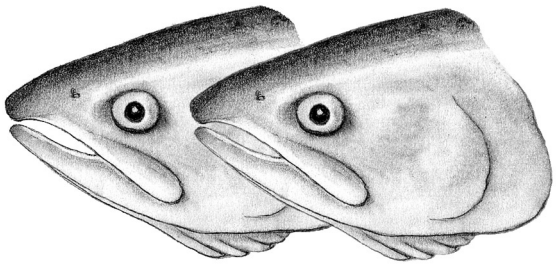
UNIT 10

SALMON LIFE CYCLE GOES ON



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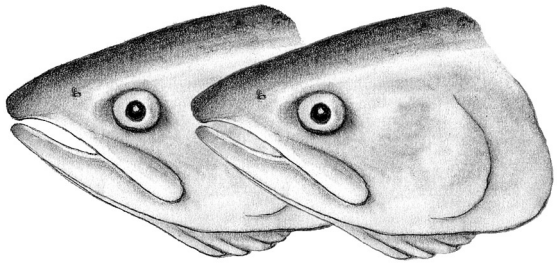


OVERVIEW

The class uses a game to review the salmon life cycle and discusses activities they can undertake to help more salmon survive.

THE BIG IDEA

If people make careful decisions and satisfy their needs without taking away from future generations, they will help take care of salmon.

SALMON LIFE CYCLE REVIEW

Materials:
For each group of four or five students:

- Copies of "Handout 1.2: Salmon Words" for each group, cut into individual illustrations
- Option: Blank index cards (3" X 5")

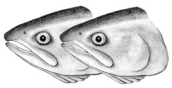
Time required:
One lesson

Level of conceptual difficulty:
Simple

Suggestions for assessment:
Monitor students as they recall facts to ensure that they can state and confirm facts about each stage in the life cycle of a salmon.

REVIEW

- Have students, in small groups, place the illustrations face down on a table and pick one at random.
- Have each student, in turn, read the name of the life cycle stage on the illustration and tell the group one fact they learned about the stage. Have other students help the student, if necessary, and question the student if they disagree with the fact stated. If they are not sure about a fact, have the students confirm the facts from the information in their salmon studies portfolios.
- *Option:* Have the students write facts for each life cycle stage on blank index cards. Students can then play "concentration/memory" by turning all cards face down and taking turns choosing two at a time to try and match the fact to the appropriate illustration.



SALMON LIFE CYCLE GAME

Materials:
For each group of four or five students:
- One copy of "Handout 10.1: Life Cycle Game"
- One copy of "Handout 10.2: Life Cycle Game Rules"
- One die
- Ten small squares of paper per player to use as game markers
- Salmon Life Cycle poster

Time required:
Two or more lessons

Level of conceptual difficulty:
Simple

Suggestions for assessment:
Monitor students as they move through the stations and in discussion to ensure that the students recognize that salmon die at every stage and, on average, only two are left to spawn a new generation.

RESEARCH

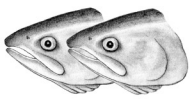
- Have the class refer to their notes or the Salmon Life Cycle poster to list and describe a variety of threats that salmon face throughout their life cycle.
  Predators, such as fish, birds, raccoons, bears, pollution, human activity in streams and estuaries, fishers, disease.
- Explain that this game will show the number of salmon that complete all the stages of their life cycle.

SIMULATION

- Have students write their name on 10 small squares of paper to use as game markers. Give groups of four or five students game markers, a die, a copy of "Handout 10.1: Life Cycle Game" and a copy of "Handout 10.2: Life Cycle Game Rules".
- Review the rules with the class. Have students cut out the stewardship cards. Have groups play the life cycle game until all the students win. Note: you may wish to laminate the life cycle game board and stewardship cards for future use.
- *Option:* Have students count and record the number that pass each stage of the game. With the class, create a graph, showing the number of survivors at each stage. Point out that the actual number of survivors is much smaller, only two out of 2,500 or more eggs.

DISCUSSION

- Discuss with the class what the game shows. If necessary, prompt them with questions, such as:
  - How many salmon die at the egg stage?
  - How many are left to grow to the next stage?
    Most salmon die. Only a few make it to the next stage.
  - What if two spawners do not survive?
    There are no eggs, but eggs from other spawners might survive and take their place.
  - How do stewardship cards help salmon finish the life cycle?
    They help the salmon survive the hazard squares.
  - What can people do to make sure enough spawners survive?
    Protect salmon and their environment, catch only those permitted.



STEWARD-SHIP

Stewardship means "making informed decisions and taking appropriate actions to protect and conserve water for all plants and animals who share our planet. It means leaving healthy, undiminished aquatic ecosystems for future generations.

Water Stewardship: A Guide for Teachers, Students and Community Groups
Ministry of Environment, Lands and Parks, 1995

Materials:

- Writing supplies

Time required:
One or more lessons

Level of conceptual difficulty:
Advanced

Suggestions for assessment:
Monitor the class discussion and lists to ensure that the students can identify hazards to salmon and describe actions that people, including the students, can take to help protect and conserve salmon and salmon habitat.

