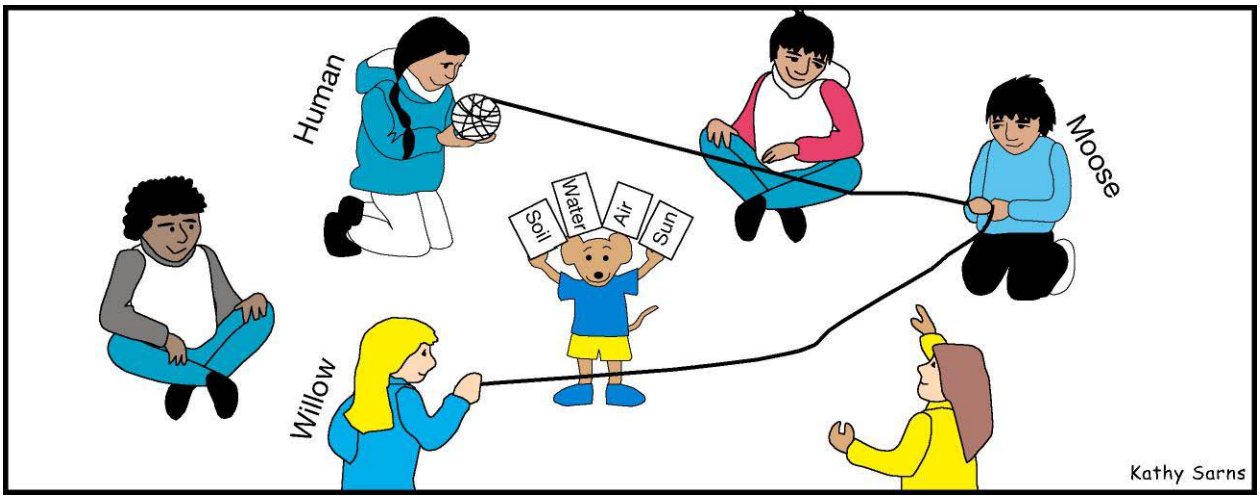
MAKING THE FOREST AND TUNDRA WILDLIFE CONNECTION



Grade Level: 5-12
Alaska State Content Standards: SA14, SA15
Subject: Science
Skills: Classifying, Predicting
Duration: 45 minutes
Group Size: whole group
Setting: indoors
Vocabulary: food chain, food web, producer, consumer, herbivores, carnivores, omnivores, detritivores

OBJECTIVE
Students will be able to form boreal forest and tundra food chains.

TEACHING STRATEGY
Students will participate in an active game to form food chains of the boreal forest.

MATERIALS
- *Alaska Ecology Cards* (see Advanced Preparation)
- String
- Tape

TEACHER BACKGROUND
A **food chain** describes the path of energy and nutrients from the non-living environment, through the living environment, and back to the non-living environment.

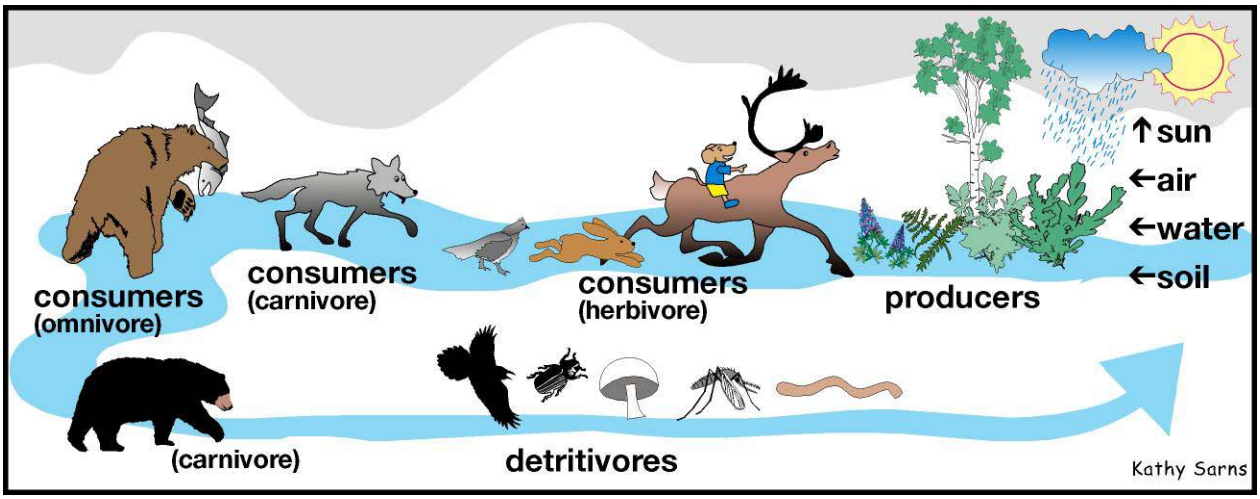
At the base of the food chain are the building blocks of the ecosystem: air, water, soil, and energy from the sun. Plants that use these building blocks to grow and to make their own food are called **producers**. Producers in the boreal forest and tundra include plants, lichens, algae, and some bacteria.

All organisms other than producers are called **consumers** because they obtain energy and nutrients by eating, or consuming, other living things. There are four major groups of consumers:

herbivores, **carnivores**, **omnivores**, and **detritivores**. Animals that eat plants are called herbivores. Willows (producers) are eaten by snowshoe hares (herbivores). Animals that eat meat are called carnivores. An herbivore can be prey for a carnivore. For example, a snowshoe hare (herbivore) may be eaten by a lynx (carnivore). Animals that have few or no predators are consumers found at the top of the food chain. Omnivores eat both plants and animals. Bears are a good example of an omnivore, feeding on mammals, berries, and fish.
There is no "waste" in nature. Every plant or animal that dies is decomposed and returned to the soil. Detritivores are consumers that eat dead organisms and waste material. They break down, or decompose, dead plant and animal material, returning the nutrients to the soil where they are available again for plant growth. Without detritivores, producers would soon run out of the minerals and nutrients that they need to make their food. Detritivores include some large animals, such as ravens; however, the most important detritivores are invertebrates (such as insects), fungi (such as mushrooms), and microscopic organisms (such as bacteria).

All plants and animals are part of at least one food chain and often more than one. Many interconnecting food chains form a **food web.**

When forces such as fire, flood, insect outbreak, or human activities cause changes to the plants, animals, or non-living components of the ecosystem, the entire food chain is affected. As a result, plant or animal populations may increase or decrease depending on where the population is in the food chain. It is important to learn about the food chains of the boreal forest and tundra so that we can understand how changes to the environment affect forest and tundra populations.



ADVANCED PREPARATION

1. Make 4 large cards, each one reading: water, sun, soil, air.
2. Select the Boreal Forest or Tundra *Alaska Ecology Cards* from the list below, starting at the top of the list and moving downward; have one card for each student in the class. Be sure that you include the habitat and food information provided on the cards. You may wish to laminate the cards for future activity.

BOREAL FOREST

Foliose Lichens
Caribou
Brown Bear
Marten
Red Fox
Voles
Club Mosses
Springtails
Molds, Mildews, and Rusts
Ground Beetles
Common Raven
Small Thrushes
Merlins
Segmented Worms
Low Bush Cranberry
Pine Grosbeak
Sharp-shinned Hawk
Fireweed
Snowshoe Hare
Lynx
Great Gray Owl
Aspen
Moose
Wolf
White Spruce
Porcupines
Cottongrass
Soapberry
Willow
Aphids
Spiders
Redpolls
Bot & Warble Flies
Humans
Blueberry
Wild Rose
Raspberry
Balsam Poplar

TUNDRA

Foliose Lichens
Caribou
Brown Bear
Club Mosses
Heather
Springtails
Ground Beetles
Mosquitoes
Northern Shrike
Common Raven
Short-eared Owl
Lowbush Cranberry
Ptarmigan
Red Fox
Bog Blueberry
Lapland Longspur
Weasel
Willow
Tundra Hare
Wolf
Grasses
Lemming
Rough-legged Hawk
Loon
Goose
Vole
Sedges
Musk Ox
Humans
Cottongrass
Bot & Warble Flies
Geese
Dall Sheep
Moss Campion
Arctic Ground Squirrel
Labrador Tea

PROCEDURE

1. On the board write a list of the cards you are using. Discuss the concept of a food chain and give one or two examples using some of the animals and plants listed on the board. Show how two predators may share the same prey, causing branching of the food chains to form a food web.

2. Give each student a card and some tape. Students read about their plant or animal noting in particular its foods and its predators. Students tape their card face up on the front of their clothes.

3. Have the group sit in a circle. In the center of the circle place the cards for air, water, soil, and sun. Give the ball of string to a student who has a plant card. The student then passes the string to an organism in the circle with which that animal interacts. This process goes on around the circle until all the organisms are linked together by the string. Finally the ball is returned to the first student.

4. The students now increase the size of the circle until the string is taut. The teacher tugs on one part of the string. When each student feels a tug, they tug gently on the string. This should cause the entire circle to vibrate from end to end. Ask the students to explain how this vibration would be felt in an ecosystem.

5. Have one of the students drop out of the circle. Find out how many other students must, then also, drop out because of their dependence on that organism. How would this affect the rest of the ecosystem circle? After a discussion about food chains and food webs, discuss the nonliving factors upon which everything depends.

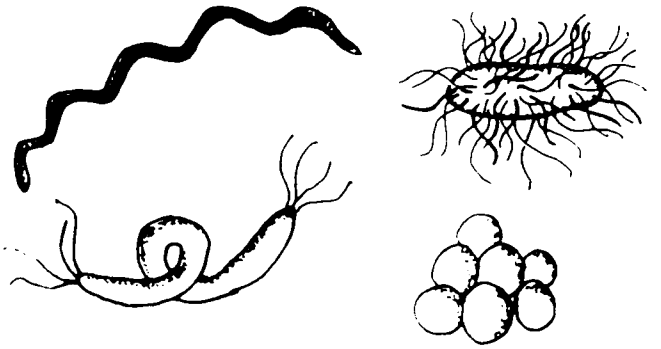
6. As the class continues to hold their string, have them imagine that a fire burns through the area. Which animal populations would be affected? These animal populations will decline and be unable to support their predator populations. Their predators will have to find alternate prey to feed on. Can these predators find other prey in the food web or will they have to move to another area in search of food? How long will it take for predator and prey populations to recover in the area? Two important factors determine when a burn site can support wildlife: 1. How severe the fire was that burned the area, and 2. If there are unburned areas left in the burn site.

EVALUATION

Have each student draw a new food chain, and food web, using other *Alaska Ecology Cards*.

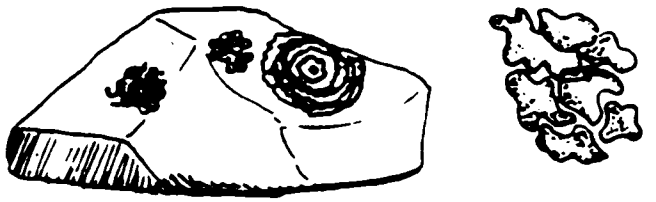
REFERENCES

Adapted with permission from Teacher's Guide – Fire in the Boreal Forest and Tundra of Alaska, US Fish and Wildlife Service, Susan Quinlan, 1991.



1. Bacteria *

TRAITS: Are microscopic organisms that may be round, rod-shaped, or spiral-shaped.
HABITAT: Some types of bacteria occur in every moist environment; a tablespoon of soil may contain millions of bacteria.
FOODS: Mainly dead plant, fungi, and animal materials; some kinds of bacteria live as parasites of living things, and some are able to make their own food by photosynthesis.
EATEN BY: Some fungi and invertebrates.
"GEE WHIZ": Bacteria are the major decomposers in some ecosystems. They can survive long periods of inactivity and unfavorable conditions. Some bacteria are parasites and cause diseases of plants, animals, or fungi; others live in the digestive tracts of animals and aid digestion.



