the NATURE SCHOOLS

Day at a Glance

SCIENCE: WEEK 1

Orb Weavers: Nature's Master Builders

The Student Experience

In this lesson, students will become young arachnologists, diving into the intricate world of orb weavers. Through observation, hands-on activities, and stimulating discussions, they'll discover the spider's role in nature, the artistry of its web, and its fascinating feeding habits. Watch as your classroom buzzes with curiosity and respect for these tiny architects of the natural world.

Kentucky Academic Standards

Life Science
- Kindergarten: K-LS1-1 - Use observations to describe patterns of what plants and animals (including humans) need to survive.
- First Grade: 1-LS1-1 - Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

Math
- Kindergarten: K.MD.3 - Classify and sort objects or people by attributes. Limit objects or people in each category to be less than or equal to 10.
- First Grade: 1.MD.2 - Express the length of an object as a whole number of same-size length units, by laying multiple copies of a shorter object (the length unit) end to endwith no gaps or overlaps.

Opening Task (10 minutes):
Introduction to Orb Weavers (10 minutes)

Gather children in a semi-circle, safely distanced from the orb weaver's habitat. Provide each student with a small magnifying glass to observe the web from a safe distance.

Thoughtful Questions and Prompts:
- "Have you ever seen a spider web before? Where?"
- "What patterns can you see in the orb weaver's web?"
- "Why do you think spiders make webs? Is it for food, a home, or something else?"
- "What kinds of things do you think this spider catches in its web?"

Exploration Activity:
- Allow children to sketch the web's design on paper, capturing as much detail as possible.
- Assign teams to count the number of 'rings' or 'spokes' in the web and report back.

Share:
"Today, we dive into the fascinating world of the orb weaver. We'll learn how its unique web helps it survive and thrive. Get ready for an intriguing adventure!"

Observation & Exploration (40 minutes)
Enhanced Web Wonders (Nature-based, 20 minutes)

Observe the orb weaver's web closely, perhaps with the help of a magnifying glass. Sketch or take notes on the web's intricacies.

Thoughtful Questions and Prompts:
- "What shapes do you see in the web? Any spirals, zigzags?"
- "How many layers can you count in the web?"
- "How do you think the spider uses its web? For food, for protection, or something else?"
- "Can you guess what materials make up the web? Is it like string, silk, or something else?"

Exploration Activity:
- Students can compare their sketches and observations, identifying common shapes and designs they've noted.
- Ask them to hypothesize about the strength of the web. How strong do they think it is?

Enhanced Diet Detectives (20 minutes)

Discuss what orb weavers eat and how they catch their food. Watch this short video to learn more.

Thoughtful Questions and Prompts:
- "What do you think the orb weaver eats? Bugs, plants, both?"
- "How does the spider capture its food? Does it use its web?"
- "What role does the orb weaver play in nature? Is it a predator, a helper, a builder?"

Exploration Activity:
Discuss the Concept of a Food Chain, Placing the Orb Weaver in Its Context

Teacher Directions
- "Class, let's talk about something called a 'food chain.' A food chain is like a game of tag, but with eating."
- "We'll start with plants. Plants get their energy from the sun. Insects like flies eat plants."
- "Our orb weaver spider eats those insects, like flies."
- "And then, something else might eat our spider, like a bird!"

Thoughtful Questions
- "In our food chain, who eats the plants?"
- "Who does the orb weaver spider eat?"
- "And who might eat our spider?"

Share:
"Today, we dive into the fascinating world of the orb weaver. We'll learn how its unique web helps it survive and thrive. Get ready for an intriguing adventure!"

Math & Measurement (25 minutes):
Web Dimensions (Nature-based, 25 minutes)

Using strings and rulers, students can simulate a web on the ground to estimate the orb weaver's web dimensions.

Thoughtful Questions and Prompts:
- "How large do you think this web is? Is it as big as your arm, your desk, your classroom?"
- "How can we measure it without disturbing the spider? Any ideas?"
- "Why do you think the web is this particular size? What advantages might the size offer?"

Exploration Activity:
- Lay down lengths of string on the ground to create a simulated web. Encourage the students to use rulers to measure these strings.
- Invite the students to calculate the area within their simulated web strings.
- Ask the kids to ponder about the design intricacies. "Do you think the web's design makes it easier for the spider to catch food? Why?"

Language Arts Connection (20 minutes)
Web of Words (20 minutes)

Create a word web chart on a whiteboard or large paper. Place "Orb Weaver" in the center and draw lines outward to link vocabulary words that describe the spider, its web, and its role in nature.

Thoughtful Questions and Prompts:
- "What words can we use to describe the web? Sticky? Intricate? Spiraled?"
- "Can you make a sentence using these words? For example, 'The orb weaver's web is so intricate that it captures even the tiniest insects.'"

Exploration Activity:
- Invite the students to add their own words to the chart.
- Encourage students to draw connections between the words on the word web, like linking "spiral" to "design" or "sticky" to "trap."
- Prompt them to use these vocabulary words to describe other things. "Can you think of anything else that is intricate like the orb weaver's web?”

Safety and Respect (15 mins)

Discuss the importance of maintaining a safe distance from the orb weaver, ensuring that it is not disturbed or endangered by our curiosity.

Thoughtful Questions and Prompts:
- "Why shouldn't we touch the spider or its web?"
- "How can we observe it safely without harming its environment or ourselves?"

Exploration Activity:
- Use a telescoping pointer or a long stick to point out features of the web and spider, without touching.
- Have children brainstorm on ways they can respect other creatures' spaces in nature, not just spiders.

Teacher Notes: Web Features to Point Out:
- Orb Shape: Note the circular design of the web and how it's different from other spider webs.
- Radii and Spirals: Point out the straight lines (radii) and the spiraled lines that make up the web.
- Sticky vs. Non-Sticky Sections: Mention that not all parts of the web are sticky. The spider uses the non-sticky part for moving around.

Teacher Notes

Teacher Notes: Spider Features to Point Out:
- Body Segments: Discuss the two main parts of the spider: the cephalothorax and abdomen.
- Legs: Count the eight legs and note how they are attached to the cephalothorax.
- Spinnerets: Point to where the silk comes out, at the back end of the abdomen.

Example Script for Teacher:
"Kids, let's look at the web. Do you notice how it's shaped like a circle? That's what makes it an 'orb' web. And look at these straight lines; we call them radii. They're like the foundation of a building. The spirals are built around them. Not all parts of the web are sticky, though. The spider knows how to walk on the non-sticky parts to avoid getting caught!"

"Let's look at our orb weaver friend now. Do you see it has two main body parts? The front part is called the cephalothorax, and the back part is the abdomen. Count its legs with me. How many are there? Yes, eight! Right at the back, it has something called spinnerets. That's like its little silk factory where the web comes from."

Brightwheel

Picture #1 Idea:
A student's sketch of the orb weaver's web.
Text: "Exploring geometry and nature, one web at a time."

Picture #2 Idea:
Children engaged in measuring the web's dimensions.
Text: "Tiny rulers for a grand web. Learning through estimation."

Picture #3 Idea:
The word web chart filled with vocabulary.
Text: "Weaving words and webs together. A vocabulary expansion in action."