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SCHNECKSVILLE, PA



EMPATHY 101

Science Communication
Cher Vatalaro
Lehigh Valley Zoo

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ICEBREAKER

Which Moo Deng are you today?



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EMPATHY



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DIRECTIONS: REPLACE THE COMMON PHRASES SO THAT THE TECHNICAL LANGUAGE IS MORE EMPATHETIC.

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What is empathy?

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Do you use empathy when talking about science?

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On a scale from 1-10, how comfortable are you using empathy in your communications?

1 - uncomfortable

10 - best thing ever!

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WHAT IS EMPATHY?

Empathy is a stimulated emotional state that relies on the ability to perceive, understand, and care about the experiences or perspectives of another person or animal.



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WHAT IS EMPATHY?

Affective Empathy - the ability to sense/experience the perceived emotions of another



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WHAT IS EMPATHY?



Cognitive Empathy - the ability to identify and understand the perspective of others

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WHAT IS EMPATHY?

Empathic Concern - the ability to sense and be motivated to improve the life of another



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Which type of empathy do you see being most useful for what you are communicating?

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EMPATHY

01 Assuring Welfare

02 Introducing the Animal

03 Informing the Audience

04 Inviting Perspective Taking

05 Connecting to Caring Action

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EMPATHY

Assuring Welfare

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EMPATHY

Introducing the Animal

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EMPATHY

Informing the Audience

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EMPATHY

Inviting
Perspective
Taking

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EMPATHY

Connecting to Caring Action

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QUESTIONS

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STORYTELLING



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WHY DO WE TELL STORIES?

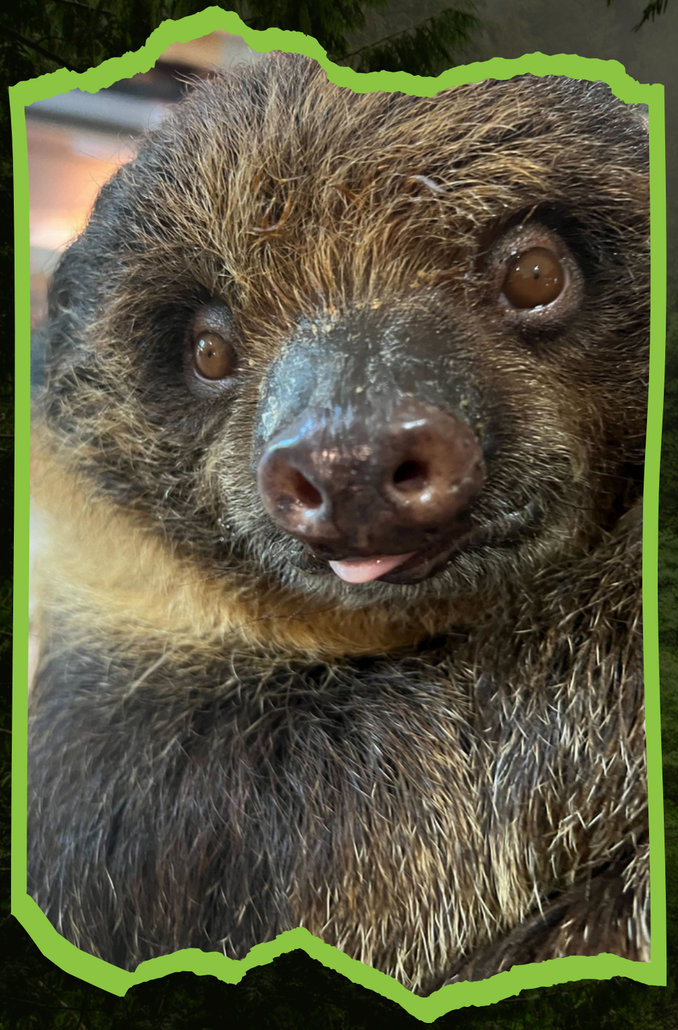
01 Universal Human Experience

02 Complex ideas → Understandable experiences

03 Invoke Empathy

04 Our brains are hardwired to remember stories

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HOW DO YOU CHOSE WHAT STORY TO TELL?