2. Crustose Lichens *

TRAITS: Crustlike, thin lichens.
HABITAT: Grow on rocks, bones, etc.
FOODS: Lichens make their own food by photosynthesis.
EATEN BY: Mites, some worms.
"GEE WHIZ": Lichens are actually made up of two living things: an alga and a fungus.

3. Fruticose Lichens *

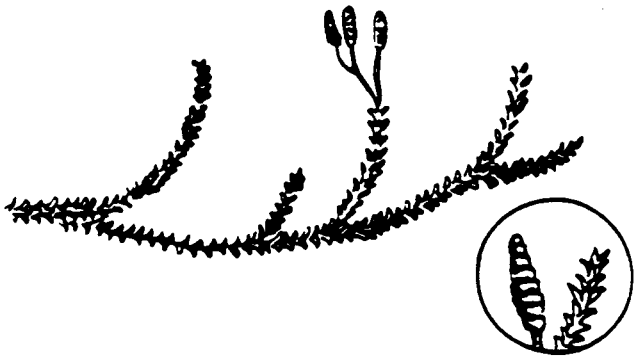
TRAITS: Shrublike, branching lichens.
HABITAT: Grow on dry or moist ground and in trees.
FOODS: Lichens make their own food by photosynthesis.
EATEN BY: Caribou, lemmings, mites, some worms.
"GEE WHIZ": Lichens are actually made up of two living things: an alga and a fungus.

4. Foliose Lichens *

TRAITS: Scaly, flat, leafy lichens.
HABITAT: Grow on moist soil and in trees.
FOODS: Lichens make their own food by photosynthesis.
EATEN BY: Caribou, lemmings, mites, some worms.
"GEE WHIZ": Lichens are able to survive very long periods of unfavorable conditions by becoming inactive, or dormant; some lichens have been revived after being dormant for 100 years.

5. Mosses *

TRAITS: Mosses with feather-like leaves that soak up and hold water; includes feather mosses and *Sphagnum* spp. mosses.
HABITAT: Moist soil, rocks, and logs of the boreal forest and tundra; often form thick, spongy mats that cover large areas.
FOODS: Make their own food by photosynthesis.
EATEN BY: Springtails, mites.
"GEE WHIZ": Sphagnum mosses have been used as a substitute for gauze in surgical dressings and as diaper lining by the Eskimos. Sphagnum moss can hold up to 20 times its dry weight in water.

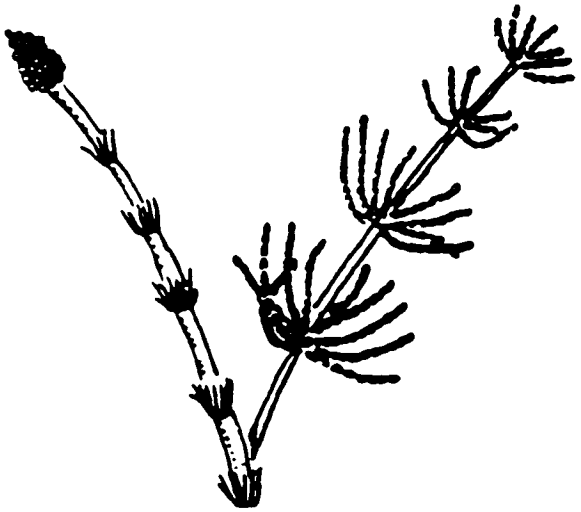


6. Club Mosses *

TRAITS: Ground cover plant; stems may grow upward or along the ground; spores usually borne in cone-like structures located at the tips of upright stalks.
HABITAT: Moist ground.
FOODS: Makes its own by photosynthesis.
EATEN BY: Springtails, mites.
"GEE WHIZ": Club mosses have the ability to become inactive during harsh living conditions and then resume activities when living conditions are good. Despite their name, club mosses are more closely related to ferns than mosses.

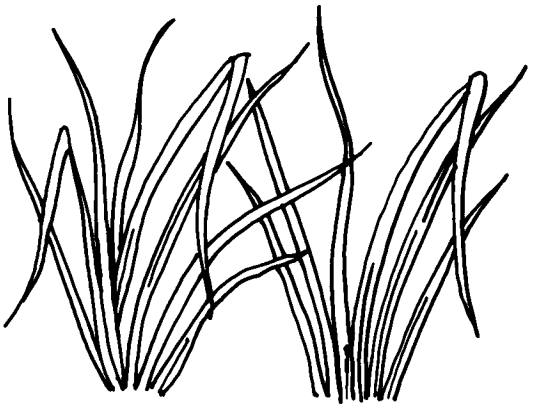
7. Moss Campion T

TRAITS: A low "cushion" plant covered with small, light pink flowers.
HABITAT: Dry soil in alpine and lowland tundra.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Dall sheep.
"GEE WHIZ": Moss campion grows low to the ground in a cushion shape which helps it to avoid strong winds and hold heat.



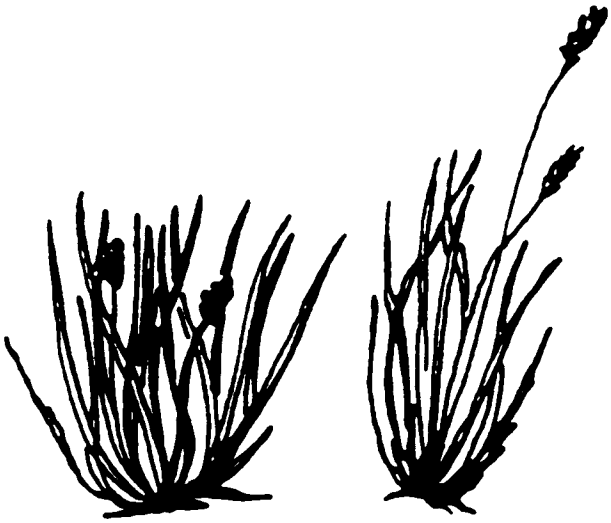
8. Horsetails *

TRAITS: Horsetails have scale-like leaves and distinctly jointed stems.
HABITAT: Wet or moist soils in forests and open areas.
FOODS: Makes its own by photosynthesis.
EATEN BY: Bears, grouse, moose.
"GEE WHIZ": Horsetail stems contain silica (the element in sand) and can be used for scouring pots and pans. They are also called "scouring rushes."



9. Grasses *

TRAITS: Ground cover with long, narrow leaves.
HABITAT: Wet, moist, and dry soils.
FOODS: Make their own food by photosynthesis.
EATEN BY: Caribou, lemmings, voles, ground squirrels, snowshoe hares, marmots; their seeds are eaten by snow buntings, longspurs, and redpolls.
"GEE WHIZ": Grasses have long, narrow leaves which are less likely to be shredded or ripped by strong winds.



10. Sedges *

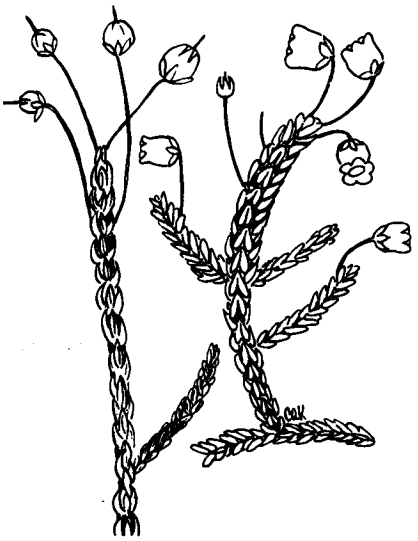
TRAITS: Herbs with long, narrow leaves and solid stems. Vary from 1 to 39 inches in height. Tiny, inconspicuous flowers grow in clusters.
HABITAT: Moist or wet ground.
FOODS: Sedges make their own food by photosynthesis.
EATEN BY: Caribou, muskox, Dall sheep, ground squirrels, pikas, marmots, lemmings, voles, geese; also seed-eating birds, such as snow-buntings, longspurs, and rosy finches, eat seeds from the sedges.
"GEE WHIZ": The long, narrow leaf shape of sedges reduces fraying by strong winds.

11. Cottongrass *

TRAITS: Herbaceous plant with long, narrow leaves, and solid stems. This misnamed sedge has tufts of white cotton-like bristles on the seeds.
HABITAT: Grows on moist or wet ground.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Caribou, muskox, lemmings, voles, geese.
"GEE WHIZ": The cottony seeds of these plants are scattered by the wind.

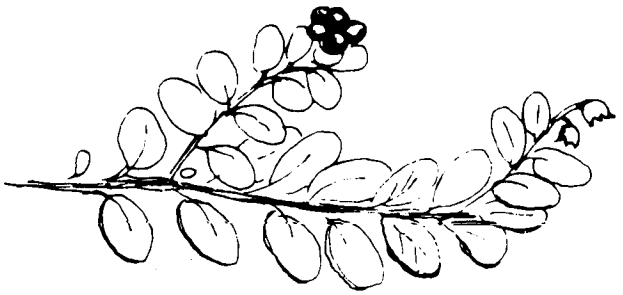
12. Dryas *

TRAITS: Often matted, low-growing, evergreen, herbaceous dwarf shrub. Leaves narrow, sometimes wavy- edged.
HABITAT: Dry soil of boreal forest and tundra.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Caribou, lemmings, ground squirrels.
"GEE WHIZ": The small, leathery leaves of dryas lose less water than other kinds of leaves and are more resistant to winds.



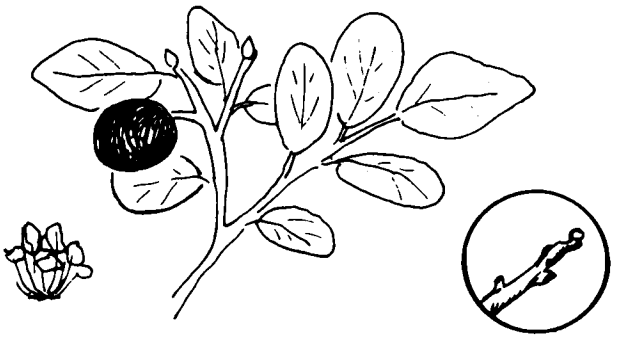
13. Heathers T

TRAITS: Heathers are low-growing, moss-like shrubs and have white bell-shaped flowers.
HABITAT: Dry soil of alpine and arctic tundra.
FOODS: Make their own food by photosynthesis.
EATEN BY: Lemmings, ground squirrels.
"GEE WHIZ": Heathers have small, leathery leaves which lose less water than other kinds of leaves and are more resistant to winds.



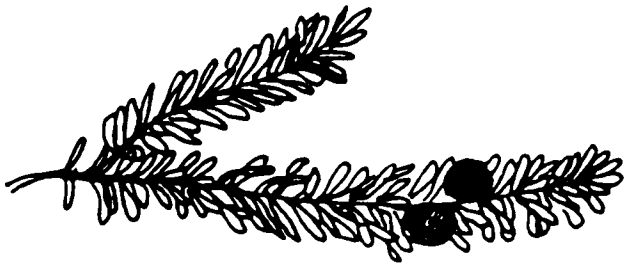
14. Lowbush Cranberry *

TRAITS: This low, creeping dwarf shrub is a member of the heath family; small white to pink bell-shaped flowers; fruit a small, red berry.
HABITAT: Moist soils in alpine and lowland tundra; grows best in young, mature, and old-growth forest areas.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Insects, ptarmigan, spruce and ruffed grouse, plovers, pine grosbeaks, waxwings, thrushes, lemmings, voles, moose, bears.
"GEE WHIZ": This plant is also called "lingenberry." Its small leaves are coated with wax which helps keep it from drying out in the wind and cold.



