

Journey of the Stickleback Species Pair Board Game

For 2-8 players

Ages 7+

Time: 15-30 minutes

Description

Do you have what it takes to be a survivor? In this game, you are an endangered fish, the stickleback species pair, living in a lake on the Sunshine Coast of British Columbia. Whether you choose to be a deep-water (limnetic) or a shallow-water (*benthic*) stickleback, you will face challenges to your survival. Follow your life path while dodging hazards like invasive species takeovers and hybrid swarms, and benefit from actions that help protect you and your habitat. Pass through all the obstacles in the Nesting Zone to complete your life cycle!

Materials

- » Game board
- » Hazard cards (28)
- » Helper cards (28)
- » Blank Hazard (11) & Helper (11) cards to create your own scenarios (optional)
- » Game pieces: Limnetics and Benthics (4 of each)
- » Dice (1 die)

Preparation and Game Play

- » Start with some learning about stickleback species pairs, their life cycle and habitat, and threats to their survival, including invasive species. See the sections on Background Information, Additional Resources and the Game Image Key.
- » **Older student option:** Before starting the game, have each participant create a special Hazard or Helper card on the included blank cards and add to the deck.
- » Decide if you will play with the Trivia Challenge cards. If not, remove them from the Helper and Hazard card decks (5 cards in each card deck).
- » Decide if you will play competitively as individuals, as a team, or cooperatively. (See Game End section).
- » Decide how you will address Nesting Zone challenges (by rolling the dice or playing Rock-Paper-Scissors).
- » Select your game piece (a limnetic or benthic stickleback) and put your piece on the starting space of the corresponding “life path”.

- » Sort and shuffle the Helper and Hazard cards and put each pile onto their corresponding place on the game board.
- » Highest roll of the dice goes first (or the person who most recently visited a lake).
- » On your turn, you roll the die and move ahead that number of squares on your life path.
 - If you land on a Hazard or Helper space, you pick the top card from the corresponding pile, show it/read it out loud, and then do what the card says.
 - If you move to another space as directed by a card drawn, you don't do the action on the space that you moved to (just rest on that spot) UNLESS you are in the Nesting Zone, when you will need to do the action on the new space you moved to.
 - In some cases, you may need to hold on to the card drawn until you use it (Action Hero Cards, or to remind you that you skip a turn).
 - Once a card is used then it is placed in its own discard pile. When there are no cards left, shuffle the discards and put them face down to form a new draw pile.
- » Game proceeds counter-clockwise to the next player (in the same direction that you move around the game board).

Additional Rules of Play

- » **Moving to spaces after drawing a card.** When you are outside of the Nesting Zone, if you draw a card that has you move ahead or backwards, you then rest on the new space (and don't draw another card). However, if you draw a card in the Nesting Zone and have to go back or forward a certain number of spaces, then you have to do the action of the space that you land upon.
- » **Sharing spaces with another player.**
 - More than one player can be on the same space **except** when in the Nesting Zone.
 - In the Nesting Zone, the limnetic and benthic life paths overlap. Fish of the same type can share a space (e.g. 2 benthics on a space, or 2 limnetics), but fish of different types *cannot* be on the same space.
- » **Helper Cards.** Includes a variety of stewardship actions that can help stickleback species pairs and their habitat. There are five types of "Action Hero" cards, each with a different way to help prevent the spread of invasive species. These cards can either be played right away or can be saved to block an "Invasive Species Takeover" card from the Hazard deck.
- » **Hazard Cards.** These cards include a variety of threats to stickleback species pairs. Some cards are "Invasive Species Takeover" cards. These cards can be "blocked" by Action Hero cards from the Helper card deck. Included are blank cards for players to make up their own hazards (optional).
- » **Trivia Challenge Cards.** (5 cards found in each of the Helper and Hazard game

decks)

- It is optional to play with Trivia Challenge cards. Best to include with older students or those who have some background about stickleback species pairs and invasive species.
 - If you are playing cooperatively or as teams, others in your group can help you to answer the Trivia Challenge cards.
 - One or more other players in the group can serve as the judge to determine if the answer to the Trivia Challenge is correct. If unsure, ask an adult or look it up.
- » **Nesting Zone Challenges.** In the Nesting Zone, as soon as a fish of one type (benthic or limnetic) lands on the same space as a fish of the other type, they have a challenge to see who can remain on that space. Determine at the start of the game whether Nesting Zone challenges will be done by rolling the dice (higher roll wins) or by playing Rock-Paper-Scissors. In either case, whoever wins gets to stay on the space in the Nesting Zone, and the loser must go back to the Get Ready To Nest space on their separate (benthic or limnetic) life path. If there is a tie, keep playing until someone wins. If more than 2 fish are on a space, keep doing challenges until *only* one type of fish remains on the space in the Nesting Zone. **See the Nesting Zone** section for more information.

Game End

Play ends when a Fish (player) or a group of fish reach the Finish. Options:

- » Individual (any number of players): First person to get to the Finish wins
- » Team (4+ players): First group (benthics or limnetics) to get all of their group to the Finish wins.
- » Collaborative (any number of players): Play until everyone reaches the Finish.

Nesting Zone!

Stickleback spawning and nesting time is an important phase of the life cycle when the fish change colours, males build nests, do mating dances to attract females, females select a mate based on how amazing their dance is and what their nest looks like, and males guard eggs and fry. It is a challenging and dangerous time of life to raise those young sticklebacks! Benthic and limnetic sticklebacks overlap in the shallow (benthic) zone of the lake during the nesting period, but they do not regularly interbreed. For this reason, in the game, the two life paths come together during nesting time, but limnetics and benthics cannot rest on the same space.

Spaces in the Nesting Zone include events during the stickleback life cycle.

