WORK WILD TOOLKIT

Grade 7: Interactions and Ecosystems

WORK WILD.

Contents

Interactions and Ecosystems

In this toolkit, students will learn how forestry and ecosystems are connected by following the immersive Love AB Forests virtual forest tour. Starting with a young forest regenerating after a harvest, students will explore aspects of the forest ecosystem throughout its lifecycle. Whether natural or managed, forests are complex ecosystems that provide essential services for humans. The activities in this toolkit will have students consider the work that goes into managing such a complex ecosystem, impacts associated with human use of the forest, and how all the living things in the forest are connected. Along the way, students will be exposed to different careers within the forestry industry and how individual people make a difference in forest management. After completing this toolkit, students will understand that every stage of the forest life cycle has an important role to play and supports various plant and animal species.

Before you begin, you may want to lead your students through the *Take a Stand* activity from section 3, part 2. You may find that students' opinions have changed once they complete the toolkit and return to the activity.

Alberta Curricular Outcomes

This toolkit has connections to both Unit A: Interactions and Ecosystems, and Unit B: Plants for Food and Fibre.

UNIT A: Interactions and Ecosystems - Specific Learner Outcomes

- illustrate how life-supporting environments meet the needs of living things for nutrients, energy sources, moisture, suitable habitat, and exchange of gases
- describe examples of interaction and interdependence within an ecosystem
- identify examples of human impacts on ecosystems, and investigate and analyze the link between these impacts and the human wants and needs that give rise to them
- analyze personal and public decisions that involve consideration of environmental impacts, and identify needs for scientific knowledge that can inform those decisions
- describe the process of cycling carbon and water through an ecosystem
- investigate a variety of habitats, and describe and interpret distribution patterns of living things found in those habitats
- investigate and interpret evidence of interaction and change
- identify signs of ecological succession in local ecosystems
- identify intended and unintended consequences of human activities within local and global environments

- describe and interpret examples of scientific investigations that serve to inform environmental decision making
- illustrate, through examples, the limits of scientific and technological knowledge in making decisions about life-supporting environments (e.g., identify limits in scientific knowledge of the impact of changing land use on individual species; describe examples in which traditional knowledge—based on long-term observation—provides an alternative source of understanding)

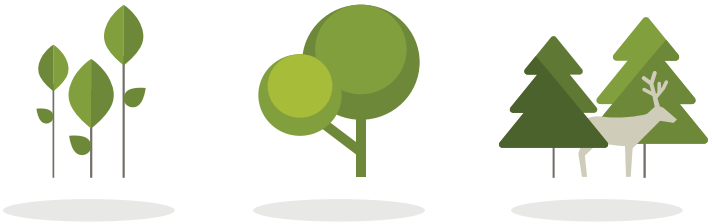
UNIT B: Plants for Food and Fibre - Specific Learner Outcomes

- illustrate and explain the essential role of plants within the environment
- describe human uses of plants as sources of food and raw materials, and give examples of other uses
- investigate trends in land use from natural environments to managed environments and describe changes
- investigate practical problems and issues in maintaining productive plants within sustainable environments, and identify questions for further study
- investigate and interpret variations in needs of different plants and their tolerance for different growing conditions
- describe and interpret the consequences of using herbicides, pesticides and biological controls in agriculture and forestry
- investigate and identify intended and unintended consequences of environmental management practices
- identify the effects of different practices on the sustainability of agriculture and environmental resources

Resources

This toolkit is centered around the *Love Alberta Forests* virtual reality forest tour. Students will need individual or group access to this resource which can be found at vr.loveabforests.com. It includes a variety of activities, including options for individual study or group work. There are prompts to use other online resources as well as individual research throughout.

Students may download the Student Activity Handouts on the Work Wild website: workwild.ca (in the Classroom Resources section). Alternatively, the student handouts are provided at the back of this toolkit so they can be photocopied and handed out.



Lesson Plan Overview

Lesson Plan 1: The Young Forest

Why do we harvest trees? In what ways do we use forest products? What kind of planning goes into a harvest before it happens? What happens after a harvest? What kinds of trees are harvested and planted in Alberta? Who makes sure the forest comes back? What kinds of plants and animals thrive in a young forest ecosystem? Why?

