the neck of the water-filled bottle.

Step 3

Screw the empty bottle onto the other end of the Tornado Tube.

Creating Snow

The following items will be required for the prep of this activity:

- diaper
- scissors
- resealable sandwich bag
- old newspaper

Step 1

Place a new diaper on the piece of newspaper. Carefully cut through the inside lining and remove all the cotton-like material (**Figure 14**). Put all the stuffing into a resealable plastic bag.



Figure 14

Step 2

Scoop up any of the polymer that may have spilled onto the paper and pour it into the bag with the stuffing (**Figure 15**). Blow a little air into the bag to make it puff up like a pillow, then seal the bag.



Figure 15

Step 3

Shake the bag for a few minutes to remove the powdery polymer from the stuffing.

Step 4

Carefully remove the stuffing from the bag. The dry polymer should be left in the bag (**Figure 16**).



Figure 16