Option for younger students: Role-play the actions, like building a nest, fanning eggs, guarding eggs and fry. You could turn these role-plays into challenges similar to that of the Zig Zag Dance if you have a competitive group.

1. **Build A Nest.** Resting spot and role-play option.
2. **Zig Zag Dance!** If you land here, you have to show your dance moves in order to move to the next spot. If there is more than one fish on this spot (no matter whether benthic or

limnetic), you have a dance off /competition. Other players vote on who has the best dance. Whoever wins gets to stay, and the other has to go back to the “Get Ready to Nest” spot on their limnetic or benthic life path. Option: for groups that are not comfortable with a dance off, instead roll the die or play rock-paper-scissors to determine the winner.

3. **Fan and Guard Eggs.** Resting spot and role-play option.
4. **Eggs eaten!** Go back to “Get Ready to Nest”.
5. **Hazard.** Draw a Hazard card and do the task shown. If you move back and land on spaces within the nesting zone, you should do the task shown on that space.
6. **Helper.** Draw a Helper card. If the card drawn has you move ahead, you should do the task shown on that space.
7. **Hazard.** Draw a Hazard card and do the task shown. If you move back and land on spaces within the nesting zone, you should do the task shown on that space.
8. **Being a dad is *tiring*!** Roll the die and go back that number & do that task.
9. **Eggs hatch! Guard Babies.** Resting spot and role-play option.
10. **Hatchlings eaten!** Go back to “Get Ready to Nest”.
11. **Proud parents!** Roll the die to find out how many (hundreds of) hatchlings survived. Move ahead the number rolled.

Background on Stickleback Species Pairs

Stickleback species pairs, *Gasterosteus aculeatus*, are rare and endangered, minnow-sized fish that are only found in four lakes on Texada Island and in Little Quarry Lake on Nelson Island on the Sunshine Coast of British Columbia. On Texada Island (sayayin) there are two unique types of stickleback species pairs: the Vananda Creek threespine stickleback species pair, found in Emily (Turtle) Lake, Priest Lake, and Spectacle Lake, and the Paxton Lake threespine stickleback species pair, found in Paxton Lake. Stickleback species pairs are of great interest to scientists as one of the youngest species on earth and a model organism in which to study how new species form.

Stickleback species pairs were discovered in the 1980s. Since that time, two species pairs- one in Hadley Lake on Lasqueti Island and one in Enos Lake on Vancouver Island- went extinct due to the introduction of aquatic invasive species. Stickleback species pairs disappeared from Hadley Lake within five years after an invasive catfish, the brown bullhead (*Ameiurus nebulosus*), was introduced. Likewise, signal crayfish (*Pacifastacus leniusculus*) were introduced to Enos Lake on Vancouver Island, where they caused the collapse and hybrid swarm (interbreeding) of the species pair there.

Stickleback species pairs are closely related to the threespine stickleback, which is commonly found in marine and freshwater habitats throughout the northern hemisphere. Stickleback species pairs are unique in that they are two distinct and closely related species that live together in the same lake: the *benthics* and the *limnetics*, named for the area within the lake in which they feed. Benthics and limnetics are different from each other in many ways, including their size, colour, and anatomy; their diet and the ways in which they catch their food; their

habitat within the lake, and other aspects of their behaviour and lifestyle.

Benthics live in the shallow areas of the lake, where they are more solitary, camouflaged in the vegetation, and eat invertebrates that live among the bottom substrates of the lake (the *benthic zone*). They are larger and chunkier than the limnetics. Limnetics live in the deeper waters of the lake (the *limnetic zone*), where they swim in schools in open water and feed on plankton. They are silvery and have more pronounced spines for protection from predators such as trout and loons.

Three-spined sticklebacks have interesting spawning behaviour. Both types of fish come to the shallows during spawning season, but they do not interbreed. Males build a nest made out of algae, sticks, vegetation and other materials found in the nesting area, which they glue together with a substance produced in their kidneys. Males do a zig-zag dance to attract females to the nest. Interested females may enter the nest and lay their eggs, and then leave. Males work hard to protect their eggs and hatchlings: they fan the eggs to keep oxygen flowing over them and fiercely guard them from predators for up to a week until they hatch. Once hatched, the males continue to guard the tiny fry until they swim off on their own after about a week.

We can help to protect stickleback species pairs and the amazing biodiversity wherever you may live by preventing the spread of invasive species. Invasive species in British Columbia are living organisms (plants, animals, fungi, bacteria, etc) that are introduced from another region and that spread and take over, causing harm to the environment, the economy, and communities.

For More Information

- » Poster: Texada Sticklebacks: Global Superstars and Local Treasures
https://bcinvasives.ca/wp-content/uploads/2024/05/Stickleback_Poster_11x17_Final_May2024.pdf
- » Factsheet- Texada Island Stickleback Species Pair
https://bcinvasives.ca/wp-content/uploads/2024/07/Texada_Island_Stickleback_Species_Pairs_Factsheet_5_2024.pdf
- » Treasure Fish of Texada Video & Clips- ISCBC YouTube Playlist
<https://www.youtube.com/playlist?list=PLxx-2yRtjicSgrV1fJ6w1jDmtJG2LrJX>
- » Visit <https://bcinvasives.ca/> for more information on invasive species in BC, and for best practices to stop the spread, visit <https://bcinvasives.ca/play-your-part/>

Stickleback Species Pairs Images



Vananda Creek Threespine Stickleback

Top: Limnetic male (L) and female (R), Bottom: Benthic male (L) and female (R)

Photo Credit: Gerritt Velema



Paxton Lake Limnetic Male Threespine Stickleback with Eggs (L)

Paxton Lake Benthic Male Threespine Stickleback with Young (R)

Photo Credits: Nicole Bedford