



## Ecosystems and Plants for Food & Fibre

### Weaselhead Field Trip: Student Worksheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

#### Ecosystem of Study: human-modified grasslands

**a. Comparing the ground cover of a native grass (rough fescue) with that of an introduced weed species (creeping thistle):**

- i. get into your assigned group
- ii. lay out a transect across the grass by stretching your rope in a straight line
- iii. starting at one end of the transect and working to the other, count the total number of centimeters where the rope is lying over fescue grass
- iv. starting at one end of the transect and working to the other, count the total number of centimeters where the rope is lying over creeping thistle
- v. share your results with the rest of the class and fill in the table below

	<i>example</i>	Group 1 (area A)	Group 2 (area B)	Group 3 (area C)	Group 4 (area D)	Group 5 (area E)
cm. of rough fescue	5					
cm. of creeping thistles	2					
ratio of fescue cover to thistle cover	$5/2 = 2.5$					

- Looking at the results above which area has the healthiest population of fescue grass? \_\_\_\_\_
- If you only had a limited supply of herbicide with which to control the thistles, which area would you target?  
\_\_\_\_\_
- By outcompeting and displacing native species what impact might invasive species have on biodiversity?  
\_\_\_\_\_
- Besides invasive plants like creeping thistle, list two other threats that threaten Alberta grassland habitat?  
\_\_\_\_\_  
\_\_\_\_\_

*Did you know that grasslands are one of the most endangered ecosystems in North America?*

*Grasslands only take up 14% of Alberta's land area but 75% of Alberta's species at risk live in grassland ecosystems.*



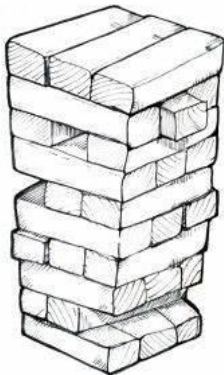
b. Explore the grassland with your group, and using the cards provided by the instructor identify different trees, shrubs and herbaceous plants. Fill in the table below:

	name of species
Find and identify one tree	1)
Find and identify two different shrubs	1) 2)
Find and identify three different herbaceous plants (not including grasses)	1) 2) 3)
Find and identify two different grasses	1) 2)

Disturbances such as fire, disease, climate change, etc. can impact ecosystems. If this takes place in an ecosystem that has a LOW level of biodiversity it may not recover and return to how it was before, even after a long time. Can you think of two reasons this might happen?

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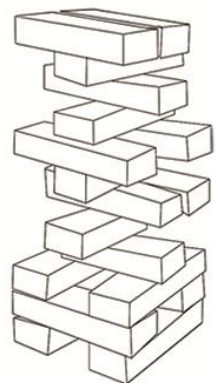
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*The effect of loss of biodiversity on ecosystem resilience is like removing pieces in a game of jenga.*

*In a complex ecosystem there are lots of pieces duplicating roles in holding up the structure. You can remove pieces and the structure stays standing.*

*But in a simple ecosystem every block is essential and removing just one can cause the whole structure to collapse.*



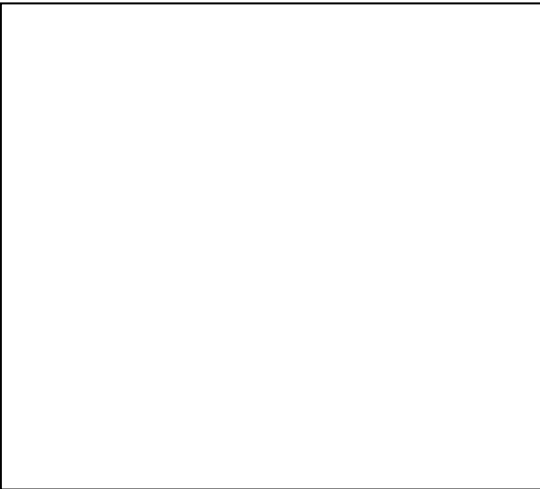
**Ecosystem of Study: the aspen stand**

a. In the space below to do a quick sketch of this ecosystem and use notes to describe it.