Guided by Nathan Fillion, students will follow along and explore a young forest a few years after harvest. Using the VR tool and other resources, students will discover and come up with their own answers.

Lesson Plan 2: A Growing Forest

How does a forest begin to change as it grows? How does it absorb carbon from the atmosphere? What kind of impacts do disturbances like fire and harvesting have on the landscape? How do we use this information to make decisions about the forest? How do we decide what happens and where?

Exploring a growing forest, students will be presented with many questions regarding the management of forests throughout their lifecycle. Using their own critical thought and experimentation, students will examine forest management decisions up close.

Lesson Plan 3: Mature Forest

What organisms thrive in a mature forest? How are mature forests vulnerable to disturbances? Are woodland caribou a threatened species? What is being done to help? In what ways do different stakeholders value the forest? What happens at the end of a forest's lifecycle?

Seeing a mature forest, students are prompted to consider the future of these forests, and how humans play a role in shaping them.

Lesson Plan 1: Young Forest

Course

Grade 7: Interactions and Ecosystems

Time

Virtual Tour: 10 minutes

Class Discussion and Handout: 50 minutes

Forest Product Bingo: 10 minutes

Assessment

Review the Activity 1 handout to identify whether students have considered all points in the curricular outcomes.

Materials

- Love.AB.Forest Virtual Forest Tour **https://vr.loveabforests.com/**
- Work Wild Forest Products Bingo **https://www.workwild.ca/2020/03/26/wood-product-scavenger-hunt/**
- Activity 1 Handout – Students can either download this handout online or be provided with hard copies.

Activity

1. Explore Stage One: Young Forest of the Love.AB.Forest Virtual Forest Tour. This can be done individually or together as a class using a SmartBoard.
2. Lead students through a class discussion highlighting the values of a young forest. During or after the discussion, have students fill out the Activity 1 handout.
3. Print and hand out Forest Product Bingo sheets to individual students or groups. Set a timer for 10 minutes and let students search the classroom for unusual wood products. This activity can also be sent home with students to see how many of their household products come from the forest industry.

Activity 1 Handout - ANSWER KEY

Young Forest

Part 1: Harvest

1

Check out some of the following resources to learn how people use trees, some of them may surprise you! What are the top two wood products in Canada?

Optional: Take a bingo sheet home andsee if you can get a bingo!

https://www.workwild.ca/2020/03/26/wood-product-scavenger-hunt/

http://albertaforestproducts.ca/about-us/wood-works/

https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/forest-fact-book/forest-products/21685

Lumber and Pulp

2

Before a harvest, forestry companies must have a plan. How long does it take to create that plan? How often is it renewed?

3-5 years to create, re-evaluate every 10 years

3

What are some examples of things that are considered in a forest management plan?

Age of trees, tree species, tree health, water, wildlife, soil quality, recreation, hunting and trapping, sustainability.

4

A forest management plan in Alberta looks 200 years in the future. Why is it important to look so far ahead?

Trees take a long time to grow and changes on the landscape have lasting effects. Planning is an important part of sustainability. Wildlife, soil quality, recreation, hunting and trapping, sustainability.

Part 2: Reforestation

1

Why do forest companies replant the trees that have been harvested?

Legal requirements, sustainability, future harvesting.

2

How many trees are planted for each tree harvested?

2 trees are planted for every one that is harvested.

3

Do you know which tree species are harvested in Alberta and how are they used? Use some of the following resources to learn about common tree species in Alberta. List at least 3 different tree species and their uses.

http://abtreegene.com/albertas-trees/

https://www.insideeducation.ca/learning-resources/guide-common-native-trees-shrubs-alberta-46/

https://tidcf.nrcan.gc.ca/en/trees

Lodgepole Pine: Lumber & Plywood. White Spruce: Lumber & Plywood. Aspen Poplar: Pulp and OSB. Balsam Fir: Lumber, Boxes & Crates, and Christmas Trees.

4

How long do forestry companies monitor the growth of seedlings in a young forest?

At least 14 years.

5

Tracey Courser is a planning superintendent. Visit the link below to learn about another planning forester. Based on what you have learned, why is it important for people to understand forests and forestry in Alberta?

https://www.workwild.ca/2015/04/16/forestry-job-profile-planning-forester/

No wrong answers.