RESEARCH/DISCUSSION

- Have students, in small groups, list several dangers that can affect the life of a salmon.
  Loss of habitat, siltation, flooding, pollution, predation, capture by fishers, disease.
  Make a class list of the hazards the groups identify.
- Have the class identify the dangers that can be affected by human activity.
  Loss of habitat, siltation, flooding, pollution, capture by fishers.
- Have the class identify things that people can do reduce each of the dangers they identify.
  Avoid building or logging in salmon streams; dispose of hazardous wastes safely; fish only when and where permitted; don't harass spawners.
- Have students make a list of things they can do themselves to protect salmon and reasons for taking these actions.
  Stay out of salmon streams during and after spawning so that more salmon will survive; replant damaged stream banks; conserve water, energy and other resources; put garbage in waste containers.

SUMMATION

- Have students make a poster or display to encourage others to take steps to protect salmon near their home or school.
- *Option:* Have students carry out steps they can take in and around their school to protect salmon.
  Recycle waste, keep nearby streams clear, contact the local community advisor for information and supplies to mark storm drains that drain to creeks, don't remove salmon carcasses, etc.

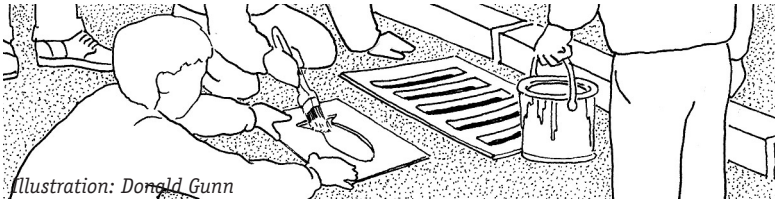
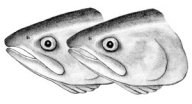


Illustration: Donald Gunn

- *Option:* Have students identify ways to protect other animals and reasons for taking these actions.
  Look after pets, don't harm wild animals or damage the environment.



SALMON LIFE CYCLE GOES ON
WRAP-UP

EVIDENCE FOR UNIT ASSESSMENT

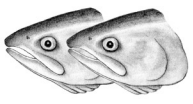
- Have students draw life-sized pictures of each stage of the salmon's life cycle on chart paper and describe (or label) where the salmon live at each stage. In a conference, discuss the movement of salmon from stage to stage, to ensure that the students can describe the movement as a continuous cycle.
- Have students review their journals, including their initial questions about what they wanted to learn, and describe what new knowledge they acquired while studying the units.
- Have students complete a stem sentence, such as, "I used to think… about salmon life cycles but now I know that…," or, "One thing I learned about salmon life cycles is that…".
- Have students add their materials to their learning log and write a sentence explaining what they learned.

LANGUAGE AND ARTS INTEGRATION

- Have students research the life cycle of the salmon, linking the seasons with what happens in a salmon's life cycle and explaining why each stage takes place when it does.
  Eggs are sensitive to warm water, so most salmon spawn in the fall to protect the eggs; they tolerate warmer water in the spring when alevin and fry are growing and insect larvae are available for food.
- Have students work with the technology lab to develop a multimedia presentation on the salmon's life cycle, and ways of protecting salmon.
- Have students carry out activities from other environmental and resource programs, such as Destination Conservation, Greening Schoolyards, Power Smart; Aqua Wild, Water Stewardship; Project WET, Water for Tomorrow, Better Environmentally Sound Transportation. For references, see the *Marine and Aquatic Educators Resource Guide*, available by contacting the B.C. Teachers Federation (1-800-663-9163.)

HOME CONNECTIONS

- Have students describe to an adult the dangers a salmon faces throughout its life cycle and actions people can take to reduce the dangers.
- Have students fill in "Appendix 4: Classroom Salmon Science News" and read it to an adult.



HANDOUT 10.1

LIFECYCLE GAME

START: NEW REDD					
Eggs eaten by birds	Eggs poisoned by pollution	Eggs freeze	**SAFE REDD**	Eggs eaten by trout	Eggs killed by disease
Spawners lay eggs and die					**STEWARDSHIP CARD**
SAFE STREAM					Eggs smother in silt
Spawners eaten by eagle					Alevins fail to hatch
Spawners eaten by bears					**SAFE GRAVEL**
SAFE LAKE					Alevins eaten by trout
Spawners blocked by dam					Alevins die of disease
Spawners caught in nets					**SAFE GRAVEL**
SAFE RIVER					Alevins washed away in flood
Adults don't find way home					**SAFE POOL**
Adults caught on fishing line					Fry eaten by birds
STEWARDSHIP CARD					Fry eaten by trout
Adults eaten by seals					**SAFE POOL**
Adults eaten by mackerel					Fry overheat in sun
SAFE OCEAN					Fry can't find food to eat
Adults caught in nets					**SAFE STREAM**
Adults don't find food					Fry can't find pools to rest in
SAFE ESTUARY					Fry can't swim past dam
Smolts eaten by heron					**SAFE STREAM**
Smolts poisoned by pollution	**SAFE ESTUARY**	Smolts' habitat dyked	**STEWARDSHIP CARD**	Smolts eaten by eels	Fry poisoned by water pollution

