



Minimizing Forest Fragmentation

Age range: 8-14 (can be used as a main activity for younger students or a quick activity for older students)

Time: 20 or 60 minutes, depending on student age

Subjects: Science, Geography, Social Studies

Resources: Class handouts: *Boreal Forest Area, Sources of Fragmentation and Forest Fragmentation: What Have we learned?*
Maps of the boreal forest from pages 4 and 5 (photocopied for class or shown on overhead), scissors, glue

Learning Outcomes

Students will understand the importance of intact habitat to biodiversity by cutting out and arranging images representing various sources of fragmentation on a forest landscape page (as they are occurring in Canada's forests, especially the boreal forest). Through their placement of the items, students will understand how fragmentation can be minimized by grouping developments together, or by limiting development.

Hook: Your Playing Field — Fragmented

On the chalkboard, draw a large rectangle to represent a soccer playing field with nets at either end. Have a student go up to the board and place a play area at the edge of the field, about one tenth the size of the field. Have another student place a walking path that meanders through the field lengthwise with a couple of people and a dog on the path. Place two small square horseshoe pits inside the field and make a walking path to the pits.

Ask the class if they can still play soccer on the field (yes...but it is more difficult and dangerous). Discuss the fact that most of the field is indeed still available for play, but the other items that have been added

have destroyed its integrity; it has been **fragmented for other uses** even though most of the field is still intact.

Introduce the similar concept of forest fragmentation and how important it is for an animal to have intact habitat (see below). Have students brainstorm some of the possible developments that may fragment a forest (logging roads, dams, farming, pipelines, mines, gas and oil extraction, etc.) Note that although forest product companies require roads to harvest timber and that trees take time to re-grow, forest companies encourage both artificial (tree-planting) and natural regeneration of forests.

Note

Intact forest is forest that has not been negatively impacted by humans. It does not contain roads or other developments and the human activity occurring within it has a low impact (e.g., hunting, fishing, hiking, birdwatching, etc.). Canada's boreal forest has some of the largest intact forest area in the world (show students the maps from pages 4 and 5). Intact boreal forest is important for millions of birds that migrate there each year to raise their young. They depend on undisturbed nesting sites, although predators are always lurking and natural disturbances such as storms can also have a negative effect on breeding success. Animals are adapted to live in certain habitats that can vary in terms of climate, food sources and many other factors. They cannot simply move to another place to live, like humans can.

In addition, intact forest is important to many other birds and animals that have permanent territories within the forest. For example, predators like black bears, hawks and wolves require large spaces in order to catch enough food for themselves and their young. If the forest is split up into little patches, it may not be good habitat for these species. Furthermore, to be able to successfully breed and raise their young, members of a species must be able to access each other in order to mate. If territories of large mammals are fragmented and no longer overlap, they can become cut off from each other. Population numbers can start to drop if an animal's territory has become too fragmented by too many highways, pipelines, urban areas and other human disturbances. Fragmentation can also make it easier for predators, such as wolves, to find prey, such as caribou, because they can move faster and more easily through the landscape (for example, along roads). However, those same roads may put the wolves at risk of a collision. Fragmentation encompasses the effect of habitat edges, which may allow predators or invasive species from non-forested habitat easier access into the forest.

Habitat loss is a separate concept from fragmentation and represents the overall loss of habitat (rather than the fragmenting or breaking up of a given area). Overall habitat loss is currently a more serious threat to bird populations in boreal forests than habitat fragmentation.

Land use planning is about the balance (and inevitable trade-offs) between accessing resources that support our modern lifestyles and protection of wild spaces. (See "Land Use Planning" on page 7 for more on this balance.)

Procedure

1 Go over the handout: *Boreal Forest Area*.

2 Have students cut out and arrange the items from handout: *Sources of Forest Fragmentation* onto their *Boreal Forest Area sheet*. (They should try to minimize fragmentation by grouping developments together.) Students will then glue their items onto the sheet.

3 Students may answer and discuss the questions below.

1. Why is **intact forest important** for plants, birds and animals?
2. What is **forest fragmentation**?
3. What are the **possible sources of fragmentation** that could continue to affect the boreal forest? (Hint: you just arranged and glued these development items on the forest sheet.)
4. List **three negative effects** of fragmentation on mammals, reptiles, birds and other creatures. (Hint: think about how human developments can be a hazard to animals as they migrate, try to find food, stay away from predators, find a mate and raise young.)
5. What are two ways forest fragmentation can be minimized?
6. Are you surprised at how many resources (such as wood products, oil and gas, minerals, hydro-electric power, etc.) exist in forests? Why or why not?
7. What is the connection between our modern Canadian lifestyles (for example, we drive long distances, eat food transported from far away, enjoy many modern conveniences, use lots of electricity and hot water) and the need for extracting resources from our forests?