6

Visit workwild.ca/career-profiles/forestry/ to learn about the three different types of foresters. What are they, and how are they different?

Planning Forester: writes the forest management plan and ensure harvesting is sustainable. Operations Forester: puts the forest management plan into action and overlooks all harvesting activities. Silvicultural Forester: after harvesting is completed, silviculture foresters ensure that the forest is replanted and monitors all new growth.

Part 3: Young Forest Ecosystem

1

Young forests provide habitat for different species than older forests. What is the major factor that affects the plants and animals found in young forests?

Lack of canopy and more sun.

2

Why are deciduous trees, like aspen poplar, not planted? Do your own research to learn about why aspen poplar trees grow quickly. List some of their adaptations below.

They are a fast-growing species, sun loving, pioneer/foundation species, suckering, bark sunscreen, leaves drop to preserve moisture. Resource for teachers: https://www.fs.fed.us/wildflowers/beauty/aspen/grow.shtml

3

Aspen trees play an important role in our forest's ecosystem, however, because they grow so quickly they can outcompete conifer species like spruce and pine. How might foresters help conifers grow?

Cutting back competing plants, herbicides, defoliants, site preparation to disrupt aspen root suckering.

4

What is edge habitat?

The young forest or clearing at the edge of an older forest.

5

Give an example of an animal species that is drawn to young forest or edge habitat. Why?

Deer, fox, bears, beavers. The sunlight promotes the growth of plants that these animals eat, understory berries and other flowers.

Lesson Plan 2: Growing Forest

Course

Grade 7: Interactions and Ecosystems

Time

Virtual Tour: 10 minutes

Piece of the Land Activity: 20 minutes

Assessment

Review the Activity 2 Handout and the *A Piece of the Land* activity sheet to identify whether students have considered all point in the curricular outcomes.

Materials

- Love.AB.Forest Virtual Forest Tour **https://vr.loveabforests.com/**
- Inside Education "A Piece of the Land" Activity **https://wJw.insideeducation.ca/learning-resources/piece-land-24/**
- Activity 2 Handout- Students can either download this handout online or be provided with hard copies.

Activity

1. Explore *Stage Two: Growing Forest* of the Love. AB.Forest Virtual Forest Tour. This can be done individually or together as a class using a SmartBoard.
2. Lead students through a class discussion highlighting the values of a growing forest. Be sure to have students compare growing and young forests. During or after the discussion, have students fill out the Activity 2 handout.
3. In groups or individually, have students complete the *Piece of the Land* activity. The student handout can be downloaded and completed online or printed.

Activity 2 Handout - ANSWER KEY

Growing Forest

Part 1: The Growing Forest Ecosystem

1 What are the main characteristics of a growing/middle stage forest?

Self-sustaining, mix of sun and shade.

2 How long does the middle stage of a forest's life last?

15-85 years.

3 What process allows plants like trees to take in carbon dioxide and release oxygen?

Photosynthesis.

4 Why might forests capture the most carbon at this stage?

Carbon is stored during the process of photosynthesis which is providing the energy for trees to grow. As trees are growing the most during this stage, they are going through photosynthesis at a higher rate and storing more carbon.

5 Give an example of an animal found in a growing forest habitat. Why are they drawn there?

There are many places for small mammals, like hares and squirrels, to burrow. These small mammals become food for carnivores, like lynx and wolves, which are also found in a growing forest.

6 What happens to the competition between coniferous and deciduous trees at this stage? Do your own research to learn about conifer adaptations and list some below.

Coniferous and deciduous trees even out. Deciduous trees tend to make up the overstory where there is plenty of sunlight, and coniferous trees begin to dominate the understory where they are adapted to shade. Coniferous trees can thrive in the shade, despite colder temperatures and less direct sunlight, because they have waxy needles which prevent moisture loss and are evergreen which allows them to take advantage of a longer growing season.

7 What happens to the plants on the forest floor during the middle stage of a forest? Why?

Sun loving plants fade out, shade tolerant plants take over because a canopy starts to form.

