

Day 3

Bird brains





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Introduction

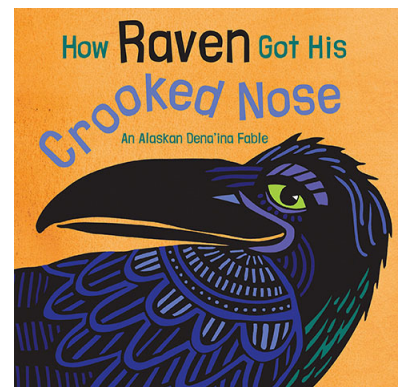
Birds learn and remember. And they are smart. They have to solve some of the same problems that humans do — finding nutritious foods, cooperating with or getting along with others, creating a safe environment to raise young. Activities on this day focus on behaviors that show how birds use their brains to plan, problem solve, reason, and learn.

Questions to guide explorations and experiments

- How smart are birds? Can birds solve problems?
- How do birds look at the world?
- How are instinct, behavior, and intelligence related?
- Who do birds learn from?

Books and activities

- **Books:** fables and brainy birds
- **Activities:** cache food like a bird and find it again, examine truths in fables, design an experiment, and take a Bird Walk





Children's Books

Fiction

- *Aesop's Fables* by Jerry Pinkney (Ages 4-8)
- *Birds of a Feather and Other Aesop's Fables* by Tom Paxton (Ages 6-9)
- *Fly, Eagle, Fly: An African Tale* by Christopher Gregorowski (Ages 4-8)
- *Freedom Bird* by Jerdine Nolen (Ages 6-9)
- *Hello Crow* by Candace Savage (Ages 4-8)
- *How Raven Got His Crooked Nose: An Alaskan Dena'ina Fable* retold by Barbara J. Atwater and Ethan J. Atwater (Ages 4-8)
- *Homer on the Case* by Henry Cole (Ages 9-12)
- *Inch by Inch* by Leo Lionni (Ages 4-8)
- *King of the Birds (Arlo & Pip)* by Elise Gravel (Ages 6-10)
- *The Lost Little Bird* by David M. McPhail (Ages 4-8)
- *Mr. Popper's Penguins* by Florence and Richard Atwater (Ages 9-12)
- *Real Pigeons Fight Crime* by Andrew McDonald and Ben Wood (Ages 9-12)
- *The Tale of the Mandarin Duck* by Katherine Paterson (Ages 3-6)
- *Welcome, Brown Bird* by Mary Lyn Ray (Ages 6-9)
- *What Is a Wise Bird Like You Doing in a Silly Tale Like This?* by Uri Shulevitz (Ages 6-9)

Poetry

- *Seagulls Soar* by April Pulley Sayre (Ages 4-8)
- *Superlative Birds* by Leslie Bulion (Ages 8-12)

Nonfiction

- *Alex the Parrot: No Ordinary Bird* by Stephanie Spinner (Ages 8-12)
- *Animal Fact/Animal Fable* by Seymour Simon (Ages 6-9)
- *Beastly Brains: Exploring How Animals Talk, Think, and Feel* by Nancy F. Castaldo (Ages 10-12)
- *Crow Smarts: Inside the Brain of the World's Brightest Bird* by Pamela Turner (Ages 10-12)
- *Crows: Genius Birds (Science Comics)* by Kyla Vanderklugt (Ages 9-12)
- *Professor Aesop's the Crow and the Pitcher* by Stephanie Gwyn Brown (Ages 6-9)
- *Wow! Look What Birds Can Do!* by Camilla de la Bedoyere (Ages 6-9)



