# Arroyos as Pathways

Closing Activities, Lesson 1

**Lesson Summary:** Students will explore the arroyo looking for evidence of how it serves as a natural corridor through the city.

**Suggested Timing**: 1 hour, including walking to and from the arroyo

**New Mexico State Standards**

**Performance Expectation(s):**
MS-LS2-4: Ecosystems: Interactions, Energy, and Dynamics: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

| Science & Engineering Practices: | Disciplinary Core Ideas: | Crosscutting Concepts: |
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| Engaging in Argument from Evidence: Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.<br>Constructing Explanations and Designing Solutions: Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future. | LS2.C: Ecosystem Dynamics, Functioning, and Resilience: Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.<br><br>ESS2.A: Earth's Materials and Systems: The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.<br><br>ESS2.C: The Roles of Water in Earth's Surface Processes: Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. | Stability and Change: Small changes in one part of a system might cause large changes in another part.<br><br>Scale Proportion and Quantity: Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. |

**Evidence Statements:**

- MS-LS2-4 Evidence Statements
- MS-ESS2-2 Evidence Statements

**ELA CCSS Connections:**

- RST.6-8.1: Cite specific textual evidence to support analysis of science and technical texts. (MS-LS2-4)
- RI.8.8: Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS2-4)
- WHST.6-8.2: Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS2-2)
- SL.8.5: Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-ESS2-2)

**Math CCSS Connections:**

- MP.2: Reason abstractly and quantitatively. (MS-ESS2-2)

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| Content Objectives and Daily Learning Targets | **Objectives**:<br>● I can examine evidence and draw conclusions.<br>● I can identify tracks.<br>● I can identify scat.<br>● I can explain how the arroyo is used as a pathway for people and wildlife. |
| Focus Question | Who uses arroyos to move through urban areas? |
| Language Objectives | ● Students will apply key vocabulary in a real world setting.<br>● Students will share their thinking orally and in writing. |
| Vocabulary | ● **Scat** - animal fecal droppings.<br>● **Signs** - any trace of a wild animal, especially its tracks or droppings.<br>● **Evidence** - signs or indications of something.<br>● **Tracks** - an imprint left behind in soil, snow, or mud, or on some other ground surface, by an animal walking across it. |
| Materials | ● Guide to scat and tracks<br>● Clipboards<br>● Pencils<br>● Lab sheets or science journals |
| Preparation before class | ● Make copies of materials |
| Assessments (Formative/ Summative), Rubrics, Success criteria | ● Lab notebooks<br>● Class discussion<br>● Success criteria:<br>○ Students use the evidence they observe to create connections between their environment and the animals that live there.<br>○ Students create a narrative that is clear and tied to what they have observed. |

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| EL Supports | ● Provide key vocabulary in both languages<br>● Ask students to share thinning with a partner before the whole group<br>● Allow students to record thinking in either or both languages |
| Culturally Relevant Strategies | ● Students investigate their local environment.<br>● Students work with classmates.<br>● Students practice social and academic skills they will need. |
| Special Education Modifications | ● Follow student IEP |

**Lesson Plan Details**

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| ENGAGE (~5 min): | ● Walk to the arroyo.<br>● As you are walking, have students share stories of animals they have seen in the city or how they and their families do (or don't) use arroyos. |
| EXPLORE (~15 min): | ● Ask students to explore the arroyo and find evidence of how it is used by animals.<br>● Ask them to put rocks or sticks around anything they find to avoid having people step on it. |
| EXPLAIN (~10 min): | ● Come together as a whole class and have students share what they found. Have students discuss how they know that they are seeing evidence from animals. Use the key vocabulary.<br>● Hand out tracking and scat information. Let students practice with these tools to identify the specific animal/s that belong to the evidence they already observed.<br>● In addition to having students look for tracks and scat, encourage them to look up. Many arroyos in Santa Fe that receive stormwater from large impervious areas (e.g. Arroyo de los Pinos near K-mart) tend to have taller trees than the surrounding area and prolonged pooling of water. This often leads to unique habitat for raptors such as sharp-shinned hawks. |
| ELABORATE (~15 min): | ● Have students write or draw a graphic novel style story that explains how they imagine an animal might experience the arroyo.<br>● Have them include:<br>○ Why is the animal there?<br>○ What time of day is it?<br>○ What does the animal feel?<br>○ Why is the arroyo important to the animal? |
| EVALUATE (~15 min): | ● Have the students return to the arroyo and use the guides to verify any of the signs they observed before and see if they can identify new signs. Have them record what they notice and what details help them identify |

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| | the animals that left the signs. (Remember that people are animals too! Human footprints should be included.)<br>● Walk back to class. |

Additional Sources:

- 5 Es of Science Instruction
- 5E Model of Instruction
- ISEC model of lesson sequence