Squirrel Observations

Grades K-12

Duration
Pre-Visit: 20-30 minutes

Location
Gem & Mineral Hall

Supplies
- Data sheets
- Pencil
- Watches or timers
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- Clipboard (optional)

Standards
NGSS:

K-ESS2-1, K-LS1-1, 2-LS4-1, 3-LS3-1, 3-LS3-2, 3-LS4-2, 4-LS1-1, 5-PS3-1, 5-LS2-1,MS-LS2-2, HS-LS2-2, HS-LS2-6

CCSS ELA:

9-12.W.1, 9-12.W.9

CCSS Math:

K.OA.1, 1.MD.4, 2.MD.10, 3.MD.3, 4.MD.4, 5.MD.2, 6.SP.4, 6.SP.5, 8.SP.1, Algebra I S-ID.6, Algebra II S-IC.4,

Vocabulary

Student Work

Concepts

- Consistent observations can be compiled into workable data sets
- Data can be evidence from which students can support a claim

Objectives

- Students will practice making and recording observations outdoors.
- Students will improve their data-collection skills through practice and reflection.
- Students will analyze their own collected data and produce graphs or other visual representations of their observations.

Outline

1. Students will practice recording observations in an outdoor setting for the first few sessions.
2. For the next few sessions, students will make more structure observations using a timed drawing exercise
3. For the last few outdoor sessions, students will collect data directly onto a data sheet.
4. The class will analyze and pictorially represent its data at grade-appropriate levels.

References & Resources

- "Opening the World Through Nature Journaling," California Native Plant Society. http://www.cnps.org/cnps/education/curriculum/owtj_dl/cnps_curriculum-otwtnj.pdf
- Using the Outdoor Classroom
- Creating an iNaturalist Account (http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Creating%20an%20iNaturalist%20Account.pdf)
- Creating an iNaturalist Project (http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Creating%20a%20New%20iNaturalist%20Project.pdf)
- Finding and Joining iNaturalist Projects (http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Finding%20and%20Joining%20iNaturalist%20Projects.pdf)

Week 1

Two 20-minute sessions

In this first week, students will practice making observations in an outdoor environment simply by journaling. While in the classroom, establish the ground rules for the outdoor classroom (for tips, see our resource here.) Lead students to your chosen outdoor location with journals and pencils, and explain that they will be sketching and taking notes about any squirrels they see. For younger students, it's a good time to remind them that remaining quiet and calm will help prevent the squirrels from getting nervous and running away, especially if multiple people are sketching the same squirrel. Remind them that observational drawings don't need to be pretty or perfect, they just need to reflect what the student sees.

Give students about 10-15 minutes of sketching time; then reconvene and ask what students noticed about squirrels. What kinds of squirrels did they see? What kinds of behaviors did the squirrels exhibit?

Week 2

Two 30-minute sessions

Head out to the Nature Gardens with notebooks and pencils, and visit the Bird Viewing Platform or the hummingbird feeders in the 1913 Garden. Remind students that holding still and staying as quiet as possible will help prevent scaring birds and animals away.

During week 2, students will begin to more scientifically approach the observation process with the Timed Behavioral Observation activity on page 41 of the California Native Plant Society's *Opening the World Through Nature Journaling*.

Weeks 3-4

Five or more 30-minute sessions

Week three asks students to begin seriously recording data. Before heading outdoors, take a moment to review the worksheets with the students and remind them of all the pointers they've been using for the last couple of weeks. Then, head out and start collecting!

ELEMENTARY SCHOOL

Ask students to fill out the environmental information on their worksheets such as time, date, temperature, weather and season. When they're done, explain to students that they'll be tallying the number of squirrels they see doing certain behaviors. Every squirrel they see should get a tally mark in section one, section two, and section three. So, for example, if they see one squirrel in a tree sitting still, they should put one tally mark in the box under "in a tree," one tally mark in the box under "sitting still," and one tally mark in the box under "By itself (alone)." This means that every squirrel they see will get three tally marks.

At the end of the observation period, they should count all the tally marks in each section and write that total number in the green box. All three green boxes should have the exact same number in them, which is equal to the number of squirrels they saw.

MIDDLE AND HIGH SCHOOL

Ask students to fill out the environmental information on the top of their worksheets: date, time, temperature, and weather conditions. Then, explain to students that they'll be tallying the behaviors exhibited by a squirrel. If they want to observe more than one squirrel, they'll need to fill out a new worksheet for each squirrel. They should first identify the species of squirrel, and then spend 10-20 minutes observing that individual and tallying its behaviors.

If possible, try to identify any different species the squirrel interacted with, as well as any trees that the squirrel used.

NOTE: 11-12th grade, split students into two groups and have them observe different populations or environments, make observations at different times of day, or other independent variables that the class has noticed over the past few weeks.