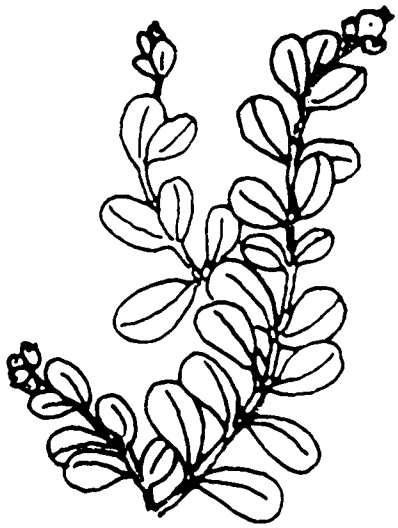
15. Bog Blueberry *

TRAITS: Low shrub; oval leaves; small, bell-like flowers; blue to black berries.
HABITAT: Heaths and bogs in the boreal forest and tundra except on the extreme northern coastal plain.
FOODS: Make their own by photosynthesis.
EATEN BY: Bears, voles, grouse, ptarmigan; moth larvae, aphids, true bugs, some flies, slugs, snails, pine grosbeaks, jays, thrushes.
"GEE WHIZ": These plants depend upon insects to pollinate their flowers.



16. Crowberry *

TRAITS: Small, evergreen, heather-like shrub.
HABITAT: Moist or wet ground in alpine or lowland tundra and boreal forest.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Berries are eaten by grouse, ptarmigan, bears, lemmings, voles, geese, plovers, snow buntings, longspurs, and rosy finches.
"GEE WHIZ": The small, wax-coated leaves of the crowberry are resistant to drying by the wind and cold.

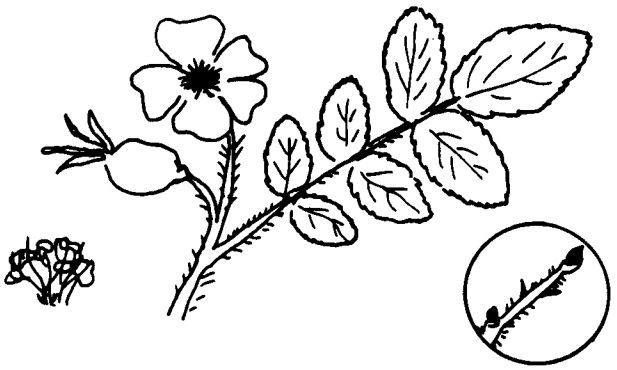


17. Bearberry *

TRAITS: Low-growing shrub with evergreen or persistent deciduous leaves; small, bell-shaped flowers; the fruit is an edible berry; a member of the heath family.
HABITAT: Grows on dry and moist soil in alpine and lowland tundra, forests, and muskegs.
FOODS: Makes its own by photosynthesis.
EATEN BY: Ptarmigan, bears, voles, lemmings, geese, plovers, and other birds.
GEE WHIZ: Bearberry plants depend on fungi to help them obtain nutrients from the soil. They provide sugars to the fungi in exchange.

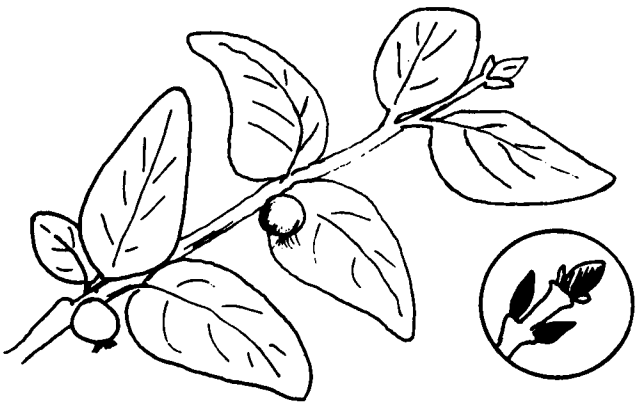
18. Fireweed F

TRAITS: A tall plant, 2 1/2 to 5 feet; many reddish-purple flowers along the top of a stem; seeds are cottony.
HABITAT: Disturbed soils; forests with open canopies that allow plenty of sunlight to reach the forest floor.
FOODS: Makes its own by photosynthesis.
EATEN BY: Moth larvae, aphids, certain flies, true bugs, leafhoppers, slugs, redpolls, sparrows, moose, hares, bears.
"GEE WHIZ": Fireweed is one of the first plants to appear after a fire, sometimes just a few days after the fire is over.



19. Wild Rose F

TRAITS: Spiny shrub; large flowers with pink petals; stems are covered with small thorns.
HABITAT: Shaded understory of forests, old burn areas, tall shrub thickets.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Moth larvae, aphids, pine grosbeaks, ruffed and sharp-tailed grouse, thrushes, hares, mice.
"GEE WHIZ": The reddish fruits of the wild rose are known as "rose hips"; rose hips are edible and contain high amounts of Vitamin C.



20. Soapberry F

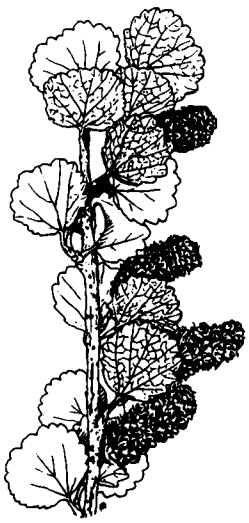
TRAITS: Shrub; undersides of leaves are covered with reddish-brown hairs; small yellow flowers; red to yellow berries.
HABITAT: Mature boreal forest.
FOODS: Makes its own by photosynthesis.
EATEN BY: Bears, grosbeaks, waxwings, grouse, insects such as aphids and larval moths and butterflies.
"GEE WHIZ": The soapberry is also known as "buffaloberry."

21. Labrador Tea *

TRAITS: Low, evergreen shrub; its narrow leaves are thick and rolled under on sides and have reddish-brown, hairy undersides; many sweet-smelling white flowers cluster at the end of twigs.
HABITAT: Poorly drained soils, muskegs, old forests.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Moth larvae, aphids, true bugs, leafhoppers, snowshoe hares.
"GEE WHIZ": Labrador tea grows abundantly after fire in black spruce forests. It is a member of the heath family.

22. Raspberry F

TRAITS: Prickly shrub; showy white or pink flower; yellow to red fruit.
HABITAT: Forms thickets along borders and in openings of the boreal forest.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Aphids, true bugs, leafhoppers, moth larvae, slugs, grouse, grosbeaks, jays, waxwings, thrushes, crows, sparrows; voles, deer mice, deer, moose, bears, hares, foxes, marten.
"GEE WHIZ": Certain fungi help these plants obtain nutrients from the soil.

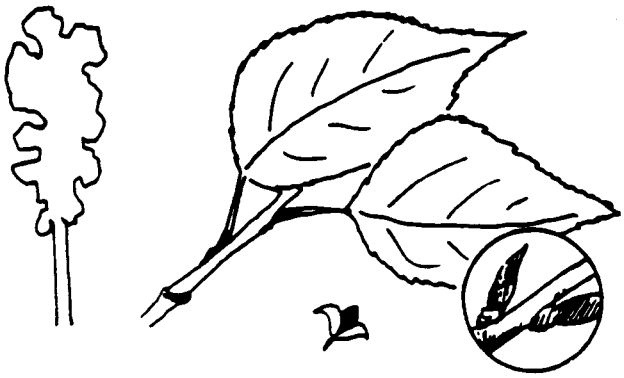


23. Dwarf Birch T

TRAITS: Low, spreading deciduous shrub, round leaves with wavy edges.
HABITAT: Moist and wet alpine and lowland tundra.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Ptarmigan, caribou, muskox, seed-eating birds such as snow buntings, longspurs, and redpolls.
"GEE WHIZ": This shrub grows low to the ground to avoid the wind and to take advantage of higher soil temperatures.

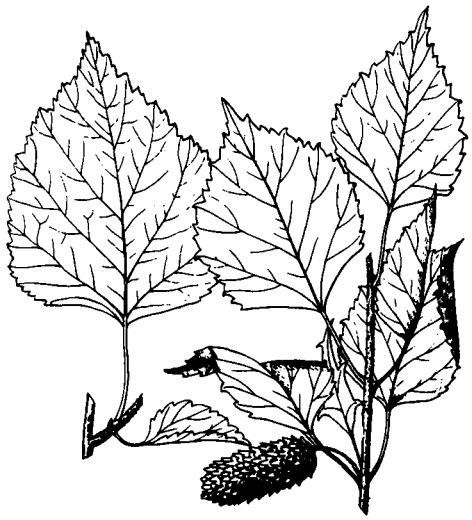
24. Willow *

TRAITS: Deciduous tree or shrub.
HABITAT: Moist and wet areas in alpine and lowland tundra.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Moth larvae, aphids, gall-making aphids, certain flies, sawfly wasps, true bugs, leafhoppers, moose, hares, muskox, caribou, ptarmigan, redpolls, pine grosbeaks.
"GEE WHIZ": Willow that grow in the tundra have branches that grow along the ground, rather than upward; this allows the willow to avoid strong winds and to take advantage of the warmer temperatures near the soil.



25. Balsam Poplar F

TRAITS: Medium-sized deciduous tree; gray bark with deep furrows.
HABITAT: Well-drained soils in boreal forest.
FOODS: Makes its own by photosynthesis.
EATEN BY: Aphids, gall-making aphids, moth larvae, sawflies, true bugs, leafhoppers, moose, snowshoe hares, pine grosbeaks.
"GEE WHIZ": Balsam poplar wood is used chiefly for boxes, crates, and pulpwood.

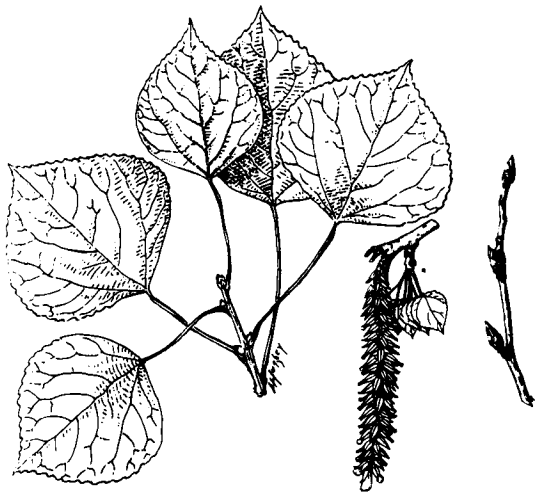


26. Paper Birch F

TRAITS: Small to medium-sized deciduous tree; bark is white, smooth, and separates into papery strips.
HABITAT: Boreal forests, all slopes; grows best in areas without permafrost.
FOODS: Makes its own by photosynthesis.
EATEN BY: Moth larvae, aphids, pine grosbeaks, redpolls, ruffed grouse, moose, hares.
"GEE WHIZ": Near cities and villages in interior Alaska, paper birch has been used primarily as fireplace wood.

27. Alder F

TRAITS: Deciduous tree or shrub; smooth gray bark with horizontal lines.
HABITAT: Varies by species; common in early successional stages and in mature forests.
FOODS: Makes its own by photosynthesis.
EATEN BY: Moth larvae, gall-making aphids, true bugs, leafhoppers, redpolls.
"GEE WHIZ": Certain bacteria live in the roots of the alder helping the plant obtain nitrogen from the soil in exchange for sugars made by the plant.



