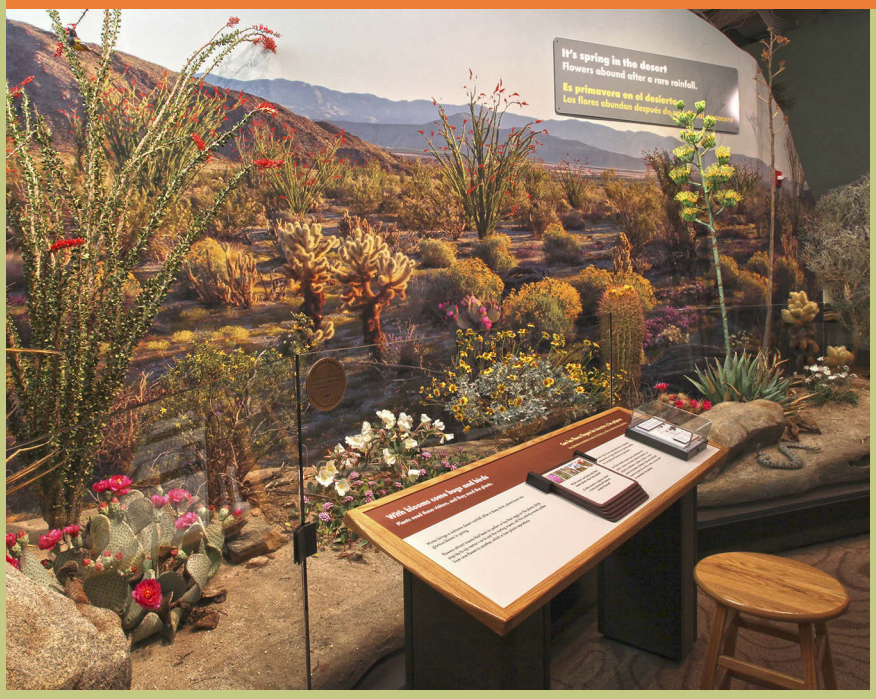
GRADE 4

COAST TO CACTUS
IN SOUTHERN CALIFORNIA

Curriculum and Lesson Plan Resource Guide



theNAT
SAN DIEGO NATURAL HISTORY MUSEUM

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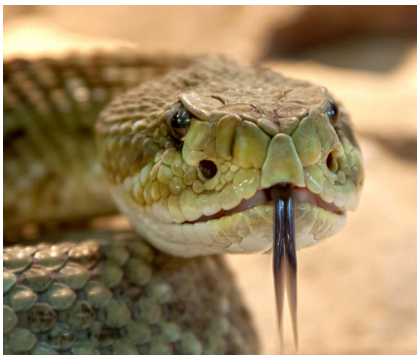
Grade 4

Snake Senses

Essential Question

Why do snakes stick out their tongues?

Snakes use their senses to hunt, to escape danger, and to find a mate. Some snakes have very strong eyesight while others can only distinguish between light and dark. For most snakes, other senses need to make up for their poor eyesight. Snakes rely mostly on their sense of smell and their sense of touch. Snakes don't have noses like we do. They have nostrils to breathe with, but snakes smell with their tongues—when a snake sticks out its forked tongue, it smells its surroundings. The moist tongue collects scents from the air around it. When the tongue goes back into the mouth, its forks touch a special sensory organ on the roof of the mouth called the Jacobson's organ and tells the snake what it smells. The forked tongue allows the snake to sense from which direction a smell is coming. Snakes have a small notch in their lips that they can stick their tongues through so they don't need to open their mouths to smell.



Activity: Snake Tongue Search

In this activity, students pretend to be a snake's tongue searching for specific smells in their classroom.

Materials

- Several scented candles or air fresheners, 2 of each scent (choose distinct but familiar smells like vanilla, cinnamon, lavender, green apple, or lemon)
- Blindfolds or sunglasses (optional)

Snake Tongue Search

This activity should be done by students working in pairs, before or following a visit to the *Coast to Cactus in Southern California* exhibition. *(See Page 2 for activity instructions.)*

Before the activity

- The teacher should hide one of each of the scented candles or air fresheners in different spots around the classroom. (The extra candles or air fresheners will be used as sample smells for the activity.)
- Gather images or video of a snake sticking out its tongue.