01 Start Simple

02 Pick Subject

03 Identify your Audience

04 Create a Theme Statement

Species: North American Porcupine

1. **Wild Habitat of the Species?**
   a. **Is it mostly arboreal, terrestrial, aquatic, or does it inhabit multiple environments?**

- Found in Canada except for the far north-central regions, as well as Alaska, western United States to the northern edge of central Mexico, and some northeastern states
- Arboreal, and common to forested areas
- Occasionally found in open areas and even deserts as long as a water source is readily available
- Dens in rock crevices, caves, and fallen logs
- North American porcupines are native to the coniferous and mixed-forest habitats of Canada, the northeastern and western regions of the United States and northern Mexico. Besides forests, porcupines can also be found in grasslands, desert shrub communities and even tundra.

2. **When is the animal most active?** (ie, Diurnal, nocturnal, crepuscular, etc)

- They are nocturnal, coming out during the night to browse on tree and shrubs
- Do not hibernate in the winter, but do not move very far either. Will feed and move only within a 300 ft. radius of their den
- When the weather is dry during the winter, they will feed at any time of the day or night

1. **What are some self-maintenance behaviors?** (ie grooming, shed, bathing, etc)

- They will gnaw on bones and antlers to keep their teeth down
- Porcupines will hunch in trees when caught in snow or rain during feeding, and wait for the weather to improve
- Porcupines are covered in about 30,000 quills.
- Porcupines do not shoot their quills, but they do detach easily
- They have over 30,000 barbed quills
- They will regrow lost quills
- Quills are actually modified hairs
- Quills are equipped in loose pores, so they can come out without causing pain to the porcupine
- Non-hollow. Filled with a spongy matrix
- Quills are designed to further penetrate their victim the more it moves

1. **Main threats to the species?** (predation, hunting, drought, etc)

- While not threatened, hunting by humans has caused populations to decline. Porcupines are targeted by the timber and agriculture industry due to certain destructive behaviors.
- In current day, porcupines are seen as pests due to their tendencies to gnaw through plywood and damage trees
- Primary predators include fishers, mountain lions, lynx, bobcats, red fox, coyotes, great horned owls, wolves and wolverines

1. **Main threat to the species' natural habitat?** (wildfires, construction, drought, etc)

- Human development and agriculture
- Climate change
- wildfires

2. **What are the primary sensory modalities of the animal?** (ie olfaction, vision, etc)

- Females will use olfactory and auditory clues to show males they are ready to mate
- Poor vision but highly developed senses of smell and hearing
- The porcupine has excellent senses of smell, hearing, and taste. Porcupines make a wide variety of sounds ranging from whimpers to screams, depending upon the circumstance.

3. **Social structure of the species?**

- Solitary
- Generally are solitary animals, though den sharing has been observed, and mothers and young always feed together
- Not normally territorial, but have been known to defend feeding sites when resources are limited

1. **Primary social behaviors of the species?** (ie courtship, play, aggression, scent marking to discern territory)

- Females will use olfactory and auditory clues to show males they are ready to mate
- Two or more males may fight for a female, often leading to quill impalements and other injuries
- Males will sometimes soak a female in urine before mating
- A dance is performed before mating, with the two porcupines standing on their hind feet, with their front feet on each other's shoulders. They may cuff each other around during the dance
- Do not hibernate in the winter, but do not move very far either. Will feed and move only within a 300 ft. radius of their den
- Porcupines will hunch in trees when caught in snow or rain during feeding, and wait for the weather to improve
- Porcupines of both sexes mark their home ranges with urine
- When attacked, a porcupine's quills stiffen upwards, which makes it easy to embed in the face and eyes of the predator
- Breeding takes place in the fall, usually in September in Alaska. Males seeking receptive females expand their home ranges up to five times the normal size. If more than one male shows interest in the same female, they will fight for the opportunity to mate with the female. Males use their incisor teeth and quills when fighting, and usually the largest and heaviest male wins.
- If she is not ready to mate, she shakes off the urine and leaves. If she is ready, she stays and the male mounts in the traditional posture with the female in front and the male in the rear. She will curl her tail over her back, covering most of the quills.
- Porcupines utilize natural cavities, such as rock caves, hollow logs and trees, or even the thicker vegetation in a tree as dens. Porcupines stay active throughout the winter.
- Porcupines may be active in the day but are mostly nocturnal. During the day they sleep in a tree, a hollow log or among rocks or tree root-wads; they do not build a nest.
- Porcupines use a combination of warning signals, which also serve to reinforce the lesson a dog or potential predator might learn from an encounter. Porcupines produce a chemical scent from a patch of skin on their backs near the base of their tails called the rosette

1. **How does the species rear young** (nesting behaviors, feeding, protective behaviors, parental input)?