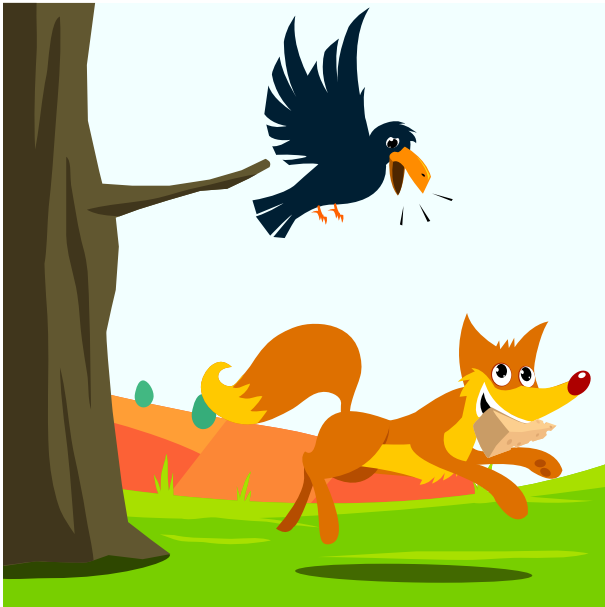
Bird Words

Cache

A safe place for hiding food (or other valuables) from others who may want to take it

Fable

A short story usually with animals that act like people as the main characters and that often teach a lesson on proper behavior



Hypothesis

A guess you make based on information you already know

Instinct

A non-thinking response that an organism is born with to deal with the environment

Learned behavior

Behavior that an organism develops through experience, either its own or from others

Spatial memory

Brain activity that enables people and animals to remember different locations as well as spatial relations between objects



Activity 1: Caching In

Introduction

Many birds, including chickadees, crows and jays, will hide food to retrieve and eat at a later time. This behavior is called **caching** and helps birds survive when the weather or food sources are low. Some birds' brains — actually the hippocampus, the **spatial memory** part of the brain — grow larger in the fall to help them remember where they've stored food.

Birds who cache can store hundreds of seeds a day! They place seeds in different locations and can remember where each cache is, even a month later. Smart birds! Kids can try their hand at caching and test their own spatial memory.

Supplies

- Small items that are decomposable, e.g., coffee beans, dried beans, popcorn kernels, etc.

Get kids thinking ...

Ask kids: Do you have a hard time keeping track of your belongings? How do you know where to find where you've put something? Do you use landmarks to remember where you put it? Do you have a map inside your head of the location?

Let's get started!

Step 1: Head to an outdoor space where you can spend a few hours or easily come back that same day. Explain **caching** behavior in birds and then give each child five small items that are decomposable, e.g., coffee beans, peanuts, other foodstuffs.

Step 2: Tell kids to “cache” or hide the items by covering them with leaves, grass, or other natural materials. (Make sure they don't dig any holes.) Ask them to make sure to remember where they hid their items because they will need to find them later.





Activity 1: Caching In

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Step 3: After everything has been cached, you can either stay outdoors and do some reading aloud and birding, or head back and plan to return to the same spot later in the day. You want some time to pass before asking kids to come back and find their caches. Before you have them start their search, discuss the **Clark's Nutcracker** (shown below).



Remind kids that earlier in the day, they hid bits of food. In doing that they were acting like the birds who do the same thing in the wild — but birds do it on a grander scale. For example, **Clark's Nutcrackers bury pine seeds in as many as 5,000 caches!** They are able to retrieve many of them, but some seeds are found by others and some they don't find. The seeds they don't find may grow into pine trees and keep the forests green.

Ask kids: Why do you think we hid those items earlier? What does this activity have to do with bird intelligence? Do you think having a good memory has something to do with how much intelligence you have? The fact that the bird can find most of the 5,000 caches it hides seems



Activity 1: Caching In

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to show that the bird has a tremendous intelligence to remember where these seeds are. Talk about some reasons birds might have better **spatial memory** than people. Do you use your memory a lot? What do you use it for?

The Clark's Nutcracker is clever in other ways too. It knows that other birds may be watching it as it hides seeds. If there's another bird watching, the Nutcracker will pretend to hide the seeds, but it then moves to another location to create the actual cache! That is clearly a sign of intelligence. Being aware of what others are thinking and acting on that awareness is a high level of intelligence.

Ask kids: Have you ever done anything similar to this strategy of Clark's Nutcracker?

Step 4: Now have kids search for their caches.