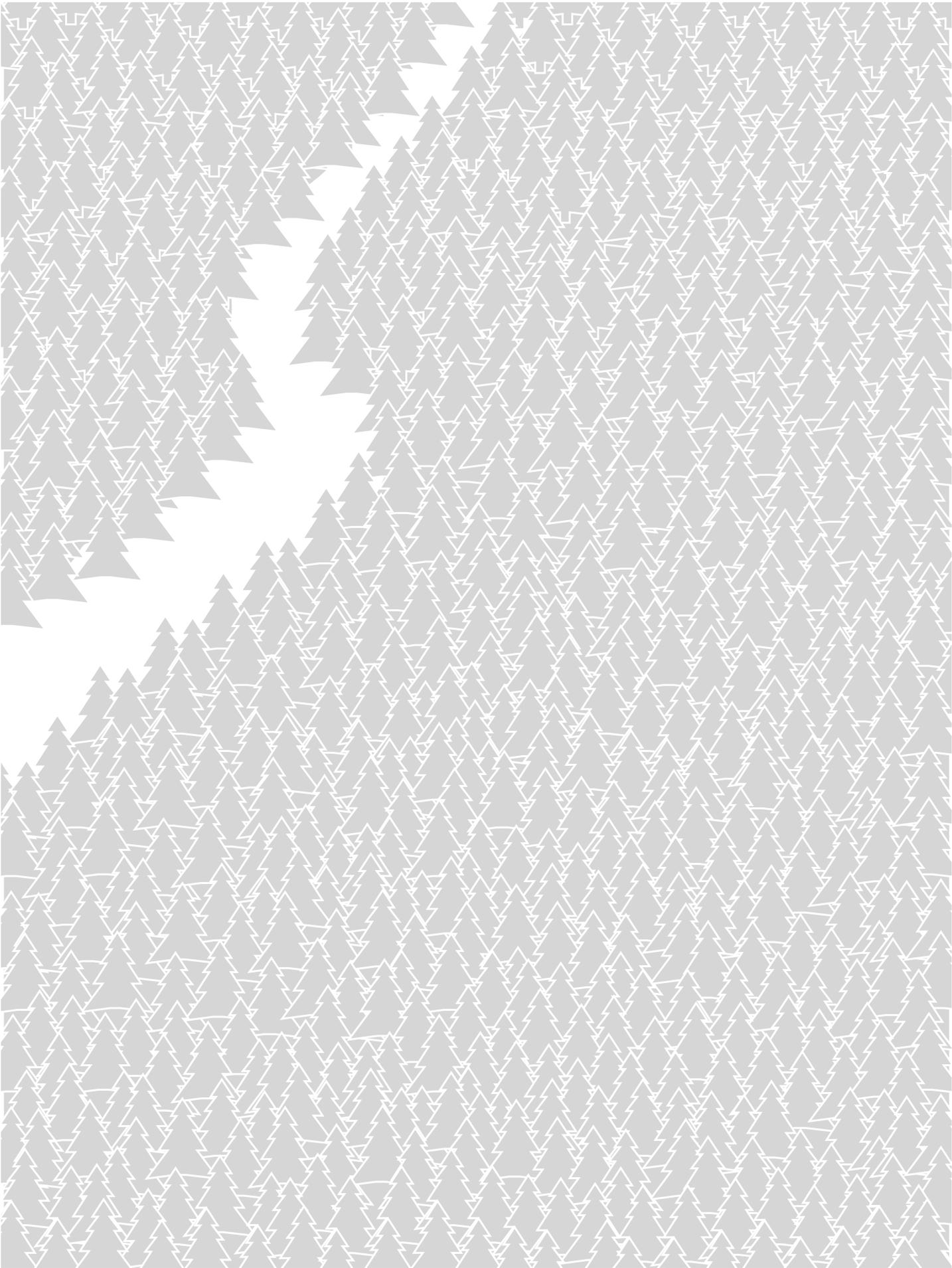
✦ Extensions

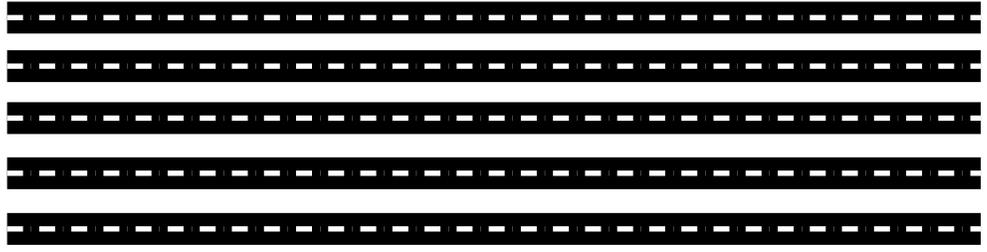
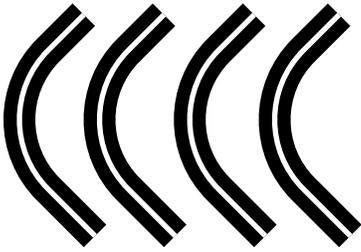
Students present their sheets to the class, explaining why they placed items where they did.