Activity 2 Handout - ANSWER KEY Continued

Part 2: Impacts of Disturbances

1 How can forest disturbances, like harvesting and fire, impact water quality and quantity? How is this managed?

Forest disturbances can create run off and erosion. This introduces soil, dirt, ash or other substances to water courses leading to a reduction in water quality. Living trees pull large volumes of water from the ground soil through transpiration. Therefore, when many trees are removed through disturbances, there can be flooding risks. To mitigate these effects, buffer zones are implemented around water courses during harvesting, and a set volume of living trees are left behind to prevent flooding.

2 Why is it important to plan for a mix of different aged forests in harvest planning?

The plans must consider the needs of different animals. Not all animals and plants prefer old-growth forest; many thrive in young forests. Some species use different aged forests to provide diverse needs (example: deer find their food in young forests but will bed in old growth forests because they provide additional cover.) Having a mix of forest age classes also increases resistance to disturbances like disease and fire.

3 What do grizzly bears need from their habitat in order to be successful? How does this compare to the needs of caribou?

Bears prefer young edge forests; these forests have more understory plants (like raspberries and blueberries) which is a large part of a bear's diet. Caribou prefer old-growth forests; these forests contain many species of lichen that grow on mature trees. This lichen is a staple of a caribou's diet.

4 Does sustainable harvesting have a negative or positive impact on the population of grizzly bears? Why? Keep this information for lesson 3!

In Alberta the forest industry's sustainable harvesting has increased the population of grizzly bears. Similar to natural disturbances, harvesting creates more edge habitat which increases the amount of food available for bears and other species that rely on young forests.

5 Science and research, like the work of wildlife biologist Gord, play an important role in forest management decisions. Visit workwild.ca and look for other science careers in forestry. Give an example of one, and how it informs forest management decisions.

Soil Scientist. Hydrologist. Ecologist.

Activity 2 Handout - ANSWER KEY Continued

Part 3: A Piece of the Land Activity

Congratulations on your new role as a land management planner! You have been put in charge of an area of land, and you are responsible for deciding how it will be used. Please follow the link below and complete the *Piece of the Land* activity. Remember, remember to use what you have learned so far to inform your choices!

Inside Education: A Piece of the Land Activity

Lesson Plan 3: Mature Forest

Course

Grade 7: Interactions Ecosystem

Time

Virtual Tour: 10 minutes

Class Discussion and Handout: 50 minutes

Assessment

Review the Activity 3 Handout to identify whether students have considered all points in the curricular outcomes.

Materials

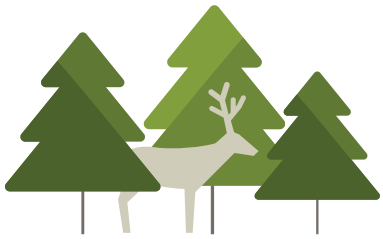
- Love.AB.Forest Virtual Forest Tour **https://vr.loveabforests.com/**
- Activity 3 Handout- Students can either download this handout online or be provided with hard copies.

Activity

1. Explore *Stage Three: Mature Forest* of the Love.AB.Forest Virtual Forest Tour. This can be done individually or together as a class using a SmartBoard.
2. Lead students through a class discussion highlighting the values of a mature forest. Be sure to have students compare young, growing, and mature forests. During or after the discussion, have students fill out Activity 3 handout.

Activity 3 Handout - ANSWER KEY

Mature Forest



Part 1: Mature Forest Ecosystem

1 What is the average age of mature tree species in Alberta?

150 Years.

2 Which type of trees generally die and decay first, providing nutrients and food on the forest floor?

Deciduous trees.

3 Which conditions found in mature forests might lead to the growth of moss, lichen, and fungi?

Shade and moisture.

4 What kinds of animals are found in a mature forest & why?

Caribou are found more commonly in mature forests because lichen (a staple of their diet) grows more frequently there. Cavity nesting birds make their homes in the hollows of dead trees. Rodents have more shelter in the forest floor, which increases the population of raptors and owls.

5 Caribou are an animal with a special status in Alberta. Check out Inside Education's *Species at Risk- Caribou* poster to lean more. What is that status, and why?

Caribou are listed as At Risk/Threatened in Alberta. Their populations are threatened because the species relies on large areas of undisturbed old-growth forests and a specialized diet.

