



Lesson Title: Wildlife Visits to Sandia Mountain Springs

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Sandia Mountain Natural History Center

New Mexico Museum of Natural History and Science

Content Area(s): Science (Biology, Ecology), Math

Grade/Age level: Middle school (6th-8th grade); adaptable for H.S. students, poss. 5th grade

Materials: computer with graphing program; or graph paper/regular paper, pencils (2 colors)

Handouts: Lesson pdf to read digitally or print, Excel spreadsheet (best used digitally)

Standards: Aligned to Common Core and Next Generation Science Standards, Page 2

Bloom's Taxonomy/Depth of Knowledge: Understand, Apply, Analyze; Level 3

Skills to be Maintained:

writing hypotheses, graphing scientific data, interpreting graphs and analyzing patterns, predicting future trends

Essential Question(s): Page 2

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Common Core State Standards Addressed:

Grade 6- CCSS.MATH.CONTENT.6.SP.A.1, CCSS.MATH.CONTENT.6.SP.B.4,
CCSS.MATH.CONTENT.6.SP.B.5 (one of these?)

Grade 7- CCSS.MATH.CONTENT.7.SP.B.3, CCSS.MATH.CONTENT.7.SP.B.4

Grade 8- CCSS.MATH.CONTENT.8.SP.A.1

Next Generation Science Standards Addressed:

Middle School- MS-LS2-1, MS-LS2-2, MS-LS2-4

Science & Engineering Practices- Developing and using models, Analyzing and interpreting data,
Using mathematics and computational thinking, Constructing explanations, Engaging in
argument from evidence, Obtaining, evaluating, and communicating information

Crosscutting Concepts- Patterns, Scale, Proportion, and Quantity; Stability and Change

Essential Question(s):

What patterns do you observe in the data of wildlife visits? What could these patterns tell you
about the species and their environment?

Why do animals visit the springs when they do? Why are there differences between when some
species visit compared with others?

If you were a wild animal, when would you choose to come to a spring, and why?

What might affect animal visits in the future? How might the patterns change over time?

Objectives:

Students who demonstrate understanding can:

Form a clear hypothesis about predicted patterns in data, based on their own knowledge and by focusing on one of the variables.

Design a graph that is appropriate for particular data, clearly readable, well-labeled, with appropriate axis intervals.

Graph two sets of data accurately and completely on the same graph.

Read, understand, and be able to describe patterns of data on a graph.

Interpret observed patterns, compare with hypotheses, with other species data, or other variables, and express in writing and/or aloud.

Think critically about real world factors that may influence patterns in data, and make predictions based on the real data about future trends.

Academic Vocabulary/Word Wall:

climate change, groundwater, natural spring

Brain Drain/Warm Up Activity:

Go to an area outside (around students' homes, schoolyard, a local park, etc.). Record the date, time, and current weather conditions (including air temperature if able). Have students search for evidence of animals living there (including any actual animals, and their sounds, tracks, scat, holes, feathers, bones, webs, bite or scratch marks, etc.). Discuss how the date, time, and weather conditions may impact which animals are seen now or have left fresh signs, and which animals do not seem to have been active recently. Discuss which animal species may be more present or active at other times of day, year, and during different weather conditions.

Lesson Description and Procedure:

- 1) Watch the accompanying video lesson, "Mud Spring: From Water to Wildlife", if able.
- 2) Read/review background information provided in the first section of the written lesson.
- 3) Choose which animals, variable, and spring(s) to use the data from.
- 4) Write hypotheses for patterns that may be found in the selected datasets.
- 5) Graph the real data, either in Excel/Google Sheets/another program, or on paper.
- 6) Analyze and interpret data by responding to and discussing critical thinking questions.

Lesson Conclusion/Assessment/Observation Activity:

Have students collect their own wildlife data by recording quantitative observations (i.e. how many birds they find of different species, categories of evidence found, or numbers of animal observations) across multiple days/weeks. Have them pick what they will collect data about and their intended procedure for doing so, write hypotheses, collect the data on several occasions, graph their own data, and interpret and explain their findings for the class. Students can then engage in discussion about their own ideas as to why the data may have come out the way it did, and compare/contrast with other students' findings.

Accommodations/Modifications:

Graphs can be done on paper or in computer programs depending on skills learned, computer access, and what is appropriate for your students.

To work with differing abilities and prior experience, or to use with younger elementary students, instructor could select *which* data each student or group will graph, have a student only graph data for 1 animal rather than 2, have students work in groups or pairs, set up axes/intervals or other graph framework to aid students along, and/or demonstrate graph types and setup before having students do so themselves.

Teachers could ensure that students or groups each use different portions of the data, so that at the end they can come together to compare all of their graphs and findings in a more comprehensive way.

Culturally Responsive Instruction and Modifications:

Gain awareness of any cultural sensitivities or associations students' may have regarding certain animals before doing the lesson.

To link to personal connections, have students graph data that they choose to collect that is directly relevant to their lives (i.e. kinds of foods in their kitchen, ages of family members, etc.)

Have students work with and present the data in another way that is more meaningful to them.

Have students write and share stories or artwork about what a certain animal species means to them and their culture.

Relevance to Families and Communities:

Allow students to share their personal stories of when their family has encountered different animals, or found animal evidence.

Compare wild animals with students' pets.

Discussing human and wildlife interactions (hunting, fishing, getting into trash cans, etc.).

Discussing climate change and water resource impacts to people and local communities, and how impacts on other species also affect humans. (MS-ESS3-3, MS-ESS3-4, MS-ESS3-5)

Cross-Curricular Connections:

Art- drawing or creating art media of local animal species, making track casts, scat models, etc.

Physical education- going for a hike in the mountains, bosque, or another natural area, and preparation for these excursions.

Geology/Hydrology- studying groundwater, aquifers, and bedrock, and why water moves the way it does in the Sandia mountains; contacting local scientists and obtaining data from them (MS-ESS3-1)

Additional Resources:

- [Mud Spring: From Water to Wildlife](#) accompanying video lesson
- [Video slideshow of camera images](#) from Mud spring
- [Virtual guided hike](#) of Mud Spring Loop trail
- [SMNHC website](#) for more information and resources

Organizations Involved:

The Sandia Mountain Natural History Center is an environmental education facility in the mountains east of Albuquerque, New Mexico. It is jointly run by the New Mexico Museum of Natural History and Science, and Albuquerque Public Schools.

The lesson was created in cooperation with the Sandia Mountain Bear Collaborative, as part of the education component of the National Fish and Wildlife Foundation Five Star and Urban Waters Restoration Grant awarded to Talking Talons Youth Leadership.