A C T I V I T Y G U I D E





SURVIVE THE LAKE / ACTIVITY GUIDE

# Introduction

Nestled between the desert and mountains of northern Utah, Great Salt Lake is the largest saltwater lake in the Western Hemisphere.

Its high salinity creates a unique ecosystem that supports brine shrimp and attracts millions of migratory birds each year. As a vital natural resource, the lake plays a key role in regional climate regulation, industry, and recreation.



Map of Utah



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### From the Film

In Secrets of Great Salt Lake, we learn that the lake is part of a watershed that supports a diverse but delicate ecosystem. There are over 10 million migratory birds that use the lake as a staging site each year, sustaining themselves on the abundant brine shrimp and brine fly populations. Some of these birds, such as American white pelicans, nest on small islands in the lake. Historically, islands served as natural barriers against terrestrial predators like coyotes. However, as water levels decline due to increased consumption, these islands have become connected to the mainland by land bridges.

While pelicans are away hunting for fish, this new access allows predators to reach nesting sites, posing a significant threat to eggs and hatchlings.



Although fish cannot survive in Great Salt Lake, they are abundant in surrounding lakes, wetlands, and rivers, where Pelicans hunt them.



# **Activity Overview**

In this activity, learners will take on the role of a fish, an American white pelican, or a coyote, and play a game of survival that models how interactions between these organisms change due to the decreasing water levels of Great Salt Lake.

Estimated time for activity: 20 minutes

#### Materials:

Based on a class size of 25 learners

- 14 Hula hoops (1 per pelican and 2 per coyote)
- 12 foam balls (or any object that can be picked up and used as the egg) (2 per pelican)
- · 30 bean bags (or any small object that won't float or roll away) (2 per fish)
- 1 whistle
- 1 timer (optional)

# Preparation



- Set out two islands of three hula hoops in the middle of the gym floor at some distance from each other.
- Designate one corner as the **respawning** zone for the fish. Place a bucket of bean bags in the respawning corner.

Note: This game is based on a class size of 25 and is intended to be played in a large open area, like a field or gym. It can be adapted for different class sizes, but it is not recommended to play with fewer than 15 learners.

Determine in advance how many learners will play each role, depending on your class size.

## Instructions

Briefly review what learners remember from the film about fish, coyotes, and American white pelicans.

With a partner or small group, rank the three animals into first, second, and third place. This is open-ended—learners can determine what it means to be first.

Then, complete an  $A \ E \ I \ O \ U$  reaction for the animal you ranked as #1:

A djective- (that describes the animal)

E motion- (how you feel about the animal)

I nteresting- (a fact about the animal)

O h!- (something surprising about the animal)

Um?- (a question about the animal)

Explain why you ranked each animal as you did.

Inform learners that they are going to play a game that models the interactions between three species of Great Salt Lake: the fish, coyotes, and American white pelicans.

In the game, the floor represents the lake and surrounding wetlands, and point out the hula hoop islands where the pelicans nest. The perimeter of the gym is the lakeshore, the **base** for the coyotes. Explain that fish can roam anywhere in the gym.

Select volunteers and explain their roles, one role at a time. Emphasize that the game runs quickly, so participants will have the opportunity to play all three roles. Have learners move to their starting location once their role is assigned.

#### PELICAN (6) - Goal: Catch fish and protect their egg.

Each pelican will stand inside one of the hula hoops in the "island" formation with one egg at their feet.

#### COYOTE (4) - Goal: Steal eggs from nests.

Coyotes will stand along the wall with one hand on the wall until Low Water is called. In their other hand they should be holding two hula hoops.

#### FISH (15) - Goal: Avoid being caught. Survive!

Each fish should hold one bean bag, representing their life. They can stand and run anywhere in the gym, but there is no time-out or safe zone.



## The rest of the Rules...

Pelicans must leave the nest to catch fish, but they cannot take the egg with them—the egg is only safe if a pelican is in the hoop with the egg. Once the pelican leaves their nest (steps outside of the hula-hoop), the coyotes can take it. Pelicans cannot guard someone else's egg, as pelicans are not *alloparental*, so they will only care for their own young.

#### Pelicans Catching Fish

Pelicans must leave the nest and catch at least one fish during every change of water level. If they don't, they starve and are out of the game—past catches don't count!

Each fish gives the pelican a bean bag, which must be returned to the nest before catching another fish.

Once a pelican catches 5 fish, they can trade in their 5 bean bags for a new egg. Let the teacher or referee know when this happens.

#### Fish Re-spawning

When tagged, a fish gives their bean bag to the pelican, puts hands on their head, and walks to the re-spawn zone. This signals they've been tagged.

Once in the zone, they re-spawn and can rejoin the game.

#### The Coyote's Role

If a coyote steals a pelican's egg, the pelican survives and can keep tagging fish to earn a new egg. Once stolen, the egg belongs to the coyote—pelicans can't take it back.

Coyotes must leave the lake before High Water. If they're still in the water, they drown and are out for the rest of the game.