- Are polygynous, meaning males will mate with multiple females
- Breeding season is once a year, usually in the fall, and lasts only 8-12 hours while the female is receptive
- Females have a copulatory plug, which means that if she is not inseminated, she may try to mate again in a month
- There is usually one offspring per pregnancy, though on rare occasions two have been produced
- Gestation lasts seven months (~210 days), and young are born weighing in at about 1 lb., already having spines and fur, and with their eyes open
- Within an hour, baby porcupines can climb trees and eat solid foods
- Juveniles will remain with their mothers until early fall, when lactation ends, and double their weight within the first two weeks of life
- Juvenile females will completely disperse from their mother, while juveniles males tend to move in and out of their mother's range
- Males reach sexual maturity at 24 months and females at 12 months.
- At birth the young weighs between 1 and 2 pounds (0.5-1.0 kg) and is about 10 inches (25 cm) long. Its eyes are open and its body covered with long grayish-black hairs and quills. Within a matter of hours the quills dry and serve as protection. The young porcupine is then capable of following its mother, although the young will not be able to climb large trees for several weeks
- The young are able to eat some vegetation after a few weeks, but the female continues nursing the young for 3.5 months.
- During the summer the young stay close to their mothers, learning about den sites and food trees, but toward the end of summer they start to spend more time apart. By October, when the female mates again, the young are fully weaned and wander off to face the winter alone.

1. **What is the diet of the species? How does diet change based on seasons?**

- They are herbivores, foraging on foliage for most of the year, and bark/ pinecones in the winter

- They feed less often in spring and summer because plant material contains a lot more protein than in autumn.
- Will often eat berries, seeds, fruits, nuts and plant stems
- Porcupines favor salty woods to gnaw on
- They will gnaw on bones and antlers to keep their teeth down
- The inner bark (phloem and cambium layers) of spruce, birch and hemlock and spruce needles are the major winter foods for porcupine living in Alaska. In the spring and summer, buds and young green leaves of birch, aspen, cottonwood and willow are eaten until the tannin levels build too high for the porcupine to tolerate.
- Because they are vegetarians and most vegetable matter is very low in sodium, porcupines need additional sodium in the blood to balance cell potassium levels. As a result, porcupines seek out salt sources such as natural licks, glue which bonds plywood together, human perspiration on tools, road salt, and some paints.
- The salt drive is primarily in the spring when porcupines are sodium deficient.
- Their diet changes seasonally. In the winter, they primarily eat evergreen needles and the inner bark of trees, often feeding heavily on a single tree causing damage or death to the tree. In the spring and summer, porcupines shift to eating berries, seeds, grasses, leaves, roots and stems.

1. **What behaviors does the animal use to locate/procure food?**

- Foraging
- Climbing
- Chewing
- Scent

1. **Natural behaviors (specifically relating to movement).**

- They are the only species of porcupine that can survive extreme cold
- Porcupines occupy dens during the winter months
- Generally are solitary animals, though den sharing has been observed, and mothers and young always feed together
- Do not hibernate in the winter, but do not move very far either. Will feed and move only within a 300 ft. radius of their den
- Not normally territorial, but have been known to defend feeding sites when resources are limited
- Porcupines will hunch in trees when caught in snow or rain during feeding, and wait for the weather to improve
- When the weather is dry during the winter, they will feed at any time of the day or night
- In summer, porcupines range farther from their dens, searching for food up to 1 mile away
- They are slow and somewhat clumsy animals, but are deft at tree-climbing, and will climb straight away at signs of danger
- While porcupines spend most of the time on the ground, they are good climbers and regularly climb trees in search of food (and occasionally are found to build nests in trees.) They are also good swimmers.
- A porcupine has a home range, the size varies in depending on the area, (studies have shown home ranges varying from 25-35 acres, to as much as 70 acres in others)

