

## Grades 6-8

### Nova, "Inside Animal Minds: Dogs and Super Senses"

What would it be like to go inside the mind of an animal? We have all gazed into a creature's eyes and wondered: what is it thinking about? What does it really know? Now, the revolutionary science of animal cognition is revealing hard evidence about how animals understand the world around them, uncovering their remarkable problem-solving abilities and exploring the complexity of their powers of communication and even their emotions. In this mini-series, NOVA explores these breakthroughs through three iconic creatures: dogs, birds and dolphins. We'll travel into the spectacularly nuanced noses of dogs and wolves, and ask whether their reliance on different senses has shaped their evolution. We'll see through the eyes of a starling in flight and test the tool-using skills of the smartest of birds, the crow. We'll listen in as scientists track dolphins in the Caribbean and elephants on the African savannah, trying to unlock the secrets of animal communication. As we discover how researchers are pushing the animal mind to its limits, we'll uncover surprising similarities to -- and differences from -- the human mind.

What is it like to be a dog, a shark or a bird? This question is now getting serious attention from scientists who study animal senses. Humans rely on smell, sight, taste, touch and sound; other animals have super-powered versions of these senses, and a few have extra senses we don't have at all. From a dog that seems to use smell to tell time to a dolphin that can "see" with its ears, discover how animals use their senses in ways we humans can barely imagine. But it's not just the senses that are remarkable - it's the brains that process them. NOVA goes into the minds of animals to "see" the world in an entirely new way.

**After watching this episode, choose from the following questions and/or tasks to extend your learning**

#### Question Box 1

- What are the key details in this program?
- What is the central message in this program? Explain?
- What is the author trying to convey through the TV program? What from the text makes you believe this?
- What are some of the super senses of dogs?
- How are the super senses manifested in these dogs?
- How has this super sense shaped their evolution?
- What are some of the jobs that dogs can do because of their sense of smell being so acute?

#### Question Box 2

- What was most challenging or least interesting about this program?

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- What about the show stood out to you?
- What did you find most interesting and why?
- How much did you know about the subject before we started?
- Think about dogs you know or have known. How do they demonstrate their super senses?
- What do you think we might not know about dogs or wolves and their intelligence?

### **Box 3 (Tasks)**

- If a human could smell as well as a dog, it would have an olfactory membrane of 150 square centimeters instead of 4 square centimeters. How might that change the shape of the human nose? Use mathematical reasoning in your justification.
- If humans could hear as well as a dog, it would be able to hear up to 40,000Hz instead of up to 20,000 Hz. How might that change the shape of the human ear? Use mathematical reasoning in your justification.
- List and discuss the evidence the video provides how dogs' noses have directed their evolution.
- Research a different animal of your choice that displays an enhanced sense and design an infographic that sheds light on that organism.

### **Box 4 (Enrichment)**

- Select an enhanced sense as mentioned on the video, or research one of your own. Discuss how that would affect humans and society if humans had that enhanced sense.
- Create a visual to represent the super senses of a dog.
- Create a short children's' picture book about a dog that uses its' superpowers.

### **Box 5 (Extend/Real-Life)**

- To learn more about the specific senses a variety of animals have check out this article and short video: <https://www.bbvaopenmind.com/en/science/bioscience/things-that-animals-perceive-about-the-world-that-we-humans-dont/>
- What was the most surprising sense in the article or video?
- How have the senses of some animals been used to help humans?
- Does studying the senses of animals interest you? Why or why not?
- Think about the animals and their senses featured in the article and video. Develop an idea of how the senses of one animal could be harnessed and used to help humans.
- Research and discuss how humans have used biomimicry with respect to an organism's special ability to solve a human problem.

