COLLEGE OF SCIENCE
Laboratory of Tree-Ring Research

Tiny Sparks: Science and Storytelling in Early Learning

Lesson Title: Geology - Nature's Toolbox: Sculpting Rocks and Landscapes

Grade Level: Preschool
Lesson Length: 50 minutes

AZ Science Standard:	E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate.
Learning Objective:	● Students will be able to use their senses to gather information about objects and make simple observations about their properties. ● Students will be able to recognize and describe similarities and differences between objects.

Vocabulary	Materials
● Geology ● Nature ● Sculptor ● Wind ● Rock ● Ice	● The book "Nature is a Sculptor" by Heather Ferranti Kinser ● Sticky Pad paper and markers to write predictions ● Erosion experiment: Shallow tray filled with sand, pebbles, small rocks, & cup of water • Ice experiment: Ice cubes or large block of ice, salt (any kind, such as table salt or epsom salt), shallow tray or plate, & food coloring. ● Materials for the art activities are listed with each option.

Costume Element:
Costumes play a vital role in storytelling by engaging children in immersive experiences, visually representing characters and concepts, and boosting cognitive skills through interactive play. They encourage creativity and support multi-sensory learning, making scientific concepts more accessible and memorable for young learners.

- **Safari hats or hard hats**: Symbolize exploration and safety.
- **Safety glasses or goggles**: Emphasize protection during scientific activities.
- **Flannel shirts, outdoor vest, or lab coats**: Represent the role of a geologist. The pockets on the vest can also hold rock type for hands-on exploration.
- **Backpacks or toolboxes**: Carry essential tools like magnifying glasses and rock hammers.
- **Work gloves**: Highlight hands-on exploration and safety.
- **Compass and notebook**: Add authenticity to the geologist role

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Guiding Questions:

- "What shapes and patterns can we find in rocks and nature around us?"
- "How does nature change and sculpt things like rocks, sand, and mountains?"
- "What tools do you think nature uses to shape the Earth, like a sculptor does?"

Engagement/Introductory Activity:

- Gather children in a circle
- Introduce the book "Nature is a Sculptor" by Heather Ferranti Kinser
- Show the cover and ask children what they think the story might be about

Exploratory Activity:

Introduction (5 minutes)

- Gather students in a circle and introduce the book "Nature is a Sculptor" by Heather Ferranti Kinser.
- Briefly explain that the book talks about how nature shapes the world around us.

Storytelling (15 minutes)

- Read "Nature is a Sculptor" aloud to the class, showing the illustrations.
- Pause occasionally to ask simple questions about what they see and what they think might happen next.
- After reading, discuss how wind, water, and ice can change the shape of rocks and land.

Science Activity: Erosion Experiment (15 minutes)

- Divide students into small groups.
- Provide each group with a shallow tray filled with sand, pebbles, and small rocks.
- Give each group a small watering can or cup of water.
- Demonstrate how to gently pour water over the sand and rocks to simulate erosion.
- Let students experiment with pouring water and observe how it moves the sand and smaller pebbles.

OR

Ice Erosion Experiment

- Place an ice cube on a shallow tray or plate.
- Sprinkle salt over the ice cube.
- If desired, add a few drops of food coloring to make the erosion process more visible.
- Observe the ice cube as it begins to melt and form channels.
- Discuss how salt causes the ice to melt faster in certain areas, creating "rivers" on the surface of the ice cube.

Art Activity (Option #1): Nature Sculpture (15 minutes)

- Take students outside to collect natural materials like leaves, twigs, and pebbles.
- Return to the classroom and provide each student with a small ball of clay.
- Encourage students to create their own "nature sculpture" by pressing the collected items into the clay to make impressions or sticking them into the clay to create 3D effects.

Art Activity (Option #2): Chalk and Water Watercolor Effect (15 minutes):

- Provide laminate pictures of geological formations, such as hoodoos, basalt columns, rivers, devil's tower, Bryce Canyon, and glaciers.
- Encourage the students to select a geological formation to draw using chalk on watercolor paper.
- Use paintbrushes dipped in water to paint over the lines, creating a watercolor-like artwork.

