



2

Brooks River Brown Bears: Inheritance and Variation of Traits

● Observing the Brown Bears

explore

Learning
IN MOTION

2

Observing the Brown Bears



Students begin by reviewing and discussing their categorizations of brown bears' specific traits as being either inherited or acquired. After observing a photograph and video clip, students find out that bears learn (acquire) their fishing techniques. Students observe individual bears on the live bear cam and record their observations on a data sheet. When they are done, the class watches a video clip of bears using different fishing techniques. The lesson concludes with students using what they have learned about bears' fishing techniques in order to come up with a question they might answer while watching a live cam.

**GUIDING QUESTION**

Why are there differences between the ways individual brown bears look and act?



Lesson 2: Observing the Brown Bears

MATERIALS

Teacher Materials

- **Key to Katmai Brown Bear Identification** handout
- **Observing the Brown Bears** visuals:
 - **Brown Bears Fishing at Brooks Falls** photograph
 - **Brooks Falls Highlight 2** video
 - Optional: **Brooks Falls Highlight 3** video
 - **Brooks Falls Highlight 4** video

Student Materials

- **Katmai Brown Bear Identification** handout (from Lesson 1)
- **Brooks River Brown Bear Data Sheet** handout (1 per student)
- Optional: **Katmai Junior Ranger Bear Behavior Bingo** handout

LESSON PREPARATION


- Set up a means for students to view a digital photograph, video clips, and a live cam from explore.org. Options include:
 - Whole-class viewing a large computer monitor or projector
 - Pairs viewing multiple computer monitors simultaneously
 - Pairs taking turns viewing a single computer monitor (appropriate for live cam viewing only)
- If online streaming is available in your school (and the month is right), preview the explore.org live cams from Brooks River, Katmai National Park and determine which area of the river currently has the most bears:
 - The [Falls](#) (most active in July)
 - The [Riffles](#) (most active in September)
 - The [Lower River](#) (most active in September and October)
- If none of the live cams are currently live-streaming, plan to have students watch the **Brooks Falls Highlight 3** video clip.
- Print two copies of the **Brooks River Brown Bear Data Sheet** handout for each student. (Students will use the data sheet as they watch the live cams in this lesson and the next.)



Lesson 2: Observing the Brown Bears

OPENING

Review Inherited and Acquired Traits

1.  Review the **Katmai Brown Bear Identification** handouts students completed in Lesson 1. For each trait, have students raise their hand to vote whether they marked it as “Inherited” or “Acquired.” Use the **Key to Katmai**


Brown Bear Identification handout to check their answers.

- Help students deepen their reasoning and explanations by asking how they reached their conclusions.
- Remind students that **acquired traits** are those that a bear learned (like fishing techniques) or that happened after it was born (like getting scars or a torn ear).



Key to Katmai Brown Bear Identification


Lesson 2: Observing the Brown Bears

2.  Display and discuss the **Brown Bears Fishing at Brooks Falls** photograph.

- Zoom in on the two bears standing at the top of the falls. Ask students to identify physical differences between them and decide whether the traits are inherited or acquired. Students may notice:
 - One bear is lighter in color than the other—inherited.
 - One bear has a steeper brow ridge above its muzzle (nose)—inherited.
 - The bears have scars in different places—acquired.
- Broaden the focus to the two bears sitting in white water below the falls. Ask students to identify acquired behavioral differences between the four bears. Students may observe and infer:
 - They fish in different places and by standing or sitting, so they might have learned different fishing techniques.
 - Some fishing spots might be better, so the bears there might be bigger and stronger than others (dominant).



Brown Bears Fishing at Brooks Falls

3.  Show the **Brooks Falls Highlight 2** video clip, which shows two bears standing and “wrestling” in the river.
4. When the video is done, ask students to describe what they saw. Confirm that it is difficult to know whether the bears were playing or fighting, but that they were definitely testing each other’s strength. In general, the strongest, largest bears are the most dominant, “top” bears. That means they get the first choice of fishing spots or anything else that other bears might want.