28. Aspen F

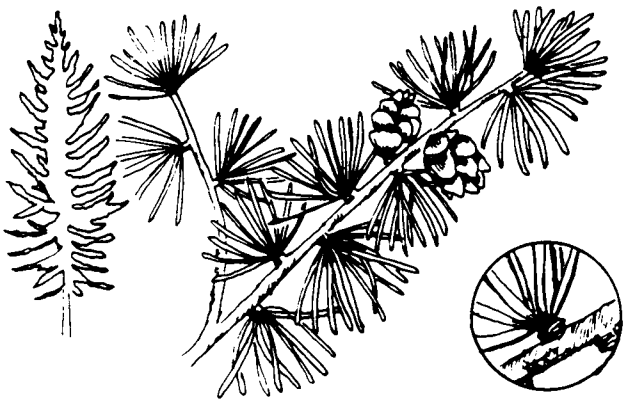
TRAITS: Deciduous tree; bark whitish or greenish gray with black scars and knots.
HABITAT: Well-drained soil on warm slopes.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Moth larvae, aphids, gall-making aphids, true bugs, mites, pine grosbeaks, ruffed grouse, moose, snowshoe hares.
"GEE WHIZ": Aspen need certain kinds of fungi to obtain some nutrients from the soil.

29. White Spruce F

TRAITS: Conifer tree; needles are 4-angled, sharply-pointed; thin gray bark; cones are long, hang downward, and fall at maturity.
HABITAT: Well-drained soils in boreal forest.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Spruce grouse, porcupines, crossbills, red squirrels, spruce bark and longhorn beetles, horntails, certain moths and flies, spruce aphids, carpenter ants.
"GEE WHIZ": White spruce is used extensively in interior Alaska for cabin logs.

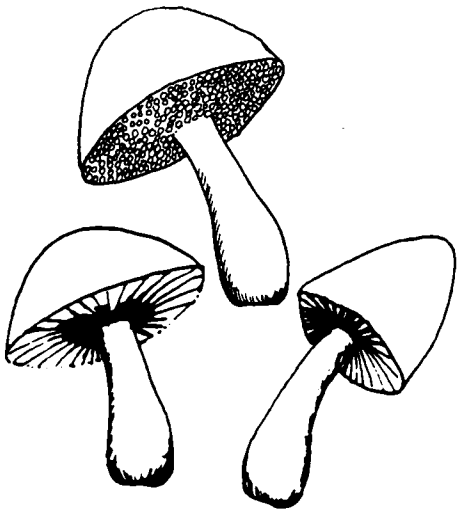
30. Black Spruce F

TRAITS: Conifer tree with 4-angled, pointed needles; thin gray to black bark; cones are small and egg-shaped and remain on the tree for several years, often clustered in the tree tops.
HABITAT: Grows mainly in wet soils and on north-facing slopes in dry climates where fires occur.
FOODS: Makes its own food by photosynthesis.
EATEN BY: Red squirrels, porcupines, bark and longhorn beetles, horntails, certain moths and flies, spruce aphids, carpenter ants.
"GEE WHIZ": The stiff-scaled cones of the black spruce stay on the tree for many years and are opened by fire or years of drying in the sun.



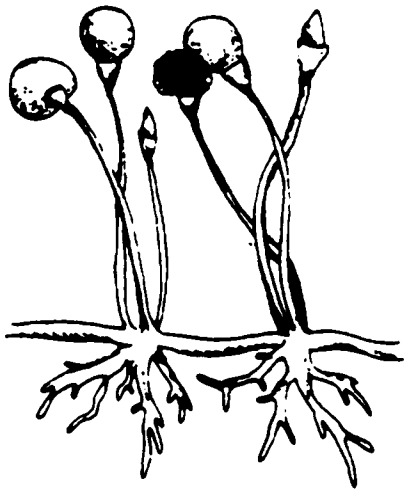
31. Tamarack F

TRAITS: Conifer that sheds its leaves in the fall; needle-like leaves are borne in clusters; bark is gray to brown with shreds and fissures.
HABITAT: Wet, cool climate; sea level to high elevations on most soil types.
FOODS: Makes its own by photosynthesis.
EATEN BY: Squirrels, wood-boring insects, aphids, seed-eating birds (sparrows, redpolls).
"GEE WHIZ": A certain species of mushroom, the yellow-pored bolete mushroom, grows only with tamaracks; tamaracks depend on certain fungi to help them obtain minerals from the soil.



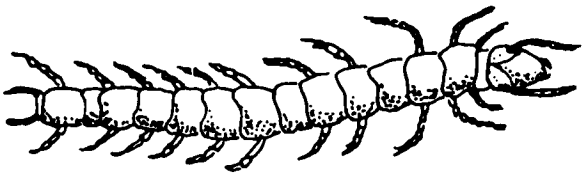
32. Mushrooms *

TRAITS: Fungi with fruiting bodies that consist of a stalk and a cap; the undersides of the caps are made up of many slits or tubes.
HABITAT: Soil, litter, rotting logs, and dead vegetation.
FOODS: Mainly dead plant material and animal wastes.
EATEN BY: Lemmings, ground squirrels, fungus gnats.
"GEE WHIZ": Most fungi that occur in tundra areas, such as the gilled mushroom, are able to grow at lower temperatures than those that occur in warmer environments.



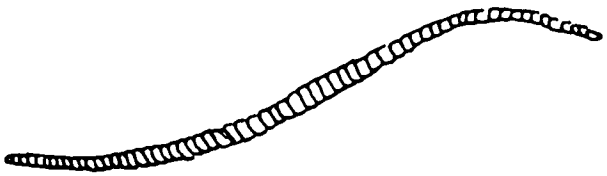
33. Molds, Mildews, and Rusts *

TRAITS: Apparent as a fine powder, fuzz, or furry coating on leaves or other plant parts or animal droppings; or as an abnormal growth.
HABITAT: Dead plants or waste materials, or on living plants or insects.
FOODS: Many feed on dead plant materials, while others live as parasites on plants or insects.
EATEN BY: Springtails, bacteria.
"GEE WHIZ": Their ability to cease functioning, then resume activities when conditions are favorable, allows them to survive in harsh environments.



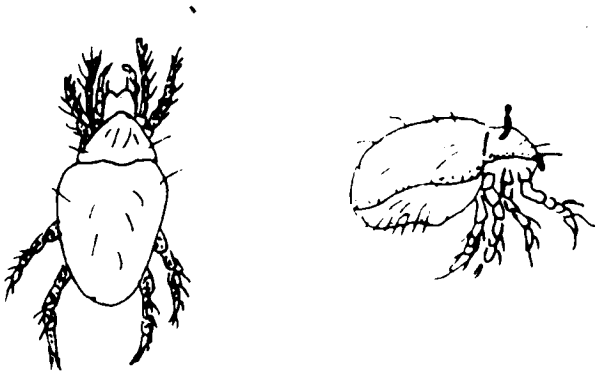
34. Centipedes *

TRAITS: A small worm-like animal with only one pair of legs on each of its body segments; all have poison claws for capturing prey.
HABITAT: In soil or beneath stones, bark, or logs.
FOODS: Invertebrates that live in the soil, including springtails, bristletails, ground beetles, fly larvae, flea larvae, mites, worms, snails.
EATEN BY: Thrushes, winter wrens.



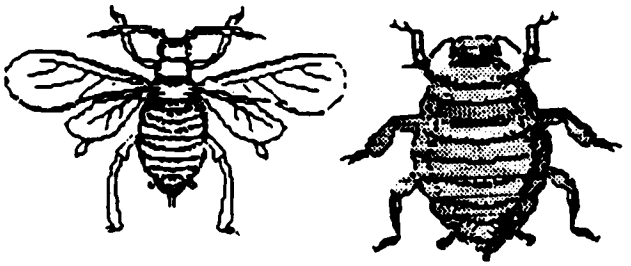
35. Segmented Worms *

TRAITS: Slender worms with distinct segments along the body.
HABITAT: Moist soil, mosses, and decaying plants.
FOODS: Varies by species; those that live in soil eat decaying vegetation, algae, or other invertebrate animals.
EATEN BY: Thrushes, centipedes, ground beetles.
"GEE WHIZ": Some segmented worms, called leeches, are parasites on other animals, including mammals, fish, birds, insects, snails, and worms.



36. Mites *

TRAITS: Tiny to microscopic animals, with 8 legs and a pear-shaped body.
HABITAT: These tiny animals are very abundant in mosses, dead leaves, and soil of the forest and tundra.
FOODS: Many mites prey on worms, other mites, and insect larvae (such as springtails, rove beetles, and flies); others feed on plants or on dead plants and animals.
EATEN BY: Ground beetles, centipedes, lady beetles, wagtails, wheatears, sparrows, thrushes, longspurs, and other insect-eating birds.
"GEE WHIZ": 10,000-83,000 mites occur in a square meter of tundra—greater densities occur in other habitats.

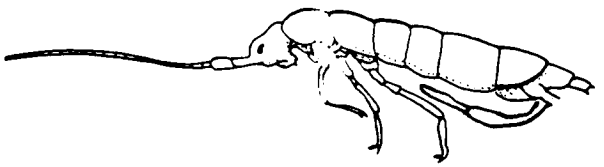


37. Aphids or Plant Lice *

TRAITS: Pear-shaped insects; winged and wingless forms in the same species.
HABITAT: Leaves and stems of plants.
FOODS: Sap of plants; they cause plant leaves to wilt, curl, and turn yellow.
EATEN BY: Ants, wasps, warblers, chickadees, kinglets, wrens, sparrows.
"GEE WHIZ": Aphids produce a secretion, called honeydew; in order to obtain this honeydew, certain ants protect and tend aphids; some aphids carry microscopic organisms that cause plant diseases; some aphids cause plants to form galls.

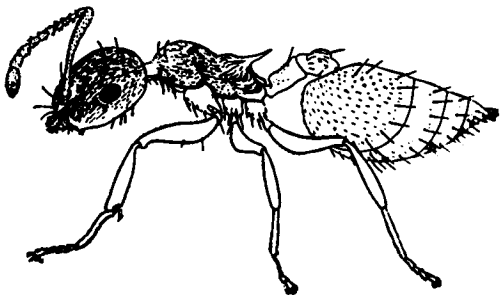
38. Spiders *

TRAITS: Small animals with 8 legs, the body appears divided into a large abdomen and a small head with large fangs.
HABITAT: In and on soil or leaf litter, mosses, or lichens.
FOODS: All spiders are predators of small animals, mainly insects, including aphids, flies, rove beetles, springtails, and others.
EATEN BY: Shrews, insect-eating birds such as plovers, sandpipers, longspurs, finches, pipits, wagtails, redpolls, thrushes, winter wrens, warblers.



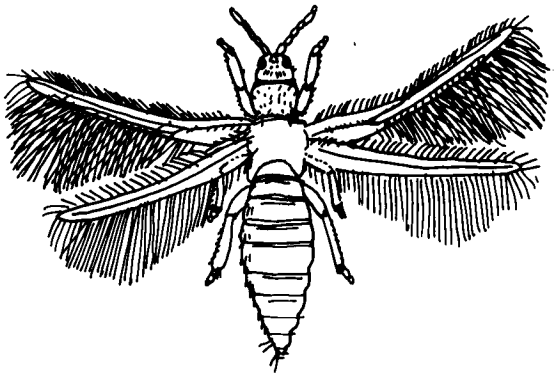
39. Springtails *

TRAITS: Small wingless insects with chewing mouthparts, a tube-like part on its front underside and a forked spring-like part on its rear underside. A springtail can spring 100 mm by using the forked part on its rear underside.
HABITAT: Lives in soil, moss, and decaying plants; a few species live in trees.
FOODS: Decaying materials, microscopic organisms, algae, lichens, pollen, and fungal spores.
EATEN BY: Centipedes, ground beetles, shrews, and insect-eating birds.
"GEE WHIZ": Springtails are able to develop slowly and resume development after long periods of cold or inactivity.



