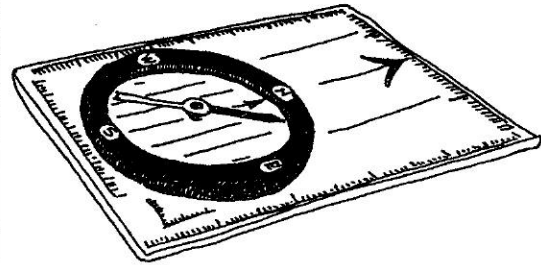


Which Way is North?

Key Concepts

1. An hypothesis is a testable statement which may be verified or rejected through carefully designed and executed experiments.
2. Experiments may be designed to test the validity of commonly held ideas.
3. Forest trees at Seal Rock Campground provide microhabitats for a rich assortment of epiphytes.



In "Which Way is North?" students design and conduct an investigation to test a hypothesis based on the popular saying, "You can tell which way is north by looking at the moss growing on the tree trunks".

A glance around Seal Rock Campground is all it takes to see that the Pacific northwest is a great spot for growing trees. Many factors account for our remarkable forests:

- **Light** - oddly enough, the consistent even light found here is better for tree growth than spurts of intense sunlight.
- **Rain** - Conifers grow especially well on 35-50 inches of rain/year. Rainfall at Seal Rock Campground averages about 50 inches per year.
- **Temperature** - Our temperatures are kept moderate, without long freezing spells or intense heat, thanks to the waters of the Pacific Ocean, Puget Sound and Hood Canal.
- **Nutrients** - In spite of the fact that forest soils are not particularly fertile, nutrients from decaying vegetation act as a time release fertilizer, providing necessary nutrients over a long period of time. Alder trees and lichens, ferns and mosses growing on forest trees also provide nutrients as they convert nitrogen in the air into a form usable by plants.

These factors also account for remarkable moss growth which tends to confound the common wisdom regarding moss growing on the north side of tree trunks.

Materials

- campsite map
- notebook with a firm back
- pencil
- 10 meter long cord (marked in 1 meter intervals with the first meter also marked in decimeter intervals)
- "Which way is North?" student activity sheets
- compass

Teaching Hints

In "Which way is North?" students are posed a problem: to design and conduct an investigation to test the following hypothesis:

"Moss growth on the north facing side of tree trunks in Seal Rock Campground will be thicker than moss growth on the south facing side of the same trunks."

Some students may find the task intimidating. The questions in the student text are designed to coax them along. Provide whatever additional prompting is required.

Ideally, each team will have a compass to use as they collect data. If compasses are in short supply, it is possible for students to use the north arrow on their campground maps provided they orient themselves at each sampling spot on the trail.

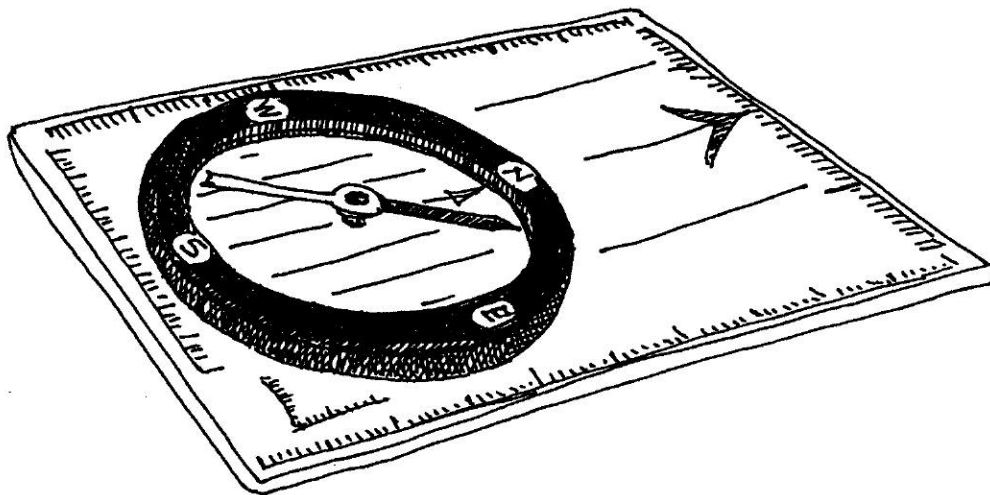
Essential Academic Learning Requirements in Science

1. 2. The student knows and applies the skills and processes of science and technology (2.1, 2.2)
2. 3. The student understands the nature and contexts of science and technology. (3.1, 3.2)

Answer Key

Expect to get a variety of experimental designs since there are many satisfactory designs that could provide a test for the hypothesis. Watch for designs that assure random sampling, provide a reasonable sample size, and standardize measurement techniques as you review the designs.

Which Way is North?



People say, "You can tell which way is north by looking at the moss growing on the tree trunks".

Why would someone say such a thing? The theory goes something like this: moss grows best in areas that remain damp. Around here, the south facing part of a tree trunk gets more sun and hence is dryer than the north facing part of the trunk. So, more moss should be found on the north side.

Is this true? Sounds like something we can test. First, let's turn the saying into a testable statement or hypothesis. How about:

"Moss growth on the north facing side of tree trunks in Seal Rock Campground will be thicker than moss growth on the south facing side of the same trunks."

Here are the tools you'll have to construct an investigation to gather data to test your hypothesis:

- campsite map
- notebook with a firm back
- pencil
- 10 meter long cord (marked in 1 meter intervals with the first meter also marked in decimeter intervals)
- compass

You'll find your trees along the Seal Rock Campground Nature Trail. Which trees, you ask? All of them? That could take a long time. Maybe you could look at every other tree or every 73rd tree. You'll have to decide.

Oh, will those trees be on the right side of the trail or the left or both? And will they be the closest tree or the one 2 m (or 10 m) away from the trail? You'll have to decide.

And how will you measure moss thickness? And at which points on the tree trunk? Which height from the ground? Which compass direction? You'll have to decide.

Once you make your measurements, how will you record the information? On a map? In a table? In words? You'll have to decide.

How will you present your conclusions? In a paper? As a talk? As a music video? You'll have to decide.

Wow, that's a lot of decisions. Think about all of the questions, then make an outline of your investigation in your notebook. Share it with another team member. Combine the best parts of each, write them out. Now do the experiment.