

# WINTER SURVIVAL ADAPTATIONS: CACHING FOOD

## BACKGROUND

To survive the harsh winters in Yellowstone, animals need to adapt. One way that some animals adapt to survive the winter is gathering and storing, or caching, their food so that they can survive when there are fewer resources available. Two significant animals that cache their food are the Clark's Nutcracker and the Red Squirrel, though their method of caching varies. The way an animal interacts with its environment has a profound effect on its ecosystem. A Clark's Nutcracker caches Whitebark Pine seeds, resulting in the spread and growth of the threatened Whitebark Pine tree.

**GRADE LEVEL:** 2nd-6th

**SUBJECT:** Ecology

**GROUP SIZE:** Up to 35 students

**SETTING:** Indoor or outdoor

**NATIONAL/STATE STANDARDS:**

**WY Science Standards (2016)** 2-LS4, 3-LS4, 5-LS2, MS-LS2

## OVERVIEW

Students will demonstrate the difference between food caching strategies of the Clark's Nutcracker and the Red Squirrel by caching "food tokens" throughout the space. Imagining its winter in Yellowstone, students will retrieve tokens at the direction of the teacher. Students will then assess the effectiveness of the caching strategies of the Clark's Nutcracker and the Red Squirrel and their impact on the greater ecosystem.



## MATERIALS

- Teacher script
- Reference photos of the Clark's Nutcracker, the Red Squirrel, and the Whitebark Pine tree (attached)
- Food caching tokens (attached) – 4 per student

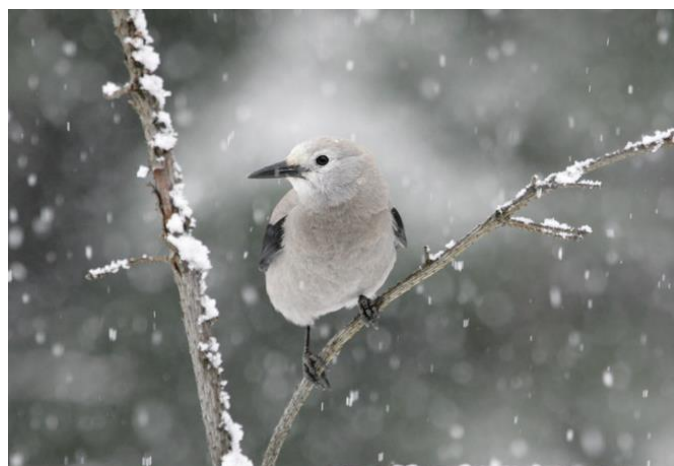
## SUPPLEMENTAL RESOURCE

**WATCH: THE BIRD AND THE TREE FROM CORNELL LAB OF ORNITHOLOGY PROVIDES VALUABLE BACKGROUND AND CONTEXT**

(<https://vimeo.com/745934097/822b3eef1?share=copy>)

## OVERARCHING CONCEPTS

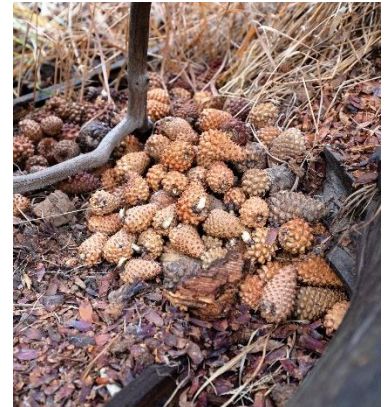
- All living things are connected in their environment.
- Living things rely on each other to survive.
- Animals adapt to survive in their habitats.



## PROCEDURE

### INTRODUCTION

- 1. Discussion: What adaptations do wildlife in Yellowstone have to survive the long winters?**
  - a. Possible discussions: migration, toleration, hibernation, camouflage, big paws to walk on snow
  - b. Present the idea of gathering and storing food
- 2. Define cache: store away or hide for future use**
  - a. Discussion: Do humans cache food?**
- We are going to learn about two animals in Yellowstone that cache their food for the winter. Both animals eat from the Whitebark Pine tree - a seed from the Whitebark pine has more calories than chocolate when compared ounce for ounce.
  - a. Introduce the Red Squirrel:** The red squirrel (show image) will collect Whitebark pinecones and store them in a *midden*, or a large pile, usually buried/hidden away. Grizzly bears often raid middens to eat the pinecones. Red squirrels are extremely territorial, and you may here them chattering to defend their middens.
  - b. Introduce the Clark's Nutcracker:** This bird collects up to 98,000 Whitebark pine seeds and stores them in up to 10,000 different places. They have amazing memories and can remember all their hiding places.