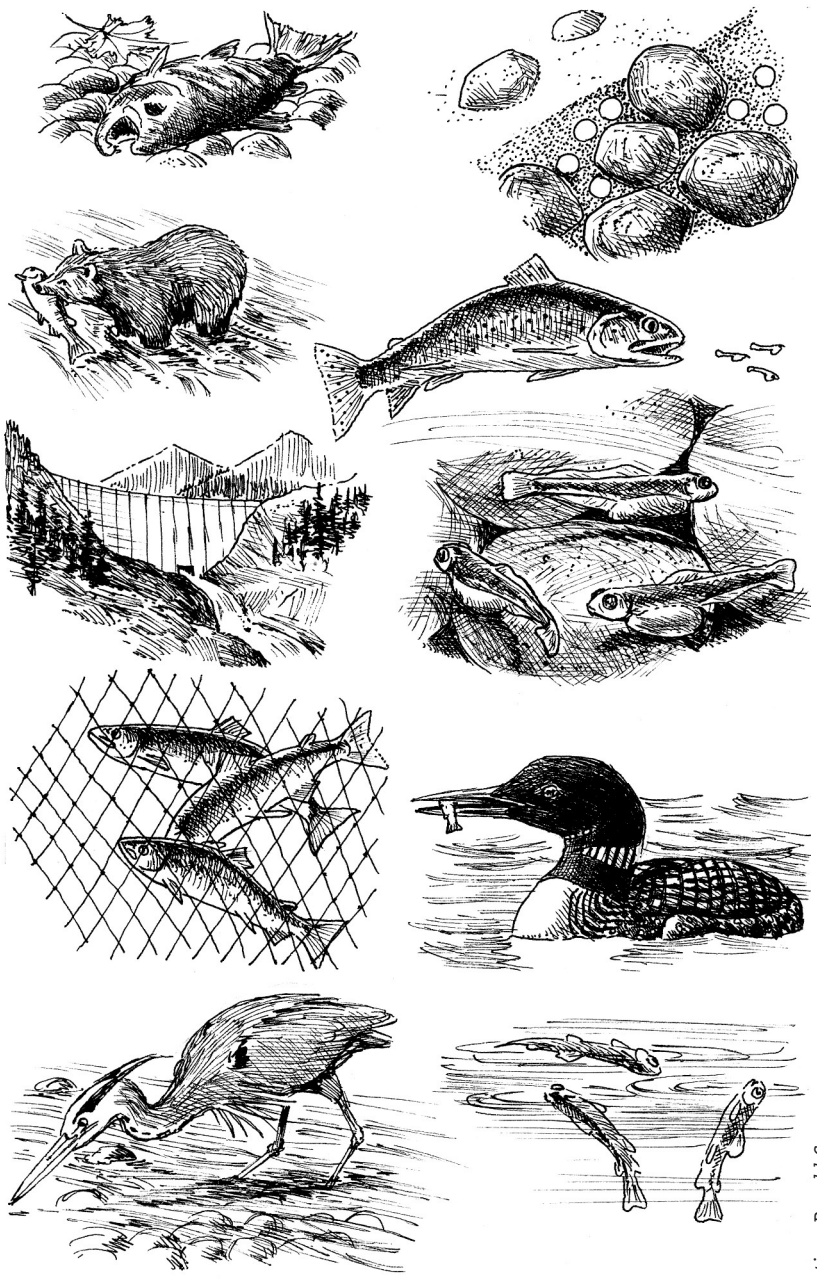


Illustration: Donald Gunn

HANDOUT 10.2

Life Cycle Game Rules

- Each player starts with ten markers. Players can use one or more markers at a time.
- Start at the new redd. Each person rolls the die. The highest number goes first and each player goes in clockwise order from the first person.
- Move clockwise around the life cycle game.
- Roll the die and enter the life cycle at the top left corner. Move the number of squares that show on the die.
- If you land on a Hazard Square (black text), your marker goes into the centre of the board.
- If you land on a Safe Square (grey text), stay there until your next turn.
- If you land on a Stewardship Card, pick a card from the pile and save it. Next time you land on a hazard square, you can use it to move ahead to the next safe square. Once you use a card, place it on the bottom of the stewardship card pile.
- Everyone wins when they move around the board and back to the New Redd.

Stewardship Card You protect salmon habitat. You can move to the next Safe Square.	**Stewardship Card** You protect salmon habitat. You can move to the next Safe Square.	**Stewardship Card** You protect salmon habitat. You can move to the next Safe Square.
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