Give everyone plenty of time to look and remind them to only retrieve what they hid. Once the search is over, check in to see if they found all of their hidden items.

Ask: How did you remember where you left your cache? For items not recovered, discuss what might have happened to them.



More memory activities

Some people try to remember things by repeating them over and over. Test kids' memory with this activity. You start with "I went to the woods and I saw a blue jay." Then the next person needs to repeat what you said and add their own bird sighting: "I went to the woods and I saw a blue jay and a sparrow." The game follows around the room with each player recalling the complete list of birds seen in the woods and adding a new one.

Test the Smarts of Your Backyard Jays (Audubon)

<https://www.audubon.org/news/test-smarts-your-backyard-jays-fun-memory-game>



Activity 2: Experimental Learning

Introduction

Much of bird behavior is **instinctive** — birds are born knowing how to build a nest or find their food. But scientists are beginning to understand that birds are capable of solving problems beyond the **instincts** that they are born with. Kids can solve problems too and learn from the experiments of others and their own.

Supplies

- Computer or other device with audiovisual display
- Internet connection
- Bird journals (see Appendix)
- Pencils

Get kids thinking ...

Crows can perform tasks that take real thinking. Aesop, the Greek storyteller who lived some 2,500 years ago, may have already realized this.

Share:

The Crow and the Pitcher

<http://www.read.gov/aesop/012.html>



Let's get started!

Ask kids about the fable: Do you think this story is true? Is the crow smart enough to have figured out how to get the water on his own? Explain that scientific experiments have demonstrated that the crow was actually smart enough to carry out such a task on his own.

Watch:

"How Smart Are Crows?" (NY Times)

<https://youtu.be/s2lBayVsbz8>



Activity 2: Experimental Learning

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Discuss any experiments kids have conducted in the past. **Ask kids:** What other ways could you test bird intelligence? Could they come up with an experiment to explore bird intelligence? Are there other fables or stories about birds that might give them ideas?

Share more research into bird intelligence with kids before helping them use experimental design steps to form a question, make a **hypothesis** or prediction, and determine the methods for conducting their experiment.

Bird IQ Tests: 8 Ways Researchers Test Bird Intelligence (Audubon)

<https://www.audubon.org/news/bird-iq-tests-8-ways-researchers-test-bird-intelligence>

Teach Students the Design of Experiments

<https://www.storyboardthat.com/articles/e/experimental-design>

Experimental Design in Science

<https://youtu.be/7q8acfBx5to>

Kids may not be able to carry out their experiments, but thinking of questions and outlining their research ideas are important concepts to learn that will enable them later to design and conduct sound scientific experiments. Remind kids about the importance of the ethical treatment of animals during any experiment.



Crow solves an 8-step puzzle to get food. Watch CCBC video:

<https://youtu.be/iVzmkbkYr0M>



Activity 2: Experimental Learning

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You can also try recreating a version of the crow and water pitcher experiment — but for kids instead of crows:

The Crow and the Pitcher (National Council of Teachers of Mathematics)

<https://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/6-8/CrowAndPitcher-AS.pdf>

Professor Aesop's The Crow and the Pitcher Educator Guide (Random House)

http://www.randomhouse.com/crown/tricycle/images/Professor_Aesop_Guide.pdf

More activities

Investigating Evidence (The Cornell Lab)

https://www.birds.cornell.edu/k12/investigating_evidence/

BirdSleuth Investigator (The Cornell Lab)

<https://www.birds.cornell.edu/k12/student-publication/>

BIRD WALK



During this Bird Walk, encourage kids to watch for dozens of bird behaviors, from preening and perching to walking and hopping.

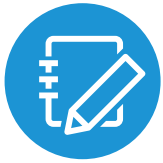
Ask kids to also be on the lookout for evidence of bird intelligence — are birds communicating with each other? Do kids notice any signs of play or cooperation?