Brooks Falls Highlight 2

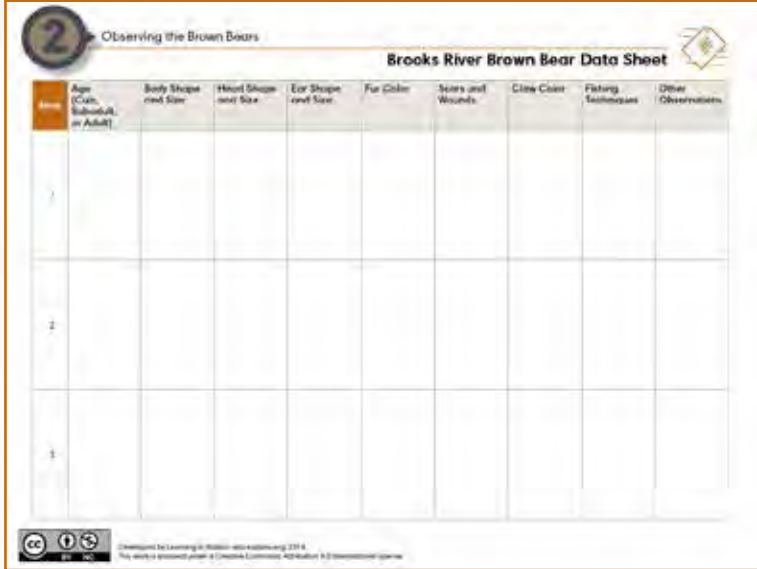
Introduce the Activity

1. Let the class know that today they will observe and collect data about the brown bears from live-streaming video at Brooks River. Explain:
 - Multiple cameras are installed along the river every summer and early fall. Two are mounted near the falls.
 - The cameras are being operated remotely. The operator will pan or zoom in when it looks like something interesting is happening.
 - The bears are wild animals, so people do not approach them.

Lesson 2: Observing the Brown Bears

2.  Give each student a **Brooks River Brown Bear Data Sheet** handout, and point out that there are spaces for them to collect data about the traits of three individual bears. They can write or draw their observations. These include:

- Age (cub, subadult, or adult)
- Body shape and size
- Face shape and size
- Ear shape and size
- Fur color
- Scars and wounds
- Claw color
- Fishing techniques
- Other observations




The handout is titled "Observing the Brown Bears" and "Brooks River Brown Bear Data Sheet". It features a table with 10 columns: Age (Cub, Subadult, or Adult), Body Shape and Size, Head Shape and Size, Ear Shape and Size, Fur Color, Scars and Wounds, Claw Color, Fishing Techniques, and Other Observations. The table has three rows for data entry. At the bottom left, there are Creative Commons icons (CC, BY, NC) and a copyright notice: "Developed by Learning in Motion and explore.org 2018. This work is licensed under a Creative Commons Attribution 4.0 International License."

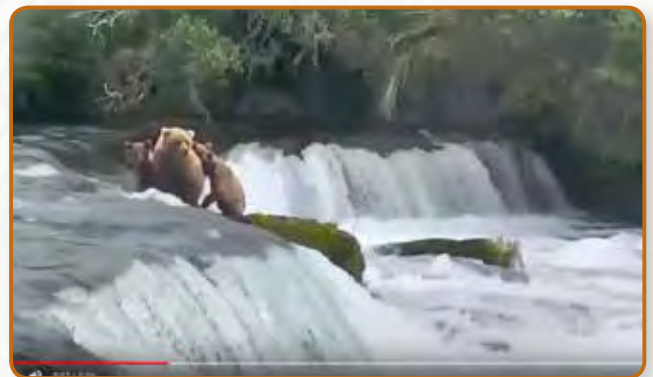
Brooks River Brown Bear Data Sheet

Remind the class that they can refer to their **Katmai Brown Bear Identification** handout for more information about what to look for in each set of traits.

ACTIVITY

Watch Brown Bears

1.  Show the live-streaming video you selected (the Falls, the Riffles, or the Lower River). Gauge how long to have students watch by the number of bears on camera and students' attention spans. (If no live cams are streaming, show the **Brooks Falls Highlight 3** video, which shows a mother moving her cubs away from a male.)
2. Call on student volunteers to describe different bears' physical and behavioral traits that they observed and documented from the video. In particular, ask students to describe any fishing behavior they might have seen. Write their observations about fishing techniques on the board.




Brooks Falls Highlight 3



Lesson 2: Observing the Brown Bears

Observe the Bears' Fishing Techniques

-  Show the **Brooks Falls Highlight 4** video, which illustrates bears using different fishing techniques. Remind the class that fishing techniques are learned, acquired behaviors. A mother bear needs to teach her cubs how to fish, so the cubs usually fish the way their mother does.
- As students watch, point out some of the bears' techniques:
 - Stand and wait** (Standing on top of Brooks Falls, a bear waits for fish to jump close enough to catch in its mouth.)
 - Sit and wait** (Sitting in the white water below Brooks Falls, a bear simply waits to feel a fish.)
 - Dash and grab** (A bear runs into the shallows at the far side of the river, chases fish, and attempts to pin them to the river bottom with its claws.)
 - Snorkeling** (A bear puts its head underwater to look for fish.)
 - Diving** (A bear goes completely underwater to look for fish.)
 - Stealing** (A bear takes a fish from another bear)
 - Scavenging** (A bear eats fish left behind by another bear)
- Explain that one way to tell apart individual bears is by watching where and how they fish.



Brooks Falls Highlight 4

Turn and Talk

- Tell students to turn and talk with a partner. They should:
 - Refer to the board and identify any fishing techniques they saw in the live-streaming video (if seen)
 - Explain to each other why bears' fishing techniques are learned and not inherited traits
 - Use what they have learned about bears' fishing techniques in order to come up with a question they might answer while watching a live cam, and write the question down.
- Let them know that in the next lesson, each student pair will share their question with the rest of the class.