6 The Forest Resource Improvement Association of Alberta (FRIAA) has a program called the Caribou Habitat Recovery Program where they help people and organizations like forestry companies with projects to recover caribou habitat. What are some ways that forestry companies might help with caribou habitat recovery? https://friaa.ab.ca/programs/caribou-habitat-recovery-program/

Incorporate caribou into planning, planting disturbed areas, monitoring caribou populations, collecting and incorporating traditional knowledge.

7 The main source of food for caribou is lichen, what is lichen?

Symbiotic relationship between algae and fungus, also cyanobacteria.

8 What role do natural disturbances like fire and insects play in the forest lifecycle?

Natural disturbances typically occur in mature forests which initiate regeneration. When mature forests are disturbed, nutrients are cycled into younger forests.

9 Visit the following link to learn more about the mountain pine beetle. Why is a natural disturbance like pine beetle an emergency? What role might humans have played in this problem?

http://albertaforestproducts.ca/our-industry/forestry/mountain-pine-beetle/

Large beetle populations can kill huge areas of forest. The beetles kill trees by introducing a fungus (blue stain fungus) which spreads and girdles the tree. The spread of mountain pine beetles threatens the economy (killing trees that would be harvested) and increases the risk of large fires (more dead dry trees). Climate change plays a role in the current pine beetle outbreak. Cold snaps early in winter (which are less common due to climate change) are historically the main population control of the pine beetle. Humans have also contributed to the pine beetle outbreak due to a history of fire suppression.

Part 2: Forest Values

1 Give four examples of how a forest is important to people, which is most important to you, and why?

No wrong answers. Oxygen, Wildlife Habitat, Recreation, Spirituality, Careers, Water.

2 How do forestry companies account for these values in forest management planning?

Consultation with community, buffer zones around water and sensitive habitats, protecting mixed age forests, ensuring access for recreation.

3 Noel is a Forest Community Liaison and his job is to gather input of different forest values before a harvest. Sometimes there are limitations to scientific knowledge about landscapes. This is where traditional knowledge and community consultation come into play. What are some things that foresters can learn from community consultation?

The location of wildlife or medicinal plants, recreation locations, cultural sites, historical changes to the forest.

4 Visit workwild.ca and take the careers quiz. Which three careers did it suggest for you? How do they connect to your values?

No wrong answers

Part 3: Take a Stand Activity

Read the following statements aloud to visualize different perspectives on forest issues. If students agree with the statement they stand. If they disagree, they remain seated. Feel free to add your own! There are no right or wrong answers, this activity demonstrates that people may have different opinions and values related to the forest.

- Humans are apart from the forest (sit) vs. Humans are a part of the forest (stand)
- All forest fires should be extinguished immediately
- ATV's (quads or side-by-sides) should be allowed anywhere within Alberta
- Logging in Provincial Parks should be allowed
- Logging is harmful (sit) or helpful (stand) to the forest
- A forest can be replanted
- It is possible for all forest users to work together to make decisions on how to use the forest in a responsible way
- Making products from wood is more sustainable than some alternatives
- We should do our part to ensure the survival of endangered species
- Nobody should own the forest

Part 4: Harvesting Mature Forests

1 How much of Alberta's land is forested?

Over 60%.

2 What percentage of our forests can we sustainably harvest annually? Why?

Less than 1%. If we harvested more, the forests would not have time to regenerate and mature.

3 As forests grow, they take carbon dioxide out of the atmosphere and store it in the trees and soil. Compare and contrast what happens to the carbon when a forest is distributed by harvesting and by fire.

When trees are harvested, the carbon is stored in that wood product until it is burned/decomposed. When trees are burned by fire, most of the carbon is released back into the atmosphere.

4 What role does harvesting and sustainable forest management play in fire, insects, and disease?

Sustainable forest management reduces the risk of severe events and mitigates the risk of air and water pollution.

5 Watch "*Why certain naturally occurring wildfires are necessary*" by Jim Shultz and TedED. What role does fire play in the life cycle of forests in western North America? How do you think humans have changed that relationship over time?

Fire is an important part of forest succession. If we do not let small fires burn regularly, larger and more disastrous fires can occur. Through history, humans have suppressed fires and created forests which are much older than history tells us forests were.