2. **Physical Description of species.**

- Adults can reach up to 39 inches long, with their tail making up a fifth to a third of that length and can weigh 10- 33 lbs.
- Have stiff, black-brown dorsal hair interspersed with white quills on the head, rear of the body, and tail
- Adults may have more than 30,000 barbed quills covering their back
- The belly of a porcupine is wooly, and quill-free
- Their feet are adapted for climbing, with large soles and strong digits with claws
- Their grip is so advanced that they can remain in trees only holding on with their hind feet
- Juveniles are better camouflaged, with all-black heads, backs and tails, and short quills
- Have chisel-like teeth for gnawing on bark, which are constantly growing. No canine teeth.
- Their fur ranges in color from brownish-yellow to black, and they sport white highlights in their quills.
- The porcupine's most famous feature—the quill—is hollow, 2 to 3 inches (5 to 7 centimeters) in length, and lightly attached to the porcupine's skin. Porcupines are covered in about 30,000 quills. Quills are not thrown or shot, as popularly conceived. Because quills are so lightly attached, they come off easily when a predator encounters them. When the quills enter the skin of a predator, they work their way further into the

skin at a rate of 1 mm an hour. Porcupines are more likely to flee predators, but if cornered, it will erect its quills, turn its back to the attacker and lash its barbed tail.

- The hair and a thick layer of body fat helps keep the porcupine warm during the winter. The tail is extremely muscular and adapted to aid in climbing and defense. The upper surface of the tail is heavily covered with quills, while the underside is covered in bristle-like hairs used to aid in climbing.
- Quills cover the body, except on the legs and belly. The quills are modified hairs which have microscopic overlapping sheaths on the tips (functioning like barbs) are filled with a spongy matrix. Quills from different parts of the body vary in length, flexibility, color, shaft diameter, and barb length.
- The average weight of an adult male porcupine ranges from 22 to 27 pounds (about 10-12 kg), but some individuals can weigh up to 30 pounds (13.6 kg). Adult females weigh 15 to 18 pounds (7-8.5 kg), about ten percent less than the males.
- When climbing, the porcupine uses the stiff bristles on the undersurface of the tail as support. The animal has long, curved front claws which also aid in climbing.



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DIRECTIONS: IDENTIFY THE EMPATHIC TECHNIQUES

Assuring Welfare

Introducing the Animal

Informing the Audience

Inviting Perspective Taking

Connecting to Caring Action

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EMPATHY EXAMPLE

“Say hi to Polly, the pollinating hummingbird. Her favorite flowers are tubular, which work best with her long, thin beak, particularly in shades of red and yellows. But Polly and other humming birds are so intelligent that they will change their color preferences to favor the most nectar rich source wherever they are. The best way to support Polly and other pollinators in your area is to plant native nectar plants and avoid pesticides for their safety as we do here at the zoo. It is okay to start small, even with just one flower plant outside or even better, include a variety of flowers with staggering bloom times to provide a steady food source spring through fall. Imagine how happy Polly will be with such a feast. Sign our pledge that you will plant at least one flowering bloom here. “

- Woodland Park Zoo Empathy Sheet



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EMPATHY EXAMPLE

"Say hi to Polly, the pollinating hummingbird. Her favorite flowers are tubular, which work best with her long, thin beak, particularly in shades of red and yellows. But Polly and other humming birds are so intelligent that they will change their color preferences to favor the most nectar rich source wherever they are. The best way to support Polly and other pollinators in your area is to plant native nectar plants and avoid pesticides for their safety as we do here at the zoo. It is okay to start small, even with just one flower plant outside or even better, include a variety of flowers with staggering bloom times to provide a steady food source spring through fall. Imagine how happy Polly will be with such a feast. Sign our pledge that you will plant at least one flowering bloom here. "

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Think, Pair, Share

Pick a topic relevant to you. Turn to the person next to you and use storytelling techniques to descibe the topic to them.

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Where do you see this information benefiting you in your chosen career path?

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QUESTIONS

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RESOURCES

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THANK YOU

