

WAYFINDER Scientific Inquiry

The following North Carolina State Science Standards are relevant to this Wayfinder:

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| Grade 7 | 1.01, 1.02, 1.04, 1.05 |
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Introduction

Learning to follow the scientific method is important for new scientists. Without careful adherence to the steps of the scientific method, one can not do verifiable science. The more practice that students have, the better they will be able to understand science. This Wayfinder takes you to *Catch the Wind*, our outdoor exploration environment and challenges students to perform an experiment at our Seed Tower. Keep an eye out for other exhibits around the Museum that allow students to experiment and test variables as they explore.

Before your visit

Conduct experiments and explorations in the classroom during which students follow the scientific method:

- Observe and describe the world around you
- Create an hypothesis based on your observations
- Use your hypothesis to make predictions
- Conduct a planned, controlled experiment
- Accept or reject your hypothesis after analyzing data

Review the steps of the scientific method to ensure students' understanding.

Review the meaning of the words: *independent variable*, *dependent variable* and *control*.

Review or discuss for the first time the three different methods of seed dispersal: air, water, animals. Discuss examples of seeds that use each method. For instance, some seeds are closely associated with fruit so they can be dispersed when animals eat and excrete them. Other seeds have hooks that latch on to fur. Water seeds are built to float and seeds that use air can glide, float or flutter as the wind blows. All of these seeds use different mechanisms to detach themselves from their parent plant so they have their own space to grow. Have students begin thinking about how a seed that uses air would be built to best use the wind to its advantage. Brainstorm a few ideas.

During your visit

Visit the seed tower in *Catch the Wind*. Imagine that the tower is the parent plant to the seed that you will be creating.

Observe and describe the world around you

- 1) What method of seed dispersal does this "plant" (the orange tower) use? *Air*.
- 2) Look at the geometric shapes that can be tested at this exhibit (square, triangle, etc.). Do any remind of you of other items (natural or manmade) that use the wind

to get around?

- 3) Looking at the shapes provided at this station, think about how each one may fall and how far from the “parent plant” it may go.
- 4) Discuss as a group what questions you can ask and answer here at the seed tower.

Create a hypothesis and make predictions

- 1) Pick one shape for your experiment. Predict which location for the red “seed pod” will make your seed fall successfully. Make sure to think about what “successful” means to you.

Conduct a controlled experiment

- 1) If you wanted to conduct an experiment that asked how to build a successful seed (based on how far away it lands) what steps might you take to find this out? *If you use the data sheet given, the experiment consists of dropping one geometric shape but moving the “seed pod” around to decide which orientation is the most successful. Students can determine if they will drop their seed with seed pod in the same location three times in a row or if they will move the seed pod location for each drop and conduct the first trials with all seed pod orientations, then their second trials, then their third.*
- 2) What might be the independent variables in this experiment? What might be the dependent? *If you choose to use the data sheet given, the independent variable is the location of the seed pod on the surface of the shape that they choose. The dependent variable is based on student’s definition of successful (e.g. distance from tower, slowest fall, etc.).*
- 3) What would you have to do to make sure this experiment is controlled? *If you choose to use the data sheet given, each seed/seed pod combination should be dropped the same number of times each. If the wind is variable, each combination should be dropped for its first trial to try to get drops at the same wind speed. Only one shape should be used for this experiment so that they are only testing location of the seed pod and not seed shape.*
- 4) If you choose, use the data sheet below. Have students drop and observe how each of the seed shape/seed pod combinations fall. Note the location where each falls and the manner in which it falls. Drop each combination numerous times to make multiple observations. Each seed combination should be dropped the same number of times.

Accept or reject your hypothesis

- 1) After conducting your experiment think about these following questions:
 - Did your predicted seed do as well as you thought? Why? Why not?
 - Was there a particular seed location that seemed to be the most successful or were they all the same?
 - If you determined a particular location to be most successful, which orientation was best? Why do you think it was the most successful?

After your visit

Discuss the results of the experiments. How many students made a correct prediction? How many students had to reject their hypotheses? Is it bad to make a wrong prediction? Why or why not?

Share which seed pod location they found to be the best for each geometric shape that was used. Discuss what their definitions of a “successful seed” were.

Have students draw the most successful seed that they can imagine. They should be able to include a diagram that locates the seed itself and all other features that may help it disperse the best. How does each feature help the seed disperse?


Please see Seed Tower Activity on next page... Seed Tower Activity

My definition of a “successful” seed:

My hypothesis:

In the box, draw your chosen shape and the position of the “seed pod” that you think will be the most successful.



| <p>Draw your seed shape with the location of the "seed pod"</p> <p>Example</p>  | <p>Tri al #</p> | <p>Describe the fall:</p> <p>How many steps from the base of the tower did it go (use the same person for each measurement)?</p> <p>Did it catch the wind or fall straight down?</p> <p>What other things did you observe?</p> | <p>Give this fall a letter grade (A-, C, D+, etc.)</p> |
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