This lesson could involve the same concept produced in a 3-D diorama scene.

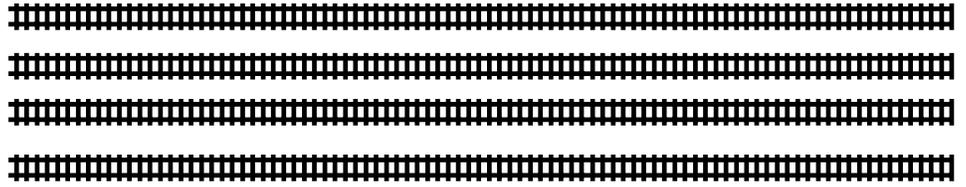
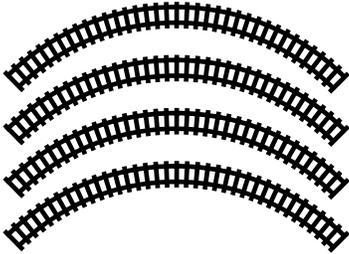
✔ Answers:

1. It is important because most species depend on undisturbed areas to raise their young, find food etc.
2. It is the 'cutting up' of intact forest to provide access to resources and resource extraction.
3. Sources of fragmentation include mines, wells and pipelines for oil, gas and minerals, roads, forestry operations (temporary fragmentation), railways, dams, communities (resorts, houses, farms), electricity transmission corridors, etc.
4. Although in certain specific instances forest fragmentation can provide benefits to certain species (e.g., by making it easier to find prey; roads and railways can provide an energy efficient way to travel), human developments generally make it harder for all animals to find a mate, find food, and safely raise young. They also generally increase risk of death from such things as vehicle collisions.
5. Placing developments together and restricting some developments.
6. Personal answer.
7. If we want to experience our modern lifestyles, we require resources found in the forests of Canada, such as hydro-electric power, oil and gas, wood products, minerals, etc. However, the forest holds value in a myriad of other ways, some of which conflict with certain situations of resource extraction. See Page 7 for more details on the balance required in land use planning in Canada's boreal forest.

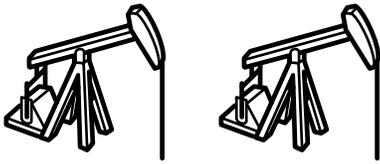




roads



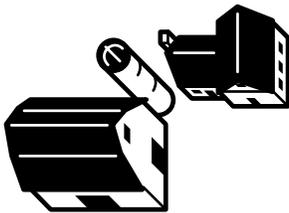
rails



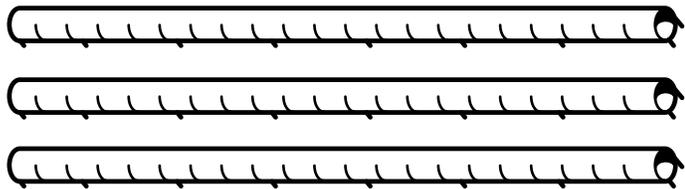
oil and gas wells



Area to be logged by forest products company



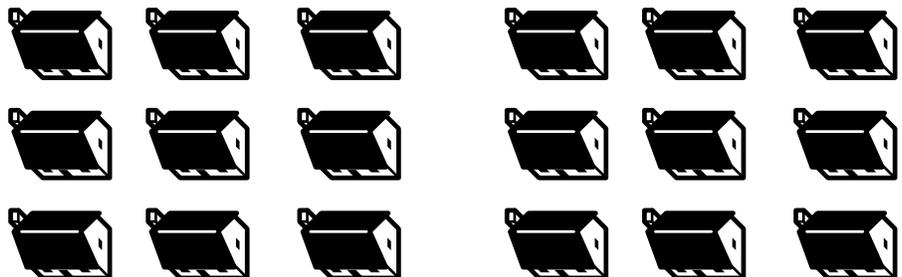
farm



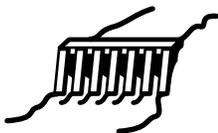
pipelines



resort



subdivisions



hydroelectric dam