Week 5

Data Analysis

If possible, ask students in all grades to upload their data to the Southern California Squirrel Project on iNaturalist.org. This incorporates your students' data into one of our researchers' ongoing Citizen Science Projects! It is probably easiest to upload the data with a class account managed by the instructor. For instructions on signing up and joining and creating projects, check out our resources here:

- Creating an iNaturalist Account (http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Creating%20an%20iNaturalist%20Account.pdf)
- Creating an iNaturalist Project (http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Creating%20a%20New%20iNaturalist%20Project.pdf)
- Finding and Joining iNaturalist Projects (http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Finding%20and%20Joining%20iNaturalist%20Projects.pdf)

K-1st grade

Ask students to get into groups of 2-5 with their data sheets and count or add all the squirrels in each box on their data sheets. For example, students can count all the tallymarks made on everyone's papers in the "In a tree" box to get the total count of squirrels in trees observed by the group. Students who are practicing addition can add the totals in the section one green box on everyone's papers.

2nd-3rd grade

Ask students to create a picture graph displaying the number of squirrels they saw on each day of data collection. Students can use their own data sheets to generate the graph, or they can all use the same data selected by the teacher.

Then, ask students to create a bar graph of the types of behaviors exhibited by squirrels on one specific day of data collection. In order to have a good number of data to graph from, it might be best to ask students to get into groups of four or five, combine their data, and then each create a graph from the combined data. Graphs for members of the same group should be the same.

Based on the graphs they create, ask students to solve word problems like the examples below. You will need to cater the problems to the graphs the students produced.

- On day one of data collection, how many squirrels did you see on the ground AND in a tree?
- How many more squirrels did you see on day four of data collection than on day one?

4th-5th Grade

Ask students to create a line plot graphing the proportions of squirrels all the students saw performing a specific behavior on one day of data collection (ex.: Liam saw 1 out of 5 squirrels in a tree on day 3; Angela saw 2/3 squirrels in a tree on day 3, etc.).

Based on the graphs they create, ask students to solve word problems like the examples below. You will need to cater the problems to the graphs the students produced.

- On day one of data collection, how many squirrels out of [total number of squirrels] did Jimmy see?
- How many more squirrels in trees did Angela see than Jimmy on day four of data collection?

MIDDLE SCHOOL

Ask students to create a few graphs depicting the number of squirrels they saw exhibiting a behavior (dependent variable) versus the temperature or weather conditions (independent variable). For example, they might graph the number of different-species interactions on sunny and cloudy days, or the number of squirrels using powerlines at different temperature ranges.

Then, ask students to look for correlations between the variables: is there any pattern to squirrels' behavior in certain weather conditions or temperatures? Whether yes or no, ask students to think about why that might be, and write up a short paragraph or two describing their answer and evidence.

HIGH SCHOOL

Ask students to create a scatter plot showing two quantitative variables of their choice—for example, number of squirrels seen by group 1 versus the temperature on that day, or how many squirrels were in trees versus time of day the observations were made.

Then, ask students to present their graphs, and describe their findings and the relationship between their chosen variables (including no relationship).

EXTENSION: Ask students to research the introduction of the Eastern Fox Squirrel to California. What kind of impact did that animal's introduction have on native species?

Using data from iNaturalist, ask students to create a second scatter plot showing the number of Eastern Fox Squirrels versus the number of Western Gray Squirrels in the Los Angeles area (they can use a section of their choice). Have them write a 1-2 page description of their graph that answers the following question: Based on their research, what explanation might they offer for the graph?

Eastern Fox Squirrel observation data sheet

Courtesy of Chuck Kopczak, Ph.D., California Science Center

Name:_____ Date:_____

Classroom:_____ Time:_____

Weather observations:

Temperature:_____° F / C (circle one)

Sunny ☐ Cloudy ☐ Windy ☐ Rainy ☐ Cold ☐ Warm ☐ Hot ☐

Season: Fall ☐ Winter ☐ Spring ☐

1 Where was the squirrel when I first saw it?

On the ground ☐ On a wall ☐ On a bench ☐

In or on a trash can ☐ In a tree ☐ Other ☐

Total number of squirrels from section 1: ☐

2 What was the squirrel doing when I first saw it?

Sitting still ☐ Walking ☐ Running ☐

Climbing ☐ Eating ☐ Chasing ☐

Other ☐

Total number of squirrels from section 2: ☐

3 When I first saw the squirrel, it was:

By itself (alone) ☐ With other squirrels ☐ With another kind of animal ☐

I saw these other kinds of animals with the squirrels:

_____

Total number of squirrels from section 3: ☐

Squirrel Observation Data Sheet

Courtesy of Chuck Kopczak, Ph.D., California Science Center

Name: _____

Date:_____

Time:_____

Temperature:_____

Weather:_____

☐ Eastern Fox Squirrel

☐ Western Grey Squirrel

☐ California Ground Squirrel

Mark a tally in the box each time the squirrel exhibits the following behaviors:

Vocalizing

Eating

Powerline Use

Same-species interaction

Tally the number of individuals in the group:

List the different species with which the squirrel was interacting:

Different species interaction

Tree use

List the species of tree the squirrel was in, or draw one of its leaves on the back of this page to help you ID it later:

Make some sketches of the tree your squirrel was using to help identify the tree later. Leaf drawings are especially useful.