6

Forestry companies are always working to reduce and minimize impacts of harvesting through sustainable management. Analyze the images above and describe how harvesting has changed to mimic natural disturbances like fire? What might be different between a fire and a harvest?

Shape & size of harvests, used to be square/checkerboard now odd shapes, elongated. Checkerboard harvesting created more edge forest. Modern cutblocks are large in size, but less of them are done in a year and they follow the pattern that a fire would most likely leave in that forest. Serotinous cones that are opened by fire, carbon in the soil from ash.

Optional: Explore the Mountain Legacy Project to compare historical and modern photos of landscapes in Alberta. What are some things you notice about how the landscape has changed over time? Check out the suggested locations below. We also recommend you take the time to explore forest in your area if comparisons are available.

- *Gap Lake*
- *Mount Coulthard*
- *Mount Louie*

No wrong answers may vary depending on photos. More forests, older/taller trees, denser forests, linear disturbances from humans, other human impacts.

Student Handouts

Activities 1-3

Activity 1 Handout

Young Forest

Part 1: Harvest

1

Check out some of the following resources to learn how people use trees, some of them may surprise you! What are the top two wood products in Canada?

Optional: Take a bingo sheet home andsee if you can get a bingo!

https://www.workwild.ca/2020/03/26/wood-product-scavenger-hunt/

http://albertaforestproducts.ca/about-us/wood-works/

https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/forest-fact-book/forest-products/21685

2

Before a harvest, forestry companies must have a plan. How long does it take to create that plan? How often is it renewed?

3

What are some examples of things that are considered in a forest management plan?

4

A forest management plan in Alberta looks 200 years in the future. Why is it important to look so far ahead?

Part 2: Reforestation

1

Why do forest companies replant the trees that have been harvested?

2

How many trees are planted for each tree harvested?

3

Do you know which tree species are harvested in Alberta and how are they used? Use some of the following resources to learn about common tree species in Alberta. List at least 3 different tree species and their uses.

http://abtreegene.com/albertas-trees/

https://www.insideeducation.ca/learning-resources/guide-common-native-trees-shrubs-alberta-46/

https://tidcf.nrcan.gc.ca/en/trees

4

How long do forestry companies monitor the growth of seedlings in a young forest?

5

Tracey Courser is a planning superintendent. Visit the link below to learn about another planning forester. Based on what you have learned, why is it important for people to understand forests and forestry in Alberta?

https://www.workwild.ca/2015/04/16/forestry-job-profile-planning-forester/

6

Visit workwild.ca/career-profiles/forestry/ to learn about the three different types of foresters. What are they, and how are they different?

Part 3: Young Forest Ecosystem

1 Young forests provide habitat for different species than older forests. What is the major factor that affects the plants and animals found in young forests?

2 Why are deciduous trees, like aspen poplar, not planted? Do your own research to learn about why aspen poplar trees grow quickly. List some of their adaptations below.

https://www.fs.fed.us/wildflowers/beauty/aspen/grow.shtml

3 Aspen trees play an important role in our forest's ecosystem, however, because they grow so quickly they can outcompete conifer species like spruce and pine. How might foresters help conifers grow?

4 What is edge habitat?

5 Give an example of an animal species that is drawn to young forest or edge habitat. Why?

Activity 2 Handout

Growing Forest

Part 1: The Growing Forest Ecosystem

1 What are the main characteristics of a growing/middle stage forest?

2 How long does the middle stage of a forest's life last?

3 What process allows plants like trees to take in carbon dioxide and release oxygen?

4 Why might forests capture the most carbon at this stage?

5 Give an example of an animal found in a growing forest habitat. Why are they drawn there?

6 What happens to the competition between coniferous and deciduous trees at this stage? Do your own research to learn about conifer adaptations and list some below.

7 What happens to the plants on the forest floor during the middle stage of a forest? Why?

Part 2: Impacts of Disturbances

1 How can forest disturbances, like harvesting and fire, impact water quality and quantity? How is this managed?

2 Why is it important to plan for a mix of different aged forests in harvest planning?

3 What do grizzly bears need from their habitat in order to be successful? How does this compare to the needs of caribou?

4 Does sustainable harvesting have a negative or positive impact on the population of grizzly bears? Why? Keep this information for lesson 3!