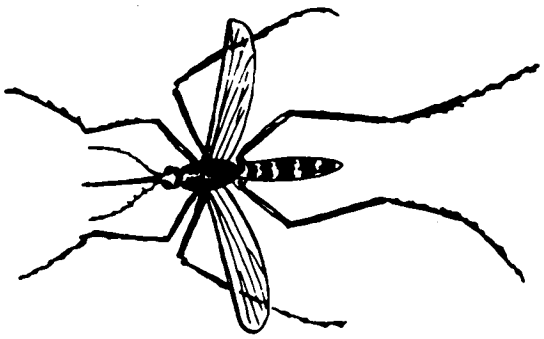
40. Ants *

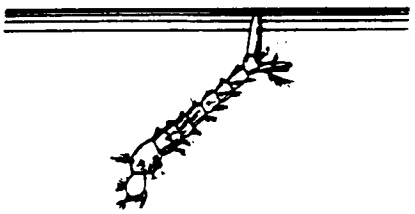
TRAITS: Body clearly divided into 3 segments by narrow constrictions; last segment forms a pointed end; only certain kinds of adults have wings.
HABITAT: In colonies in the ground or wood.
FOODS: Varies between species; some feed on flower nectar, plant juices, or aphid honeydew; others feed on seeds, leaves, or dead organisms, and some are predators on other insects.
EATEN BY: Flickers, wrens, thrushes, sparrows.
"GEE WHIZ": Some ants protect aphids from predators, then feed on the sugary secretion (honeydew) that aphids produce.



41. Thrips T

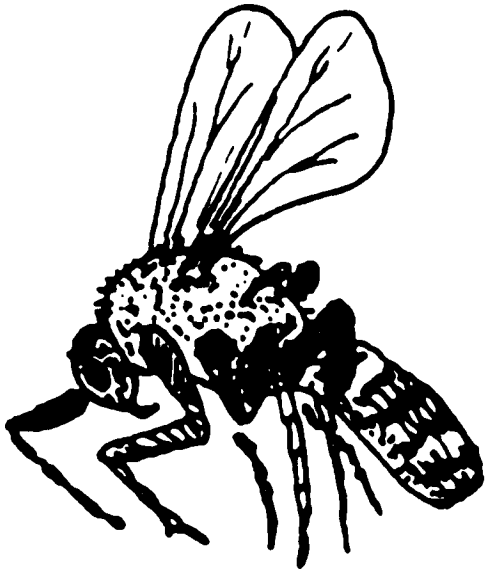
TRAITS: Tiny winged or wingless long-bodied insects; if winged, they have four narrow wings with fringes of long hairs; antennae, and tube-like mouthparts.
HABITAT: Flowers, leaves of plants.
FOODS: Most eat flowers, leaves, buds, and fruits; a few eat fungal spores or mites and small insects.
EATEN BY: Warblers, chickadees, creepers, wrens, ants, hornets, ground beetles, and lacewings.
"GEE WHIZ": Some carry microscopic organisms that cause plant diseases.





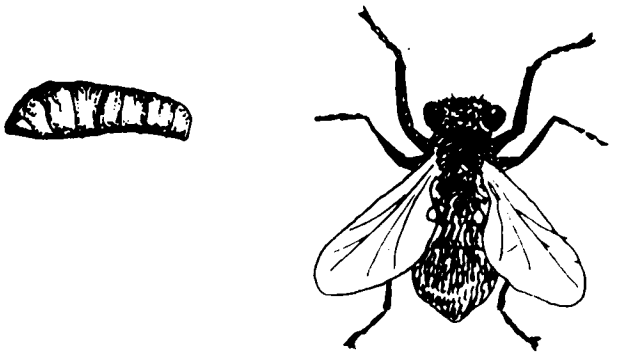
42. Mosquitos *

TRAITS: Small insects with long legs, one pair of clear wings, piercing and sucking mouthparts form a tube; males have feather-like antennae.
HABITAT: Larvae live in water; adults are found in most habitats; males are often found in or near flowers.
FOODS: Larvae feed on algae, protozoans, and dead plants; adult males feed on flower nectar, while adult females suck the blood of animals.
EATEN BY: Bats, dragonflies, fish, phalaropes, sandpipers, swallows, warblers, and frogs.
"GEE WHIZ": Males pollinate flowers; females can carry certain microscopic organisms that cause diseases in mammals and birds.



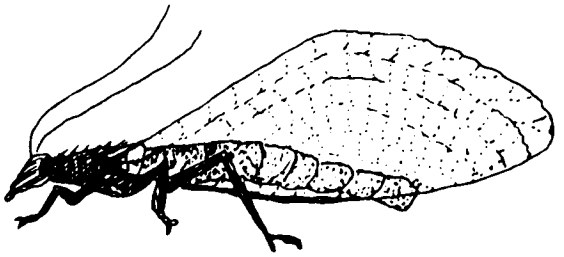
43. Fungus Gnats *

TRAITS: Small, slender, long-legged, mosquitolike insect.
HABITAT: Decaying vegetation or fungi, or moist soil.
FOODS: Fungi, decaying plants, and roots of live plants.
EATEN BY: Ground beetles, spiders, insect-eating birds.



44. Bot and Warble Flies *

TRAITS: Beelike, hairy flies.
HABITAT: Adults occur on the tundra; larvae develop inside an animal host.
FOODS: Larvae feed on the body fluids or tissues of their hosts (hares, squirrels, caribou, marmots, and other mammals); foods of the adults are unknown.
EATEN BY: Insect-eating birds.
"GEE WHIZ": Bot flies lay their eggs on their host's skin; the larvae burrow under the skin and feed on tissues or body fluids of the host, then emerge and drop to the ground where they develop into adults. By living under the skin of large animals, bot flies avoid the cold and the wind.

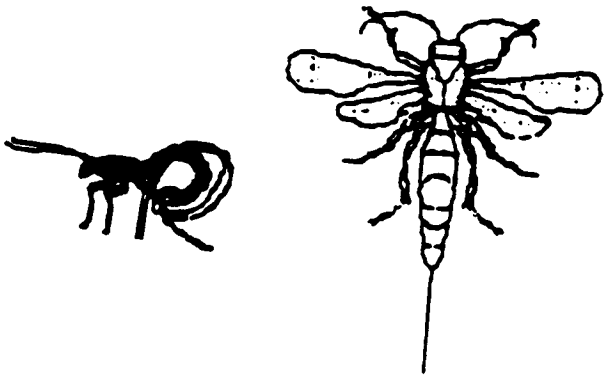


45. Lacewings *

TRAITS: Green or brown insects with large, clear wings with net-like veins, held tent-like over their body; small head with large eyes and chewing mouthparts, long antennae; some give off an unpleasant odor when handled.
HABITAT: On leaves of trees and shrubs; eggs are attached to a leaf by a thread the female forms; larvae spin a cocoon.
FOODS: Adults eat pollen, nectar, and aphid honeydew; larvae prey on mites, aphids, and other insects.
EATEN BY: Thrushes, warblers, chickadees, kinglets, hornets, dragonflies, bats, shrews.

46. Yellowjackets and Hornets *

TRAITS: Insects with bright black and yellow or white markings; the third body segment is separated from the middle one by a narrow "waist"; the tip of the abdomen is pointed and has a stinger.
HABITAT: Hornets build paper nests in the ground and in or on trees.
FOODS: Adults feed on flower nectar, ripe fruit, and other insects; they feed their larvae insects, such as caterpillars and flies, meat from dead animals, and nectar.
EATEN BY: Insect-eating birds such as flycatchers and swallows.
"GEE WHIZ": Some hornets pollinate flowers.

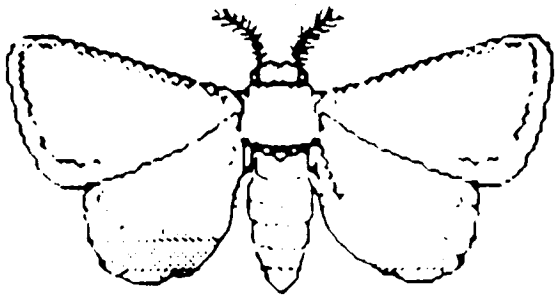


47. Ichneumon Wasps *

TRAITS: Insects with long narrow bodies, 4 clear wings of which the hind pair is smaller; antennae are at least half as long as the body; some have a long narrow tail-like structure for egg-laying.
HABITAT: Any habitat where host insects are available.
FOODS: These wasps lay their eggs inside larval sawflies, horntails, butterflies, moths, bees, and spiders; when the larvae hatch, they eat their host.
EATEN BY: Shrews, insect-eating birds such as plovers, sandpipers, buntings, pipits, wagtails, wheatears, flycatchers, swallows, thrushes, warblers, chickadees.
"GEE WHIZ": These wasps are important parasites of immature insects.

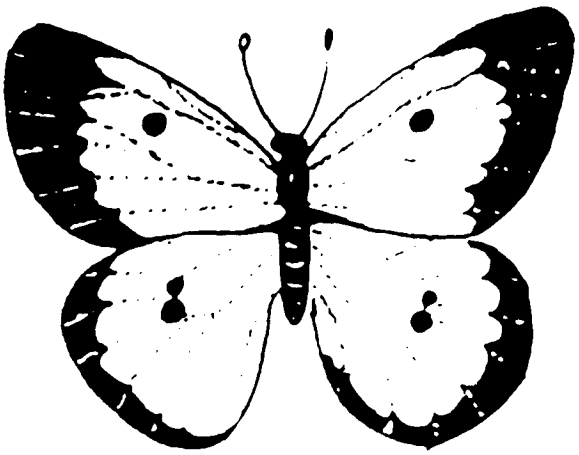
48. Bumblebees *

TRAITS: Insects with 4 wings, hind wings much smaller than front ones; hairy body covered with black and yellow or orange markings
HABITAT: Any area with nectar-producing flowers, including alpine and lowland tundra; nests in the ground.
FOODS: Nectar and pollen of flowering plants.
EATEN BY: Shrews, insect-eating birds such as plovers, buntings, longspurs, wagtails, pipits, redpolls, flycatchers, swallows, warblers.
"GEE WHIZ": Bees are important plant pollinators; mites often hitch rides on bees to reach new plants. The dense fur-like hair covering the bodies of bumblebees allows them to retain some of the heat generated by their muscles; thus they can remain active at colder temperatures than other insects.



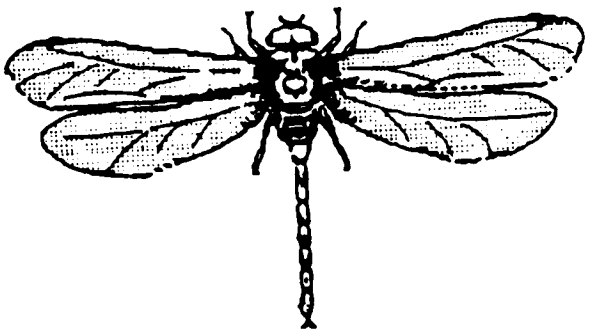
49. Moths *

TRAITS: Insects with 4 large wings with powder-like scales; large eyes, long antennae that are either feather-like or tapered at ends; most have tube-like mouths that coil up when not in use. Larvae spin cocoons; some larvae make tents of silk threads.
HABITAT: Adults use a variety of habitats; most larvae can only live on a particular species of plant.
FOODS: Adults feed mainly on flower nectar; most larvae feed on plant leaves, fruit, stems, and roots.
EATEN BY: Bats, shrews, ground beetles, warblers, flycatchers, swallows, chickadees, kinglets.
"GEE WHIZ": Adults pollinate flowers; larvae are parasitized by ichneumon wasps.