	<i>Notes:</i>
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b. Use your observation skills to answer the following questions:

- Do you see a greater variety of plant species in this habitat than in the grassed area at the top of the hill? .....
- Write down any signs of human impacts on this ecosystem:  
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- Identify a plant from this ecosystem that is used as a food or a medicine. Name the plant.  
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- Describe how it is (or has been) used for food or medicinal purposes  
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- Make a sketch of the root system of a stand of trembling aspens on the right.
- What is the benefit (if any) of this type of root system?  
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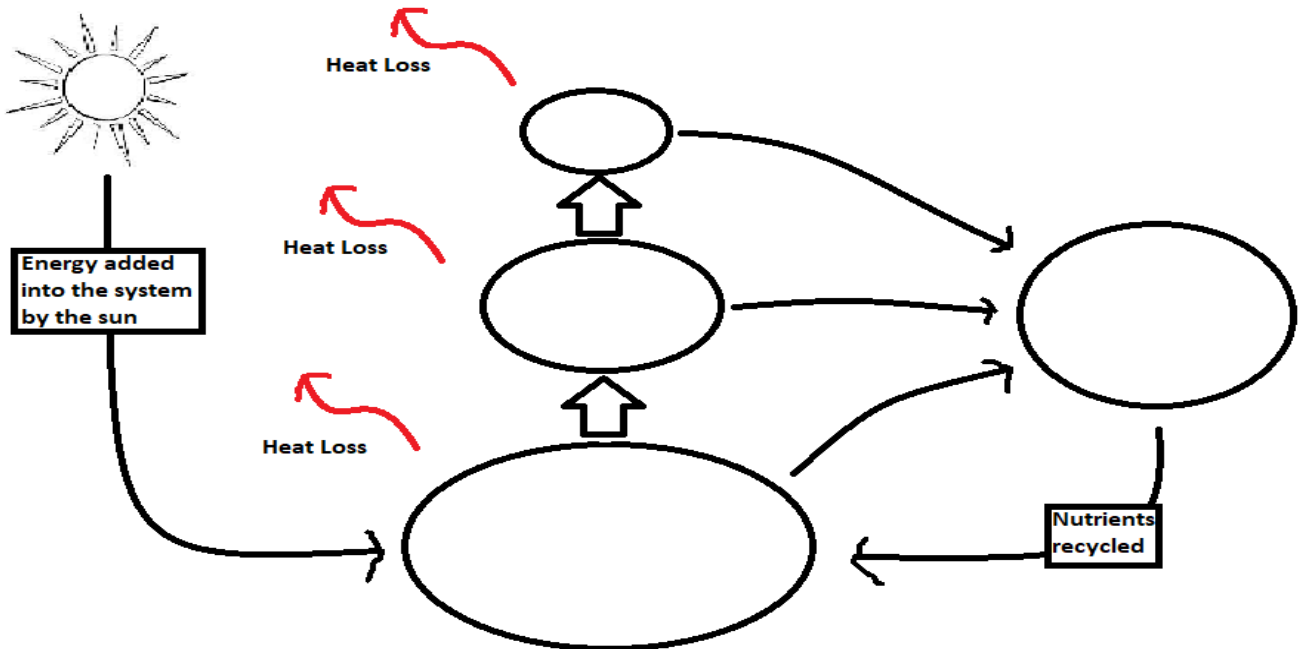


**Ecosystem of Study: riverine forest**

- a. Examine the area on each side of the trail. Find a producer, consumer, and decomposer (or find evidence of their presence) in this ecosystem. Do a quick sketch of your observations below:

<i>producer (or evidence of a producer)</i>	<i>consumer (or evidence of a consumer)</i>	<i>decomposer (or evidence of a decomposer)</i>

- b. In the diagram below that shows how energy is moved through an ecosystem, write in 'primary consumers', 'secondary consumers', 'producers' and 'decomposers' in the correct bubbles:



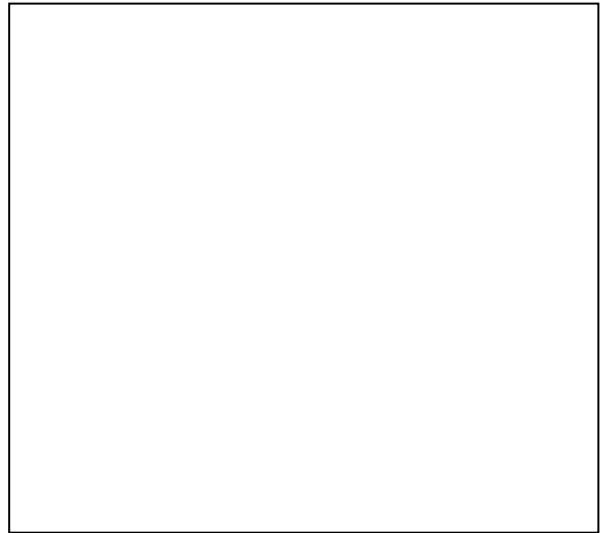
- c. The seeds of balsam poplars need to land on moist ground soon after release by the parent tree to germinate. Can you think of examples of other plants whose seeds need special conditions to germinate? How could having such special conditions help a plant reproduce successfully?