Act Activity (Option #3): Candy Geodes

- Gather the supplies: Silicone muffin cups; Cookie sheet; Hard candies (like Jolly Ranchers); Rolling pin; Plastic baggies; and Cocoa powder.
- Preheat the oven to 300 degrees.
- Start by unwrapping your hard candies and place them inside a bag.
- Then use a rolling pin to crush the candy into tiny pieces. The kids will love using a rolling pin to crush the candies! It's great heavy work for busy kids.
- Grab your muffin cups and play them on a baking tray.
- Next you want to sprinkle a layer of crushed candy on the bottom of your muffin cup. You can use two or three colors to make your candy look more like a real geode.
- Heat the candy in the oven for about 5 minutes. You want the candy to be just melted when you take it out. Then take your rock candy geodes out of the oven and let them cool.
- Once the candies are hard again, you can pop them out of the muffin cups and coat the edges with cocoa powder. This represents the rock coating surrounding real geodes.

Conclusion (5 minutes)

- Gather students back in a circle.
- Invite a few volunteers to share their nature sculptures and explain what they made.
- Recap how nature can shape and sculpt our world, just like they shaped their clay sculptures.

Explain:

- "Can you tell me what happened when you poured water over the sand and rocks?"

This question encourages students to describe the erosion process they observed, promoting recall and verbal expression of their observations.

- "What shapes did you see in your ice cube after we added salt?"

This prompt helps students focus on the visual aspects of the ice erosion experiment, encouraging them to identify and describe patterns.

- "How do you think wind or water might change a big rock over a very long time?"

This question asks students to apply their new knowledge to a hypothetical scenario, promoting critical

thinking and imagination.

- "What was the most surprising thing you learned about how nature changes things?"

This open-ended question allows students to reflect on their learning experience and express what stood out to them, potentially revealing areas of interest or confusion.

Extension Activity/Questions:

Nature Walk and Observation Journal:

- Take students on a short nature walk around the school grounds or a nearby park.
- Provide each student with a simple "observation journal" (a few sheets of paper stapled together with areas for drawing).
- Encourage students to look for signs of how nature has shaped the environment:
- Bent trees from wind
- Smooth rocks in a stream
- Cracks in sidewalks from plant roots
- Have students draw pictures of what they observe.
- After the walk, gather in a circle and let students share their findings, discussing how nature might have caused the changes they saw.

This activity helps students apply their new knowledge to real-world observations, enhancing their understanding of nature's sculpting processes in their immediate environment.

"Be a Nature Sculptor" Dramatic Play: Set up a dramatic play area where students can pretend to be forces of nature.

Provide props such as:

- Blue fabric or streamers for water
- White fabric or cotton balls for snow and ice
- Fans or paper fans for wind
- Soft foam blocks or cardboard boxes to represent rocks and land
- Encourage students to act out how they would shape the landscape if they were wind, water, or ice.

Guide them with prompts like "Show me how water might carve a river" or "How would wind shape a sand dune?"

Evaluation Activity:

Enlist the teacher’s help to record the following data as needed. Use the following combination of formative and summative assessment methods:

Observational Assessment:

- During the storytelling and activities, observe students' engagement and responses to questions about how nature shapes the environment.
- Take notes on students' comments and actions during the erosion experiments and art activity to

gauge their understanding of natural processes.

Performance-Based Assessment:

- Evaluate students' participation in the erosion experiments, noting their ability to make predictions and describe observations.
- Assess their nature sculptures, looking for evidence that they've incorporated ideas about how nature shapes objects.

Portfolio Assessment:

- Collect and analyze students' drawings from the art activity, looking for representations of nature's sculpting effects.

Informal Questioning:

- During the conclusion, ask open-ended questions about how wind, water, and ice change the landscape, assessing students' ability to apply new knowledge.

Game-Based Assessment:

- Create a simple matching game where students pair natural forces (wind, water, ice) with their effects on the environment, making the evaluation process engaging and fun for preschoolers.