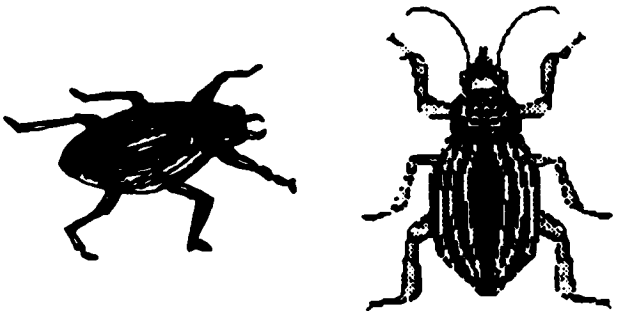
50. Butterflies *

TRAITS: Insects with 4 large wings with powder-like scales; large compound eyes, long antennae that have clubs at the tips, and tube-like mouths that coil up when not in use. Adults are active in the daytime.
HABITAT: Adults use a variety of habitats; most larvae can live only on a particular species of plant.
FOODS: Adults feed mainly on flower nectar; most larvae feed on plant leaves, fruit, stems, or roots.
EATEN BY: Insect-eating birds such as warblers and flycatchers; ground beetles, wasps, dragonflies.
"GEE WHIZ": Adults pollinate flowers. Larvae are often parasitized by ichneumon wasps.



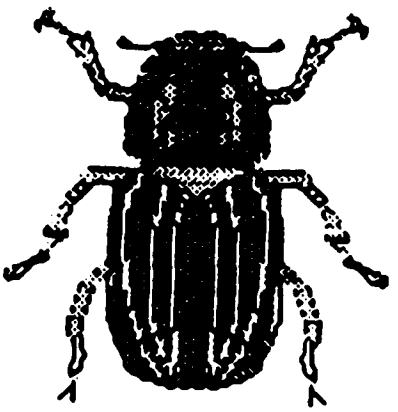
51. Dragonflies *

TRAITS: Insects with brightly colored bodies, large eyes, long narrow abdomen, and 2 pairs of large wings.
HABITAT: Larvae live on aquatic plants or on the bottom of streams or ponds; adults live near water in many habitats, including forests.
FOODS: Larvae prey on aquatic insects, tadpoles, and small fish; adults eat small flying insects including mosquitos, moths, lacewings, beetles, and others.
EATEN BY: Insect-eating birds such as swallows.



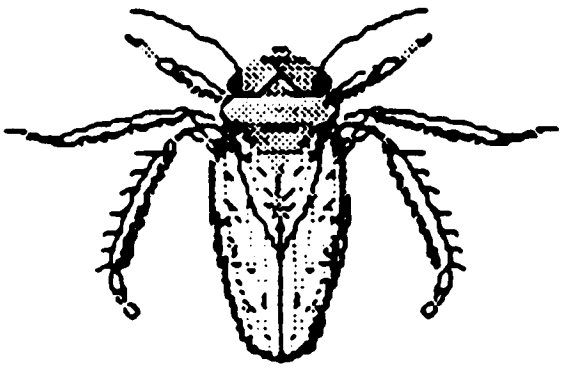
52. Ground Beetles *

TRAITS: Dark, flattened insects with front wings thickened and shiny with grooves running from front to back; long legs, large mouthparts.
HABITAT: Most habitats on land; most are active only at night and hide during the day under logs, rocks, or leaf litter.
FOODS: Varies by species; some adults feed on dead animal remains; others prey on insects, such as caterpillars, or on slugs and snails.
EATEN BY: Jays, thrushes, wrens, sparrows, centipedes.
"GEE WHIZ": Tundra species of ground beetles produce antifreezes that allow them to survive freezing temperatures.



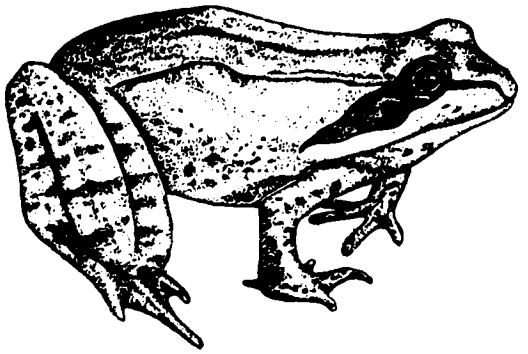
53. Spruce Bark Beetles F

TRAITS: Small, round-bodied insects with thickened front wings; small antennae with clubs on the tips.
HABITAT: Under tree bark of dead and dying trees.
FOODS: Feeds and breeds in the underside of tree bark or wood.
EATEN BY: Woodpeckers, brown creepers, ichneumon wasp larvae.
"GEE WHIZ": Under normal conditions, small populations of spruce bark beetles are always present in white spruce forests, feeding and breeding in the dead and dying trees.



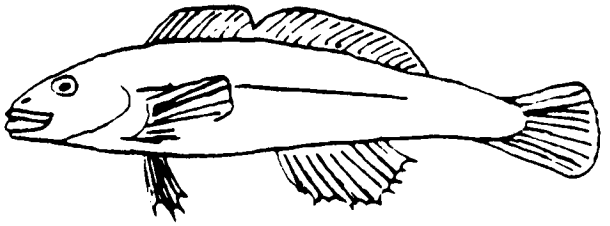
54. Leafhoppers *

TRAITS: Front pair of wings thin and clear, or only slightly colored; held roof-like over body; beak-like mouth comes out of the rear underside of the head; 1 or more rows of spines on the hind legs.
HABITAT: Found on plants in forests and other habitats.
FOODS: Sap of plants.
EATEN BY: Warblers, thrushes, chickadees, shrews, ground beetles, centipedes.
"GEE WHIZ": Many leafhoppers carry microscopic organisms that parasitize plants from one plant to another.



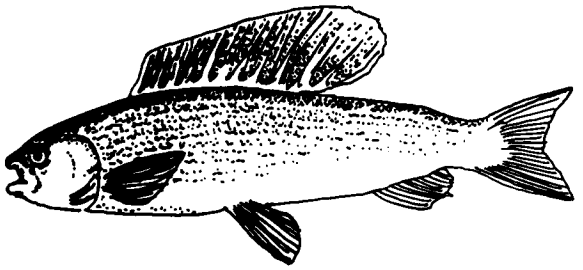
55. Wood Frog *

TRAITS: Small amphibian with moist skin, no scales or claws, long hind legs, short forelegs, large mouth.
HABITAT: Tundra, muskegs, and forests; eggs and tadpoles live only in water; adults live on land.
FOODS: Adults eat insects, including flies, true bugs, lacewings, dragonflies, and others; tadpoles eat algae and small aquatic animals.
EATEN BY: Tadpoles are eaten by fish, dragonfly larvae, loons, and grebes; adults are eaten by sandhill cranes, ravens, and other omnivores.
"GEE WHIZ": Wood frogs range farther north than any other amphibian. They produce antifreeze in their bodies and hibernate during winter beneath dry soil and plant litter.



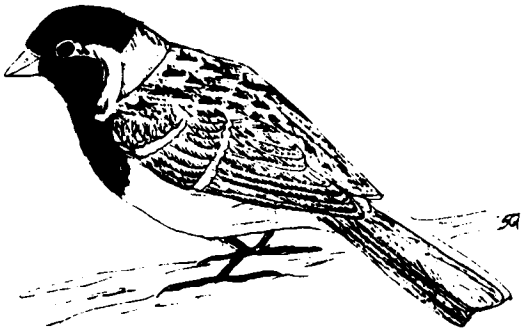
56. Slimy Sculpin *

TRAITS: A small fish with a large head that grows to 3-5 inches (7.5-12 cm).
HABITAT: Adults live on the bottoms of lakes and fast moving streams; they may move into shallow water to spawn.
FOODS: Mainly larvae of flies, such as mayflies, caddisflies, midges, craneflies; also dragonflies and amphipods; small fish and aquatic vegetation.
EATEN BY: Other fish, such as lake trout, burbot, and grayling; loons, grebes.
"GEE WHIZ": The color and pattern of their skins makes them nearly invisible when motionless on river and lake bottoms.



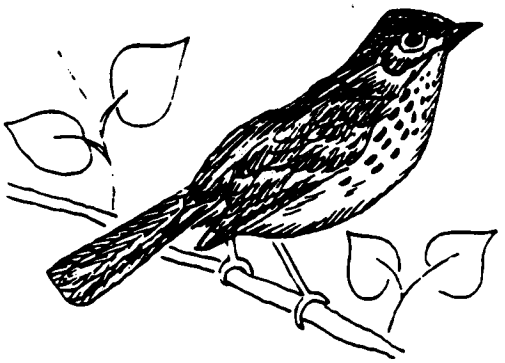
57. Arctic Grayling *

TRAITS: Graylings reach 12-14 inches (30-35 cm) and 1-1.5 lbs. (0.5-0.7 kg). They have a small mouth, and the dorsal fin is dotted with large iridescent red or purple spots.
HABITAT: Grayling live in cold, clear streams, lakes, and ponds; they spawn in streams with sandy gravel bottoms.
FOODS: Mostly insects such as midges, mayflies, stoneflies, craneflies, mosquitos, and small fish.
EATEN BY: Young are eaten by fish-eating birds and other fish; adults are eaten by humans.
"GEE WHIZ": Grayling migrate from small tributaries into deep water to spend the winter; this allows them to live in the summer in streams and ponds that freeze solid in winter.



58. Lapland Longspur T

TRAITS: Small-sized bird; breeding male has black crown, face and breast and chestnut hind neck; female nondescript, like many sparrows.
HABITAT: Alpine and dry lowland tundra; nests on small clumps of grass or dry knolls.
FOODS: Mainly seeds and buds of plants; also insects.
EATEN BY: Weasels, foxes, jaegers, gulls, short-eared owls.
"GEE WHIZ": One of the most common land birds on the tundra in the summer; migrates to warmer, more southern prairies in winter; longspurs spend a lot of time on the ground and usually run or walk rather than hop.

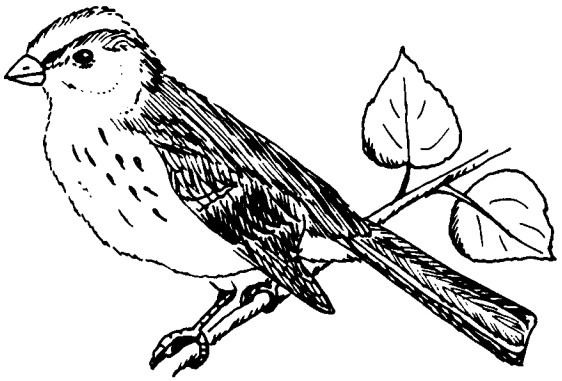


59. Small Thrushes F

TRAITS: Small birds with long tails, short, thin bills, brown backs, spots on white breast.
HABITAT: Gray-cheeked thrushes need tall shrub thickets; hermit thrushes need forest openings and edges; Swainson's thrushes need old conifer or hardwood forests.
FOODS: Beetles, ants, wasps, moth and butterfly larvae, flies, treehoppers, millipedes, snails, and other invertebrates; also berries.
EATEN BY: Merlins, sharp-shinned hawks, goshawks, boreal owls; red squirrels prey on eggs.
"GEE WHIZ": Parasitized by certain invertebrates and microscopic organisms.

60. Warblers F

TRAITS: Small birds with thin bills, most have yellow markings.
HABITAT: Some species (orange-crowned, yellow, Wilson's, blackpoll) live in tall shrub thickets; yellow-rumped warblers live in mixed forest; Townsend's warblers require coniferous forest.
FOODS: Insects that live on leaves and twigs of trees and shrubs, including true bugs, leafhoppers, moth and butterfly larvae, aphids, flies, beetles, sawflies, spiders.
EATEN BY: Merlins, sharp-shinned hawks, shrikes.