Some Bird Buddies may benefit from specific instructions on what bird behaviors to look for. To help them identify what the bird was doing, you might offer these questions for kids to include in their Bird Journals to use as prompts for noting details:

Was the bird I saw:

- On the ground?
- Flying?
- Moving in a pattern?
- Hopping?
- Picking something up with its beak?
- Eating something? What?
- Alert and looking around?
- Out in the open?
- Hiding under some thick brush?
- Standing very still?
- Singing?
- Calling?

When kids are looking out for bird behaviors, they are sure to have questions. They may wonder: *“Are those robins playing or fighting?”* Remind them to use their Bird Journals to note questions or things they wonder about so they can research answers and discuss what they’ve seen later with their fellow Bird Buddies.



Writing about Birds

Fabulous fables

Fables are short stories that teach a lesson. Most fables are filled with animals that have the characteristics of humans. Have kids think about The Crow and the Pitcher and how it teaches us to rely on our intelligence in a difficult situation; or The Lion and The Mouse, which teaches us about cooperation. Ask kids to write and illustrate a fable of their own, featuring at least two intelligent birds, that teaches an important lesson.

Share other fables for inspiration:

The Aesop for Children (Library of Congress)

<http://www.read.gov/aesop/index.html>

Silk Road Fables (American Museum of Natural History)

<https://www.amnh.org/explore/ology/anthropology/silk-road-fables2>

Chef bird

Humans often develop preferences for food based on how good we think it tastes. Birds are not so fussy. We humans have about 10,000 taste buds while birds, at the most, have about 500. Have kids choose a bird and thoroughly research what it eats. Then have kids come up with a fantastical recipe using those foods in the bird's typical diet as ingredients. They'll need to include a list of ingredients, measurements, and steps for what birds need to do to make this tempting new dish.

Smarty feathers

A know-it-all is someone who behaves as if they know everything. **Ask kids** what bird they think is the know-it-all of the bird kingdom. Have them create a comic about what happens when the know-it-all bird meets up with a bird who is actually quite wise.



Writing about Birds

Creating Comics and Cartoons! (Read, Write, Think)

<http://www.readwritethink.org/parent-afterschool-resources/activities-projects/creating-comics-cartoons-30291.html>

Quick Cartooning Tips from Jarrett J. Krosoczka

<https://www.youtube.com/playlist?list=PLg9gpgNtuVmESfbnryFQ-wJJZoq3IniNy>

Writing Tips from JJK

<https://www.youtube.com/playlist?list=PLg9gpgNtuVmGFndpo0czbvyDzdbEoG2iF>

Life list

When exciting or unusual things happen, they often stand out in our memories. Writing things down can be a good way to help remember the exciting or not so exciting things you want to remember. Talk with children about the kinds of things they most easily forget or remember.

Ask: Would keeping a list help? Keeping a list of birds is definitely helpful when trying to remember which birds you've encountered. Have kids create a list poem about their sightings. A list poem is thoughtful — not just a random list — with the last line typically being funny, meaningful, or something very important.



Kid-friendly Digital Media

Websites

Bird Intelligence (Active Wild)

<https://www.activewild.com/bird-intelligence/>

Where Is That Bird Going with That Seed? (The Cornell Lab)

<https://www.allaboutbirds.org/news/where-is-that-bird-going-with-that-seed-its-caching-food-for-later/>

Birds (National Geographic Kids)

<https://kids.nationalgeographic.com/animals/birds>

Podcasts

Bird Intelligence (The Science of Birds)

<https://www.scienceofbirds.com/podcast/bird-intelligence>

Myths (BirdNote)

<https://www.birdnote.org/explore/tune-kids-nature-resources-educators/shows-educators-topic>

Videos

Why bird brains are more brilliant than anyone suspected

<https://youtu.be/H59GcPgXXv4>

Wild Crows Inhabiting the City Use it to their Advantage (BBC)

<https://youtu.be/BGPGknpq3e0>

Crow Intelligence (California Academy of Sciences)

<https://www.calacademy.org/explore-science/crow-intelligence>

Do Birds Play? (BirdNote)

<https://www.birdnote.org/explore/field-notes/2014/04/do-birds-play>