Lesson 2: Observing the Brown Bears

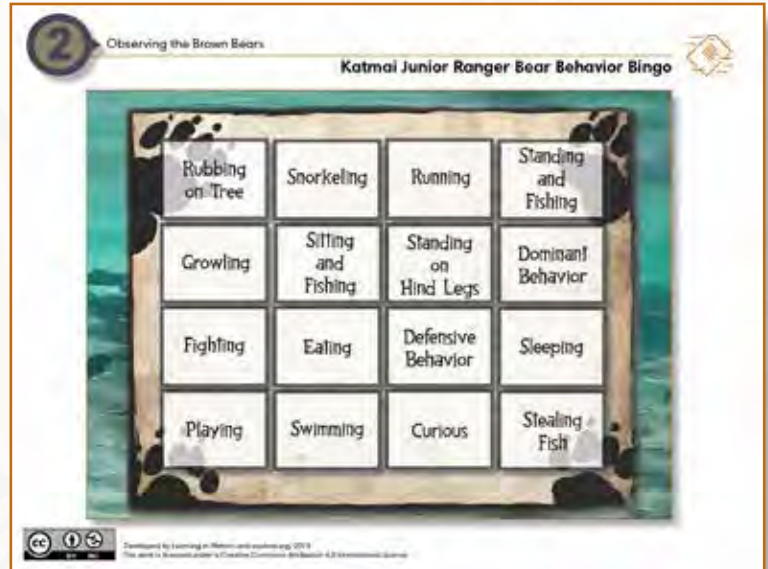
REFLECTION

- Have students write a brief exit slip describing something they learned about brown bears.

EXTENSION

Bear Behavior Bingo

-  Print a copy of the **Katmai Junior Ranger Bear Behavior Bingo** handout for each student or student pair.
- Have students mark the bingo sheet whenever they see one of the bear behaviors and actions on the live cam.
- Tell them that if they get four in a row (up, down, or diagonal), they've gotten a bingo!








Katmai Junior Ranger Bear Behavior Bingo



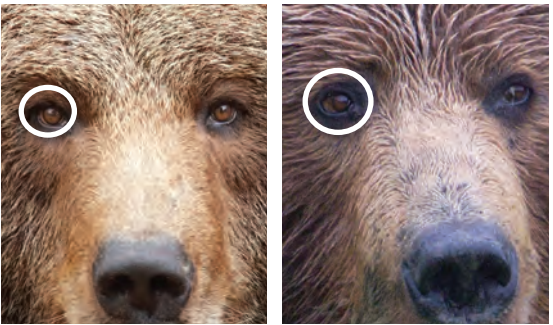





Key to Brown Bear Identification

Trait		Acquired (A) or Inherited (I)?
Body shape and size		
<ul style="list-style-type: none"> All brown bears have a shoulder hump. 		I
<ul style="list-style-type: none"> Most bears carry more weight in their shoulder area. Note if one carries more weight in its hind quarters. 		I
<ul style="list-style-type: none"> Over the summer, bears can eat enough to gain 1 kilogram (over 2 pounds) in 1 day. 		A
Head shape and size		
<ul style="list-style-type: none"> The shape of a bear's muzzle (nose) can be <ul style="list-style-type: none"> long or short pointed or blunt stepped or straight from the forehead 	<div>   </div> <div> short, blunt, straight from forehead long, pointed, stepped from forehead </div>	I






Key to Brown Bear Identification

Trait		Acquired (A) or Inherited (I)?
<ul style="list-style-type: none"> The size of a bear's eyes can be large or small 	 <div>small eyes large eyes</div>	I
<ul style="list-style-type: none"> A bear's ears can be <ul style="list-style-type: none"> large or small triangular or oval upright or flopped over 	 <div>large, triangular, upright eyes small, oval, upright ears flopped over eart</div>	I
<ul style="list-style-type: none"> Note if a bear is missing all or part of an ear. 		A
Fur color		
<ul style="list-style-type: none"> A bear's fur can be <ul style="list-style-type: none"> Light or dark Short or shaggy 		I

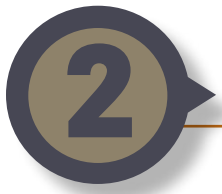


Key to Brown Bear Identification

Trait		Aquired (A) or Inherited (I)?
Scars and wounds <ul style="list-style-type: none"> Scars or wounds are most visible when adult bears shed in the early summer. They are usually seen <ul style="list-style-type: none"> On the face and neck On the back On the sides 		A
Claw color <ul style="list-style-type: none"> Most bears have dark claws. Note if one has tan-tipped or white claws. 	 <div> <div>dark claws</div> <div>tan-tipped claws</div> </div>	I
Fishing techniques <ul style="list-style-type: none"> Note how a bear tries to catch salmon, and whether it does <ul style="list-style-type: none"> With its mouth With its claws While sitting While standing While underwater 		A

Brown Bears Fishing at Brooks Falls





Brooks River Brown Bear Data Sheet



Bear	Age (Cub, Subadult, or Adult)	Body Shape and Size	Head Shape and Size	Ear Shape and Size	Fur Color	Scars and Wounds	Claw Color	Fishing Techniques	Other Observations
1									
2									
3									



Katmai Junior Ranger Bear Behavior Bingo