### RULES OF THE GAME

1. Half of the class will be Red Squirrels and half of the class will be Clark's Nutcrackers.
2. Each student will receive **4 food tokens** (4 Whitebark pine seeds)
- 3. If you are a Red squirrel, you will be caching all 4 food tokens in one spot (like a midden). If you are a Clark's Nutcracker, you will be caching each food token in a different spot.**
  - a. Establish boundaries in the space for students to play within (classroom, playground area, etc.)
  - b. Tokens must be partially visible: ensure that students do not bury tokens or put tokens in their pockets or backpacks. Have students think of caching as "storing away" rather than hiding so that they can find tokens later.
4. Once students receive food tokens and animal role, allow students to cache their tokens and instruct them to return to their seat when finished.
5. Explain that wildlife do not follow the same rules and laws that humans do (*Would you take food from your teacher's fridge?*)—when an animal needs food it can take from other animals' caches.

### GAME PLAY – TEACHER SCRIPT

- 1. Close your eyes! Imagine that it is November in Yellowstone National Park. Snow has started to fall, temperatures are dropping, and food is getting scarce. In order to survive, you need to collect one food token. DON'T GET MORE THAN ONE! You need to leave enough food to make it through the rest of winter!*
  - a. Have students return tokens to your bag – this is their belly and they can make a CHOMPing sound when they eat it!
  - b. Once everyone is back – ask who survived winter so far.

2. *Close your eyes again! Imagine that it is January in Yellowstone National Park. Snow continues to fall, temperatures are frigid, and food is even harder to find. Good thing you cached your food before winter started! You are really hungry, so go and collect 2 food tokens this time!*
  - a. Option: Add in a grizzly bear to take from a couple of caches!
  - b. Have students return tokens to your bag.
  - c. Once everyone is back – ask who survived winter so far. If students did not find two tokens, they can stay in the game but they have to move in slow motion because they will be hungry and low on energy.
3. *Close your eyes one more time! Imagine that it is March in Yellowstone National Park. Springtime is right around the corner, the snow is starting to melt, but the trees haven't started to bloom yet. To make it through the last bit of winter, go retrieve one last food token!*
  - a. Have students return tokens to your bag.
  - b. Once everyone is back – ask who survived winter so far. If students did not find a token, they still survived, but they are going to be moving in slow motion going into the Spring.

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## DISCUSSION

1. **If you were a Red Squirrel, what are the pros to hiding your food in one cache? Cons?**
2. **If you were a Clark's Nutcracker, what are the pros to hiding your food in many different caches? Cons?**
3. **Which caching method would you prefer?**
4. **What happens to pine seeds that are not collected?**
  - a. Seeds that do not get eaten GROW into Whitebark Pine trees!
  - b. Remember that Clark's Nutcrackers place seeds in up to 10,000 different places. Whitebark Pine seeds do not spread easily without the help of the Clark's nutcracker because they are heavy and do not blow easily in the wind.
5. **What would happen to the ecosystem if Red Squirrels and Clark's Nutcrackers disappeared?**

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## OTHER CONSIDERATIONS

- If you are playing this game outside, do not laminate printed out food tokens. This way, any food tokens that go unfound will decompose! If playing in the classroom, use crayons or other small items to represent food tokens to avoid having to print and cut.

## EXTENSIONS

- The Whitebark Pine tree is a threatened species that faces adversities including mountain pine beetles, deadly fungus, and effects of climate change. What might happen if Whitebark Pine trees became extinct?
- How do grizzly bears adapt for winter? How does this differ from the Clark's Nutcracker and the Red Squirrel?

## ADDITIONAL RESOURCES

- [Welcome | Whitebark Pine Ecosystem Foundation \(whitebarkfound.org\)](http://whitebarkfound.org)
- [Is the Fate of Whitebark Pine in the Beak of Clark's Nutcracker? \(U.S. National Park Service\) \(nps.gov\)](https://www.nps.gov/learn/education/activities/whitebark-pine-in-the-beak-of-clark-s-nutcracker.htm)



















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