

# Ecosystem Benefits

Real World Ecosystems  
Activity  
Grade Level: 5-8



## Main Objectives

The watershed activity challenges learners to visualize and ecosystem through a special representation, namely a map. By examining information about a local or familiar landmark, this activity also enables learners to transfer their theoretical understanding of ecosystem services and benefits to the real world in which they live.

## Learning Outcomes

By the end of this activity, learners will:

- Define the terms “ecosystem services” and “watershed”
- List major services provided by ecosystems, including water purification, flood and erosion prevention, food production, climate stabilization, air purification, and others
- Describe the value of many ecosystem services to humans, providing examples.
- Describe the impacts on human communities when ecosystems become damaged and fail to provide their normal services.
- Outline a watershed on a map
- Conduct research to learn more about human activities that occur within watershed
- Predict the threats to water quality in certain watersheds
- Prescribe or predict actions that could be taken to protect watersheds

## Length of Activity

2.5 hours

## Materials List

Ecosystem Benefits Backgrounder  
Ecosystem Benefits Worksheet  
Ecosystem Benefits Worksheet Answer Key  
Large scale map of the Province of Alberta. (E.g., a road map. Maps that show the rivers and lakes of Alberta in clear detail are best. You can often get a free class set from your local government forestry or land office)  
2 or 3 sheets of transparency film  
Clear adhesive tape  
Pencil  
Two fine point (preferably permanent ink) transparency pens of different colour  
Reference: Atlas of Alberta

## Procedure

### Step 1: Backgrounder

- a. Provide the learners with copies of the Ecosystem Benefits Backgrounder. Allow the class to read the backgrounder individually or in groups.
- b. As learners are finishing up their reading, be sure to remind them to discuss amongst themselves the “Think About” questions at the end of the backgrounder.

- c. Learners may be given the reading and Part A of the learner worksheet a homework assignment, or they can be given class time to do this work. Use the worksheet questions either as an evaluation point or as the focus of a class discussion.

- using the other marker.
- Make dots on the transparency to make the locations of major towns on the rivers and any dams and reservoirs that exist. Label them if you have room.

- b. Allow your learners time to complete the activity in class. Tracing the watershed should take about half a class to complete. Their maps may limit the accuracy of their watershed outlines. Accuracy is not as important as being able to group all the streams that feed the river and to estimate the region for which the river provides drainage.

## Step 2:

- a. Divide your learners into groups of two and provide them with the materials listed.
- b. Assign one river from the following list to each group:
- Hay river (northwest corner of the province)
  - Slave River/Lake Athabasca (northern)
  - Peace River (northwest)
  - Athabasca (north and northeast)
  - North Saskatchewan (central)
  - South Saskatchewan (southern)

## Step 3:

- a. Instruct your learners on how to map the area drained by their assigned river. Using an overhead projector or wall map, trace the tributaries that feed into the named river. Show your learners how to find the divide between streams that feed into their river and those that empty into other watersheds.
- Learners should pencil in the watershed boundary of their selected river directly onto the map. They need to locate any streams that empty into their river and include the areas they drain within their river's watershed. Exclude areas that appear to be drained by other major rivers.
  - Lay the transparency film on the map so that it covers the entire watershed the learners have outlined in pencil. If necessary, lay additional transparency sheets on the map and tape them together to fully cover the watershed.
  - Trace the outline of the watershed onto the transparency film using one of the fine point markers.
  - Trace the major river and its tributaries onto the transparency film

## Step 4:

- a. In the second half of the class, your learners should be working on the 6 investigative questions in the learner worksheet. This may take more time, and they can be assigned as homework, since much of the information the learners need is available on the internet.
- b. After learners have completed the investigative questions, you may opt to have them present their transparency maps and information to the class in brief presentations.

## Tips and Extensions

- Build a natural ecosystem in the schoolyard: For a more serious class project, you might consider "naturalizing" a small part of the schoolyard. This is a significant project involving obtaining permission from your administration and the school board, working with the maintenance staff, fundraising, and lots of hard work. But the results can be spectacular and highly rewarding for the whole school. Your project can be as simple as planting some trees, shrubs, and flowerbeds, or creating a complete forest, prairie, or wetland, depending on the microclimate and conditions available in your school yard.
- For excellent information about the Alberta governments water conservation plans, go to [Water for Life](http://WaterforLife.ca). The site provides information on the value and conservation of Alberta's previous water supply.

## Comprehension

Here are some questions to check for comprehension, and to pique the interest of your learners in the subject matter of this activity:

- What would happen to our food supply if suddenly there were no more insect pollinators? *Up to one half of our plant food would no longer be available. This would include most of the fruits and some of the seeds and nuts we count on every day. For example, canola, sunflower, and safflower (similar to sunflower), from which we obtain most of our vegetable oil are all insect-pollinated.*
- Usually, we are told that plants and ecosystems develop that are adapted to the local climate. This backgrounder says that the opposite can be true, that an ecosystem such as a rainforest can create its own climate. How does this work? *Densely vegetated ecosystems such as forests do indeed create their own weather, which, over time, contributes to the climate of the region. For example, on a sunny, warm day, a single tree can move several hundred litres of water into the atmosphere through its leaves. Millions of trees across a large forest can put so much moisture into the atmosphere that storm the humidity levels are elevated substantially, leading to storm clouds and rainfall. The process of photosynthesis and transpiration (emission of water vapour from leaves) has the effect of cooling the forest, so that forests often do not experience the extreme high temperatures often observed in unforested ecosystems. Ask your learners what benefits this may have for people who live or work in forests.*
- Spaceship Earth: Planet Earth is like a self-contained space ship in orbit around the sun. It is equipped with many life support systems that enable humans to survive. Without the biosphere and atmosphere, we would be exposed to the vacuum, radiation, and other lethal conditions of space. What are some of the most important life support systems that Spaceship Earth provides, and how does it provide them? *This is a great question to get learners thinking about things from a global systems perspective. They can imagine life on board the Freedom Space Station, and what systems are needed to refresh the oxygen supply, absorb and process the carbon dioxide, water, and wastes produced by the astronauts. These same systems, plus food production, climate control protection from radiation, and many others also operate on our own Space Ship.*
- If you were to get onto a raft on our local river, where would you end up? *Unless you happen to be referring to Milk River in southern Alberta, you would end up in either the Arctic Ocean (Hay, Peace, and Athabasca Rivers and tributaries). Or Hudson's Bay (North and South Saskatchewan Rivers, including Bow and Red Deer Rivers).*
- Where does our river get its water supply? *Explain that for most Alberta rivers, the water supply comes from the mountains, from melting snow and glaciers high in alpine valleys. Another large portion of the water comes into the tiers and their tributaries through springs and groundwater flowing in at or below the waterline. Yet more water flows into these streams during spring snowmelt, and during summer rainstorms as surface runoff.*
- Have learners in the class ever taken a trip on one of Alberta's rivers? *Ask one or two learners to describe the trip, what river they saw, how they travelled, and any interesting experience they had.*
- What would happen to our community (or another community nearby that depends on a river for its water supply) if the local river dried up? *Get learners to brainstorm ways the town would replace this water supply, and whether the residents would continue to have conveniences such as flush toilets, watered lawns, golf courses, and public swimming pools.*