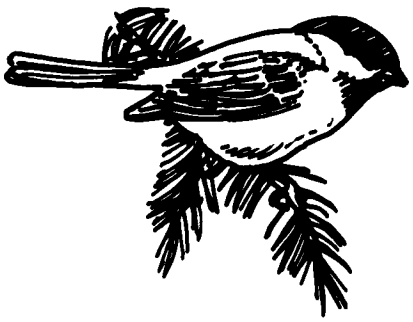


61. Sparrows F

TRAITS: Small birds with stout, cone-shaped bills, most are brown on the back and light underneath, many have streaks on the breast.
HABITAT: Tall shrub thickets, forest edges.
FOODS: Mainly seeds of groundcover plants and tall shrubs; also, insects that live on these plants.
EATEN BY: Sharp-shinned hawks, merlins, hawk owls, shrikes; shrews, squirrels; weasels prey on eggs and young.
"GEE WHIZ": Sparrows often use hair from moose or feathers from other birds to line their nests.

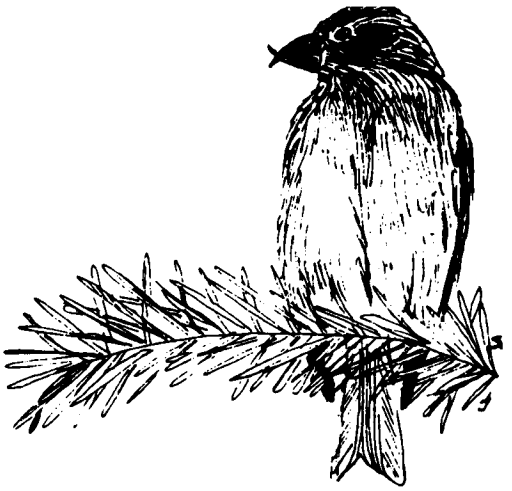
62. Redpolls *

TRAITS: Small bird with red cap; stout, cone-shaped bill.
HABITAT: Tall shrub thickets, mixed hardwood-conifer forests; nest in alder or willow shrubs; also nests in alpine and lowland tundra areas with low shrubs; winters in boreal forest.
FOODS: Mainly seeds and buds of willow, aspen, birch, alder, and other tundra and forest plants; also insects.
EATEN BY: Merlins, boreal owls, short-eared owls, jaegers, sharp-shinned hawks, shrikes; weasels, foxes, and squirrels may prey on eggs.
"GEE WHIZ": Redpolls wander over large areas of tundra and boreal forest in search of places with abundant food; they often burrow into snow drifts to avoid cold and wind.



63. Black-capped and Boreal Chickadees F

TRAITS: Small gray to brown bird with thin bill, long tail, dark cap and chin.
HABITAT: Chickadees require trees with holes; boreal chickadees need mature to old boreal forest; black-capped use hardwood or mixed forest.
FOODS: Mainly insects from leaves, bark, or branches (thrips, moths, butterflies, lacewings, flies, wasps, spiders, etc.); also seeds and berries.
EATEN BY: Any small hawk or owl, shrikes.
"GEE WHIZ": Chickadees require dead trees with nest holes made by woodpeckers or fungi.

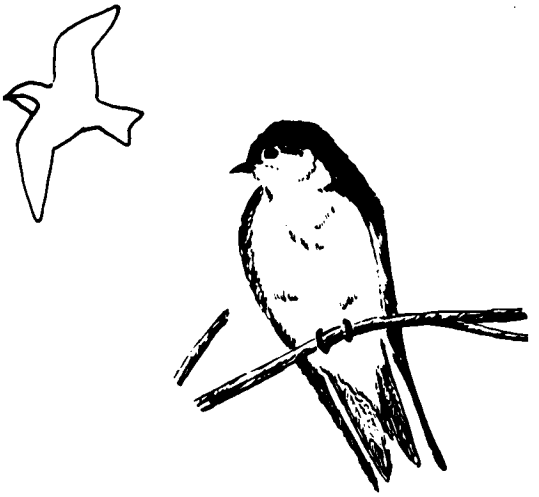


64. White-winged Crossbill F

TRAITS: Medium-sized bird with slightly forked tail; bill crosses at tip; males are reddish, females are yellowish:
HABITAT: Mature and old-growth conifer forests.
FOODS: Seeds of conifers.
EATEN BY: Sharp-shinned hawk, boreal owl; squirrels may eat eggs and young.

65. Pine Grosbeak F

TRAITS: Medium-sized bird with long tail; stout, cone-shaped bill; males are red, females are gray with gold markings.
HABITAT: Young to old coniferous and mixed hardwood-conifer forests; nests in conifer trees.
FOODS: Buds, seeds, and berries of trees and shrubs.
EATEN BY: Sharp-shinned hawk, merlins, goshawk.
"GEE WHIZ": May carry and spread seeds of some berry-producing plants.

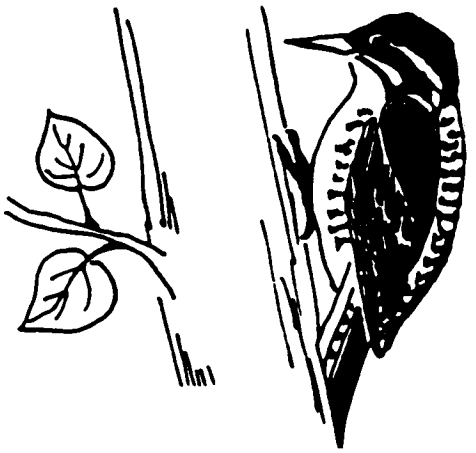


66. Tree and Violet-green Swallows *

TRAITS: Small birds with long wings, slightly forked tail; fly continuously to search for and capture flying insects.
HABITAT: Both species require holes in dead trees for nesting; forage for insects in open areas, over water and moist ground; tree swallows are closely tied to human settlements in tundra areas.
FOODS: Flying insects, such as moths, beetles, flies, dragonflies, bees, wasps, and leafhoppers.
EATEN BY: Merlins, sharp-shinned hawks, hawk owls; squirrels may eat eggs.
"GEE WHIZ": These birds depend upon fungi and woodpeckers to form the holes in dead trees that they need for nesting.

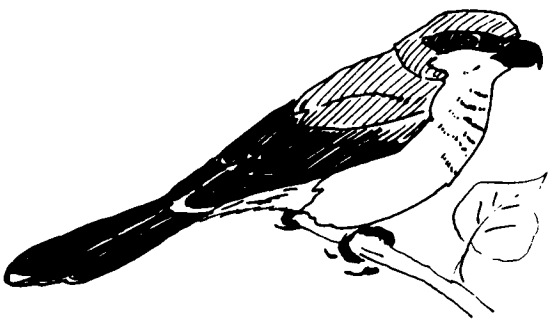
67. Brown Creeper F

TRAITS: Small brown bird with thin, curved bill and stiff tail feathers.
HABITAT: Requires many dead and dying trees for feeding and nesting; nests behind bark that has peeled away from the trunks of dead trees.
FOODS: Insects that live in and under the bark of dead and dying trees (beetles, moths, flies, and others); inches its way up the trunk and out branches of dead trees to search crevices for insects.
EATEN BY: Sharp-shinned hawks, boreal owls.



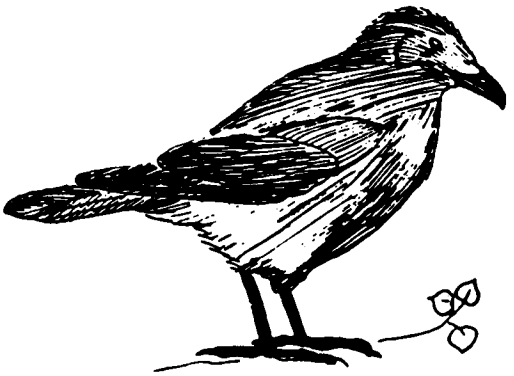
68. Woodpeckers F

TRAITS: Medium-sized birds with chisel-shaped bills, stiff tail feathers; Alaska species include three-toed, black-backed, hairy, and downy woodpeckers.
HABITAT: Old forests and recently-burned forests with many dead and dying trees and forest openings.
FOODS: Insects that live beneath tree bark, including bark beetles, longhorned beetles, horntails, and others.
EATEN BY: Sharp-shinned hawks, goshawks, great horned owls.
"GEE WHIZ": These birds dig holes in dead trees for nesting and roosting; the trees must first be decayed by fungi; their holes provide homes for other cavity-nesting birds and squirrels.



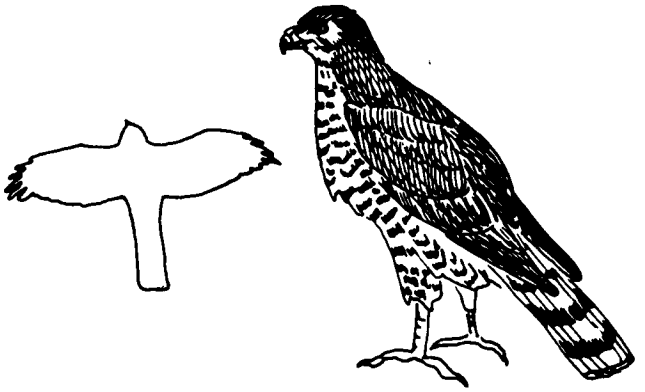
69. Northern Shrike *

TRAITS: Medium-sized gray bird with black mask; sharply hooked bill, long claws.
HABITAT: Tall shrub thickets, forest openings and edges, shrub thickets on the tundra.
FOODS: Small birds and mammals, large insects; chickadees, warblers, small thrushes, kinglets, voles, shrews, grasshoppers, beetles, butterflies.
EATEN BY: Merlins, sharp-shinned hawks.
"GEE WHIZ": The shrike will impale its prey on thorns, broken twigs, and barbs of barbed wire fences; it will kill and hang up more prey than can be eaten at one time, earning it the name "butcher bird".



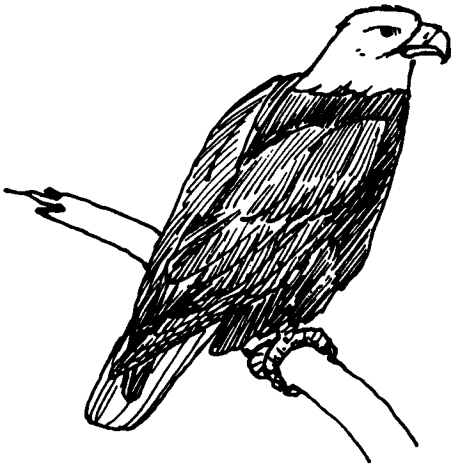
70. Common Raven *

TRAITS: Large black bird with wedge-shaped tail, broad wings; sharp talons and heavy bill.
HABITAT: Forests, shrublands, tundra, wetlands; builds a stick nest on cliffs or in trees.
FOODS: Scavenges meat from kills of large predators; eggs and young of other birds, hawks and owls; small mammals, berries.
EATEN BY: Eggs may occasionally be taken by eagles, crows, marten, jays, or other predators.
"GEE WHIZ": May follow other predators around to feed on scraps left after their kills; sometimes nests in old nests of magpies, goshawks, peregrine falcons, red-tailed hawks, eagles, great horned owls, or other large birds.