5 Science and research, like the work of wildlife biologist Gord, play an important role in forest management decisions. Visit workwild.ca and look for other science careers in forestry. Give an example of one, and how it informs forest management decisions.

Part 3: A Piece of the Land Activity

Congratulations on your new role as a land management planner! You have been put in charge of an area of land, and you are responsible for deciding how it will be used. Please follow the link below and complete the *Piece of the Land* activity. Remember, remember to use what you have learned so far to inform your choices!

Inside Education: A Piece of the Land Activity

Activity 3 Handout

Mature Forest

Part 1: Mature Forest Ecosystem

1 What is the average age of mature tree species in Alberta?

2 Which type of trees generally die and decay first, providing nutrients and food on the forest floor?

3 Which conditions found in mature forests might lead to the growth of moss, lichen, and fungi?

4 What kinds of animals are found in a mature forest & why?

5 Caribou are an animal with a special status in Alberta. Check out Inside Education's *Species at Risk- Caribou* poster to lean more. What is that status, and why?

6 The Forest Resource Improvement Association of Alberta (FRIAA) has a program called the Caribou Habitat Recovery Program where they help people and organizations like forestry companies with projects to recover caribou habitat. What are some ways that forestry companies might help with caribou habitat recovery? https://friaa.ab.ca/programs/caribou-habitat-recovery-program/

7 The main source of food for caribou is lichen, what is lichen?

8 What role do natural disturbances like fire and insects play in the forest lifecycle?

9 Visit the following link to learn more about the mountain pine beetle. Why is a natural disturbance like pine beetle an emergency? What role might humans have played in this problem?

http://albertaforestproducts.ca/our-industry/forestry/mountain-pine-beetle/

Part 2: Forest Values

1 Give four examples of how a forest is important to people, which is most important to you, and why?

2 How do forestry companies account for these values in forest management planning?

3 Noel is a Forest Community Liaison and his job is to gather input of different forest values before a harvest. Sometimes there are limitations to scientific knowledge about landscapes. This is where traditional knowledge and community consultation come into play. What are some things that foresters can learn from community consultation?

4 Visit workwild.ca and take the careers quiz. Which three careers did it suggest for you? How do they connect to your values?

Part 3: Take a Stand Activity

Activity: Take a stand. Read the following statements aloud to visualize different perspectives on forest issues. If students agree with the statement they stand. If they disagree, they remain seated. Feel free to add your own! There are no right or wrong answers, this activity demonstrates that people may have different opinions and values related to the forest.

- Humans are apart from the forest (sit) vs. Humans are a part of the forest (stand)
- All forest fires should be extinguished immediately
- ATV's (quads or side-by-sides) should be allowed anywhere within Alberta
- Logging in Provincial Parks should be allowed
- Logging is harmful (sit) or helpful (stand) to the forest
- A forest can be replanted
- It is possible for all forest users to work together to make decisions on how to use the forest in a responsible way
- Making products from wood is more sustainable than some alternatives
- We should do our part to ensure the survival of endangered species
- Nobody should own the forest

Part 4: Harvesting Mature Forests

1. How much of Alberta's land is forested?

2. What percentage of our forests can we sustainably harvest annually? Why?

3. As forests grow, they take carbon dioxide out of the atmosphere and store it in the trees and soil. Compare and contrast what happens to the carbon when a forest is distributed by harvesting and by fire.

4. What role does harvesting and sustainable forest management play in fire, insects, and disease?

5. Watch "*Why certain naturally occurring wildfires are necessary*" by Jim Shultz and TedED. What role does fire play in the life cycle of forests in western North America? How do you think humans have changed that relationship over time?

6

Forestry companies are always working to reduce and minimize impacts of harvesting through sustainable management. Analyze the images above and describe how harvesting has changed to mimic natural disturbances like fire? What might be different between a fire and a harvest?

Optional: Explore the Mountain Legacy Project to compare historical and modern photos of landscapes in Alberta. What are some things you notice about how the landscape has changed over time? Check out the suggested locations below. We also recommend you take the time to explore forest in your area if comparisons are available.

- *Gap Lake*
- *Mount Coulthard*
- *Mount Louie*