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If a coyote has an egg with them when they drown, the egg is "dead" too. It doesn't go back to the pelican. If a coyote doesn't steal an egg by the end of the game, they are dead.

**Optional rule:** If a coyote catches 3 eggs, they can "have a baby" and a fish or dead pelican can become a new coyote.

# Game Play

After explaining the rules for High Water and Low Water, play a practice round. Confirm that everyone understands their goals and limitations.

Each game has three rounds of High Water and three rounds of Low Water, and the entire game will last about **5 minutes**. Play the game at least twice so learners can have a chance to experience a different role.

- 1. The game starts on High Water: Water levels are high. Pelicans can tag fish, but coyotes cannot access their nests.
- 2. After 15 seconds, announce Low Water: Coyotes can now use the hula hoops as land bridges to access the nests (standing in one hoop, placing the other hoop down next to the hoop and hopping into it, then placing the first hoop down, repeating all the way to a nest), steal an egg, and bring it back to the shore.
- 3. If they didn't get an egg this round, they can try again the next round.
- 4. After 20 seconds, give a 10-second countdown to High Water. This gives coyotes a warning to make their way back to the shore before High Water is called, or they will be caught in the lake and drown.
- 5. Announce Low Water. Coyotes can go back into the lake.
- 6. After 20 seconds, give a 10-second countdown to High Water. Coyotes must not still be in the lake when High Water is called.
- 7. Announce Low Water. Coyotes can go back into the lake.
- 8. After 20 seconds, end the game. If playing again, allow learners to choose different roles.

# Tips for a Smooth Game

There are a lot of moving parts (literally!) in this game and it can be helpful to assign a volunteer learner to be a referee to watch the following:

- Make sure that if a pelican doesn't tag a fish during the round, the pelican sits out.
- Make sure to count the bean bags the pelicans collect and trade them a new egg for each 5 bean bags they collect.
- Make sure that if a coyote is still in the lake when High Water is called, the coyote sits out.

## Debrief

Evaluate the game by asking the following questions:

- 1. Who was successful and who was not successful?
- 2. Why can't fish live in Great Salt Lake?
- 3. Why do pelicans have to search further out for fish?
- 4. Are pelicans adapted to eat other food sources that live in Great Salt Lake, like brine shrimp? Why or why not?
- 5. Do you think pelicans will continue to nest on these islands? Why or why not? What will happen to other organisms in the lake if the pelicans stop coming?
- 6. What other food sources could the coyotes use if they can't access the islands?
- 7. What would happen if we introduced another migratory bird species to the game? Many species besides the pelicans stop at Great Salt Lake.
- 8. What actions could humans take to positively impact this ecosystem?
- 9. How would severe storms affect the timing of bird migration and the birds' survival? How about droughts or rising temperatures?

# Early Childhood Modifications

Play a variation of Red Light, Green Light.

Place several balls ("eggs") at the front of the room with the caller, and have the caller play the role of a pelican and the runners play the role of the coyotes.

Instead of "Green Light", call out "Low Water"--the coyotes are allowed to approach the caller. Instead of "Red Light", call out "High Water"--the coyotes remain in place."

To learn more about migration, read *Follow the Flyaway: The Marvel of Bird Migration* by Sarah Nelson or *How Do Birds Find Their Way?* by Roma Gans.



## Extension: Birdwatch for Science

Introduce learners to the basics of birdwatching. In the classroom, watch a video or livestream of a local habitat and review how to identify a bird using the following look-fors and a field guide or the **Merlin Bird ID** app:

To identify a bird, note its size, shape, and color; what it is doing; and where and when you saw it.

As a class, go outside and practice these skills. Select an area and identify and count birds over a period of time. Click for more advanced **eBIRD TIPS**.

## Extension: Birdwatch for Science

Remind learners to move calmly and quietly (sitting still when possible) to avoid disturbing birds. Learners are most likely to find birds at a spot where birds can access food and water.

Try collecting data at different times throughout the year to notice patterns and changes. Encourage learners to continue making observations and recording data independently, either on paper or with an app such as **eBird**.

Once learners have had a chance to hone their bird ID skills, invite learners to participate in a citizen science project, such as the *Great Backyard Bird Count*, to learn about what may be affecting changing



What do these bird's distinctive features tell you?

populations of local and migratory birds in their own region. Explain that scientists rely on people participating in citizen science projects to collect the widest possible amount of data—there is power in numbers!

For a more in-depth explanation of how to collect bird data with your learners, visit this website:

https://www.birds.cornell.edu/k12/citizen-science

Find citizen science opportunities here:

https://www.birdcount.org/

And learn more about the impact of climate change on migration here: https://abcbirds.org/blog/climate-change-impact/

Learners can also compare their findings with what's happening to the migrating birds at Great Salt Lake.

#### ACTIVITY GUIDE CREDITS

WRITERS Tali Cohen & Sophia Pons

**DESIGN** Andrew Crews

PHOTOGRAPHY SK Films, Adobe Stock Photo

Gabor Zsuppan **EDITOR** 

# SECRETS OF GREAT SALT LAKE