Activity

1. Use images or videos to show your class a snake sticking out its tongue. Ask your students if anyone has ever seen a snake flicking its tongue. ***What do they think the snake was doing with its tongue?*** The snake was smelling or "tasting" the air. Using its tongue and a special organ in its mouth (Jacobson's organ), a snake samples particles from its environment. ***What does the snake tongue look like?*** A snake tongue is forked, meaning it has two distinct points at the tip. The forked tongue allows the snake to sense from which direction a smell is coming.
2. Split your class into pairs.
3. Let your students know that they will be acting out a model of a snake tongue. Explain to students that models are not perfect examples of events; they are imitations that help us understand science concepts and how things relate to each other.
4. Give each pair a candle or air freshener. This is their sample scent. Let them know you've hidden matching candles and air fresheners all around the classroom, and they need to find their specific assigned scent.
5. Give them a minute to try to memorize the smell.

NGSS Alignment for Grade 4

Performance expectation: 4-LS1-2

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing explanations and designing solutions	**LS1.A:** Structure and Function **LS1.D:** Information Processing	Cause and Effect Interdependence of Science, Engineering and Technology

Interdisciplinary Common Core Connections: W.4.1, SL.4.5, 4.G.A.3

6. Take away the sample smells.
7. Turn off the lights or pass out blindfolds or sunglasses. This helps students to understand a snake's limited eyesight.
8. Have each pair link arms. The two students in a pair represent the two points of a fork in the snake's tongue.
9. Instruct each pair to start searching (smelling) around the classroom using walking feet. (You can let one or two pairs go at a time if it works better for your class or space.)
10. After all of the pairs have found their candles, have them describe the challenges of the activity. ***Was it hard to pinpoint the smell they were looking for? Did not having clear vision make it harder or easier to find things?***
11. Optional: Have your students draw a picture of a snake's tongue and write down how it senses smells.

Extension

Hide the candles or air fresheners outside. Have your students search while trying to negotiate with environmental factors such as wind, noise, and other smells. Have them compare and contrast a snake's sense of smell with a human's.

Key words

Sense

One of the five natural powers (touch, taste, smell, sight, and hearing) through which you receive information about the world around you.

Snake

A long limbless reptile that has jaws that can open extremely wide. Some snakes have a venomous bite.

Forked tongue

A tongue split into two distinct points at the tip.

Smell

The quality of a thing that you can sense with your nose.

Particle

A very small piece of something.

Scent

A smell that is produced by something.

What will they learn?

Students learn how to create and use a model to increase their understanding of events that occur on a larger scale in nature. During this activity, students gain an understanding of why snakes stick out their tongues, and why a snake's tongue is forked. Students learn that snakes with limited eyesight compensate by smelling using their tongues and a special organ in their mouths. Snakes have forked tongues that helps them identify which direction smells are coming from.

Additional Resources

- Use the *Explore the Region from Coast to Cactus* website to learn more about the different habitats in the southern California region. Visit **coasttocactus.sdnhm.org** to journey through coastal areas, mountains, and deserts, and to learn more about San Diego's amazing diversity of plant and animal life.
- Check out a specimen from our Nature to You Loan Library. Specimens related to this lesson include: Red Diamond Rattlesnake, Western Rattlesnake, Coastal Rosy Boa, Gophersnake. For more information visit **sdnat.org/specimensearch** or contact the Loan Library at **loanprogram@sdnhm.org** or 619.255.0236.
- Visit the San Diego Natural History Museum and explore our *Coast to Cactus in Southern California* exhibition. San Diego is known for its incredibly diverse terrain, ranging from the beaches and chaparral near the coast, to the mountains and the desert farther afield. Using specimens from the Museum's scientific collections alongside immersive environments (hands-on exhibits, live animals, and innovative media), *Coast to Cactus in Southern California* illustrates that richness by taking visitors on a journey through these habitats to explore the plants and animals that live in them.