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**Ecosystem of Study: tall shrubs**

a. Explore the area with your group and find a river birch. Look closely at the bark, draw a picture of it in the box on the right and label the lenticels.



b. What are lenticels for?

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c. Examine other shrubs – do all trees and shrubs have lenticels? .....

d. Find a growing leaf and search the underside. Can you find tiny pores on the underside of the leaf called stomata (singular: stoma)?

e. Stomata help in two important processes. What are these?

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f. This ecosystem has lower plant biodiversity compared to the Riverine Forest. What conditions would make it difficult for many plants to grow here? Tick the correct answer/s:

- It is too cold by the river for plants to photosynthesize efficiently.
- There are not enough nutrients in the soil for most plants to survive.
- The area gets flooded regularly by the river: young plants get washed away before they can establish strong root systems.
- The soil is saturated with water so gas exchange between roots and soil is difficult.
- The area has little shade: on hot sunny days stomata on leaves close and plants cannot photosynthesize.
- Can you think of any other reasons?

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**Ecosystem of Study: spruce forest**

a. Explore the area with your group, take the 'Bingo' sheet and marker provided by the Naturalist. First group to find examples or evidence of the ecosystem components shown on the sheet and make a complete row, column, or diagonal shout 'Bingo!'

b. Spruce trees are an important resource in Alberta. What are they used for? Tick the correct answer/s:

- For firewood
- For lumber in construction and house-building
- To make bark chips for gardeners.
- To make rope from.
- For the paper industry.

c. What do you notice about the ground cover? Are there more or less low-growing plants on the forest floor than in the other ecosystems we have looked at today? Why do you think this is?

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d. If there was a large disturbance such as a forest fire or a flood that killed the plants you see around you today, the first plants to grow after the disturbance would be different than the ones that are growing here now. Why would this happen? How might growing conditions change over time?

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a. What animals would you expect to find in this ecosystem? Why? For example why would a red squirrel live in a spruce forest instead of a tall shrub ecosystem?

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## Ecosystem of Study: wetlands

### a. These are terms often used when talking about ecosystems:

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|-----------------------------|-----------------------|
| 1. bio-monitoring           | 5. endangered species |
| 2. succession               | 6. biodiversity       |
| 3. environmental management | 7. extinct species    |
| 4. bioindicator             | 8. disturbance        |

### Write the correct number next the correct definition of the term below:

- \_\_\_\_\_ a species that is at risk of extinction
- \_\_\_\_\_ a species where there are no living individuals left
- \_\_\_\_\_ a species whose presence and/or health provides information about the health of the environment generally
- \_\_\_\_\_ a temporary change in the condition of an environment that leads to a large change in an ecosystem (like a flood or fire)
- \_\_\_\_\_ taking purposeful actions that alter how large, and what type of an impact human activities have on an ecosystem; actions that deliberately shape human-ecosystem relationships.
- \_\_\_\_\_ the process through which an ecosystem changes naturally over time
- \_\_\_\_\_ the act of evaluating the state of an ecosystem through observing ongoing changes in biodiversity, population sizes, invasive species abundance etc.
- \_\_\_\_\_ the number of different species in an ecosystem.

### c. Working in groups you will be assigned one of the following questions to discuss. Each group will present the results of their discussion to the class.

*(Assign one of your group to make notes as you discuss the topic. Use these note to help prepare your presentation.)*

1. Can you think of three ways that this wetland has been altered by people or human activity? How might we get involved in decisions that affect wetlands near us?
2. What bio-monitoring might you carry out to understand changes in a wetland?
3. How are we impacted by the health of this wetland?
4. What is a healthy wetland ecosystem? What aspects (biotic and/or abiotic) could we monitor to tell if it is healthy or not?
5. What actions would you take to protect a vulnerable or threatened species of animal or plant living in or near this wetland?