71. Sharp-shinned Hawk F

TRAITS: Medium-sized bird with long tail and rounded wings; sharp talons and hooked bill.
HABITAT: Mature and old mixed hardwood-conifer forests.
FOODS: Small birds, including chickadees, warblers, sparrows, thrushes, and woodpeckers.
EATEN BY: Eggs and young may be eaten by squirrels.
"GEE WHIZ": This hawk is difficult to see because of its small size and its habit of hunting close to the ground and perching in thick conifers.

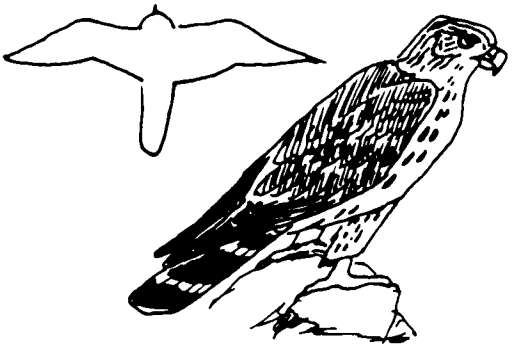


72. Bald Eagle F

TRAITS: Large brown bird with rounded tail and wings; sharp talons and hooked bill; adults have a white head and tail.
HABITAT: Old forests along rivers, lakes, and ocean; usually nests in large old trees, but feeds mainly near water; also nests on the ground or cliff ledges on islands where predators are absent.
FOODS: Waterfowl, small mammals, salmon, herring, dead and dying fish, mammals, or birds washed up along shorelines.
EATEN BY: Young occasionally eaten by ravens and magpies.
"GEE WHIZ": There are more Bald Eagles in Alaska than in all other states combined.

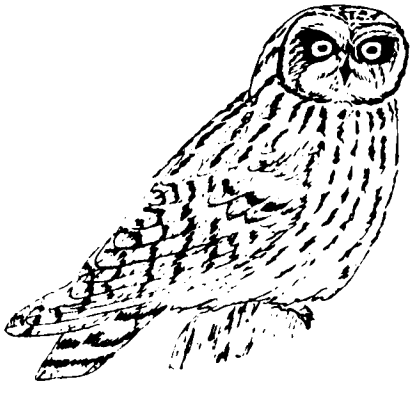
73. Rough-legged Hawk T

TRAITS: Large bird with whitish tail with dark terminal band, dark back, light breast and belly, pale head.
HABITAT: Alpine and dry lowland tundra near cliffs or river bluffs; nests in cliffs or trees.
FOODS: Lemmings, voles, hares, shrews, ground squirrels; occasionally small birds and insects.
EATEN BY: No predators known.
"GEE WHIZ": Migrates from tundra regions to areas with milder winter climates; winters in open habitats throughout the Lower 48.



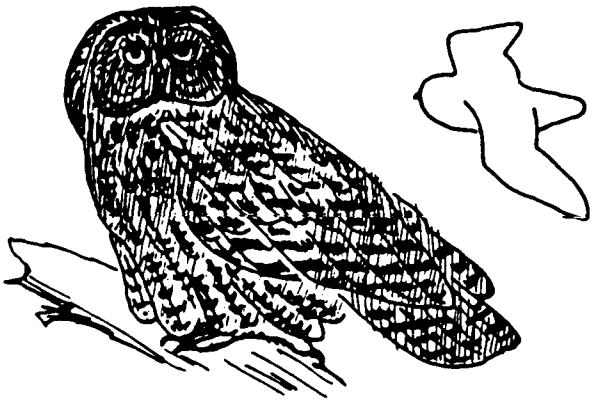
74. Merlin *

TRAITS: Medium-sized bird with long tail and sharply-pointed wings; sharp talons and hooked bill.
HABITAT: Open coastal and boreal forests; uses stick nests in spruce trees, or less commonly, nests on the ground.
FOODS: Songbirds, including thrushes, juncos, swallows, waxwings, sparrows, woodpeckers, and warblers.
EATEN BY: Squirrels and marten may eat eggs.
"GEE WHIZ": These small falcons often place their nests in abandoned magpie nests.



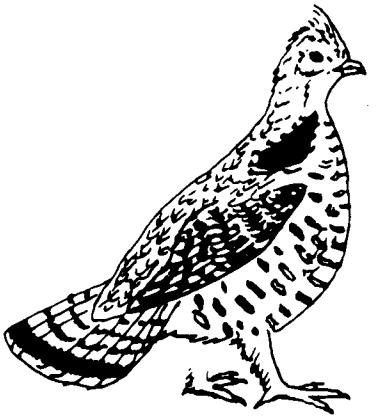
75. Short-eared Owl T

TRAITS: Large owl, light brownish color, moth-like flapping flight.
HABITAT: Open country, tundra and wetlands throughout Alaska; nests on ground in grass-lined depressions.
FOODS: Small mammals and birds, including voles, shrews, lemmings, young hares, weasels, sparrows, and shorebirds; also large flying insects.
EATEN BY: Eggs and young may be eaten by foxes or bears.
"GEE WHIZ": Migrate south to winter in prairies and coastal wetlands of the lower 48.



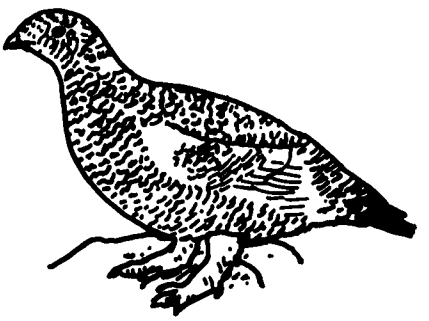
76. Great Gray Owl F

TRAITS: Large gray owl; forward-facing eyes, rounded head, sharp talons and hooked bill.
HABITAT: Boreal forest mosaic; nests in old trees but feeds in open areas including early successional stages, muskegs, and along rivers.
FOODS: Snowshoe hares, voles, squirrels.
EATEN BY: No predators known.
"GEE WHIZ": The great gray owl is the largest owl in Alaska, although the great horned owl and snowy owls are heavier and stronger.



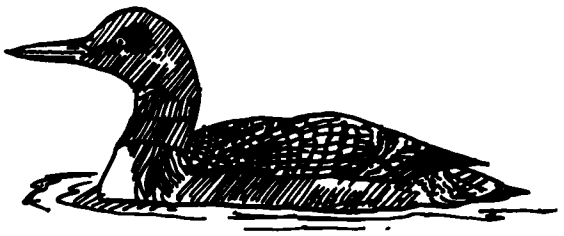
77. Ruffed Grouse F

TRAITS: Chicken-like bird with a ruff of black feathers on the sides of neck; dark band at edge of gray tail.
HABITAT: Hardwood forests, also thickets of willow and alder.
FOODS: Leaves, shoots, seeds, and berries of trees, groundcover and understory plants; chicks eat mainly insects.
EATEN BY: Goshawks, great horned owls, great gray owls, foxes, lynx, humans.
"GEE WHIZ": May help transport seeds of some forest plants.



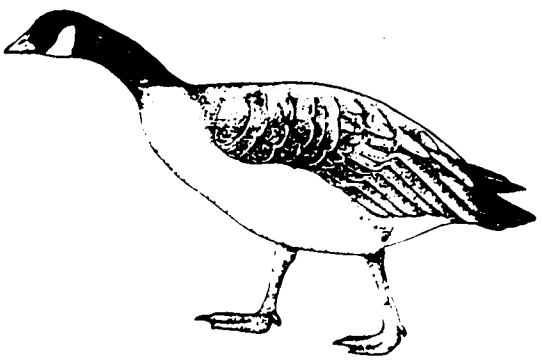
78. Ptarmigan *

TRAITS: In winter ptarmigan are all white; in summer their plumage is barred, grayish-brown.
HABITAT: Alpine and lowland tundra and forest.
FOODS: Mainly buds and twigs of willow, dwarf birch, and other shrubs, also seeds, berries, and some insects.
EATEN BY: Foxes, weasels, gyrfalcons, golden eagles, humans.
"GEE WHIZ": Ptarmigan have fully feathered feet; these provide insulation and "snowshoes" that allow ptarmigan to walk on the snow surface; ptarmigan often roost in snow banks to keep warm; their dense feathers and down provide excellent insulation against the cold.



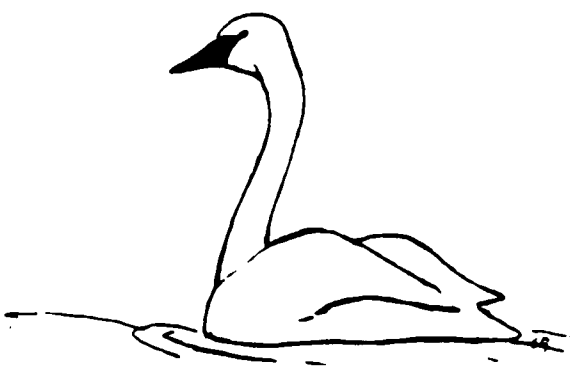
79. Loons *

TRAITS: Large, long-bodied swimmers; dagger-like bills and webbed feet.
HABITAT: Ponds and lakes in tundra and forest areas
FOODS: Mainly small fish.
EATEN BY: Eggs and young are eaten by foxes, weasels, bears, and jaegers; young may also be eaten by northern pike.
"GEE WHIZ": Loons dive from the surface of water or sink to chase after fish; they are able to disappear quietly below the water surface, barely making a ripple.



80. Geese *

TRAITS: Large waterfowl; heavier-bodied and longer-necked than ducks; bill thick at base; noisy in flight, often flying in "V" formations.
HABITAT: Nests on islands and shores of lakes and estuaries particularly in lowland tundra.
FOODS: Leaves, stems, seeds, and roots of grasses, sedges, mosses, and aquatic plants; brant and emperor geese feed on eelgrass and algae in the winter.
EATEN BY: Eggs and young may be eaten by foxes or bears; humans.
"GEE WHIZ": In winter, migrate south to ice-free wetlands and coastal areas of North America.



81. Swans *

TRAITS: Very large, all-white waterfowl; long neck, all-black bill; species include the Tundra Swan and the Trumpeter Swan.
HABITAT: Forest wetlands, lakes, marshes, rivers with dense vegetation; coastal, lowland tundra.
FOODS: Grasses, sedges, aquatic plants.
EATEN BY: Eggs and young by bears, foxes; adults eaten by humans.
"GEE WHIZ": The Trumpeter Swan is the largest swan in the world, sometimes weighing as much as 40 pounds; 80% of the world's Trumpeter Swan population nests in Alaska.

82. Voles *

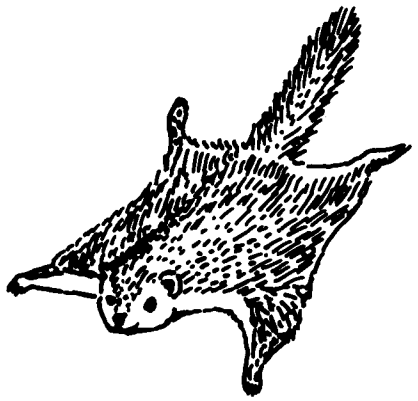
TRAITS: Small mammal with rounded nose, short tail, short legs; long front teeth for gnawing.
HABITAT: Forests, shrublands, and grassy areas, lowland and alpine tundra.
FOODS: Fresh green vegetation, seeds, roots, berries, mushrooms, and other fungi; alpine plants and lichens.
EATEN BY: Foxes, marten, weasels, boreal and hawk owls, jaegers, hawks.
"GEE WHIZ": Some species of voles gather and dry large amounts of green vegetation during summer to serve as their winter food supply.

83. Lemmings T

TRAITS: Small mammal; thick fur, short legs, tail, and ears.
HABITAT: Alpine and lowland tundra.
FOODS: Shoots of grasses, sedges, and other plants in summer; bark and twigs of willow and dwarf birch and roots of various tundra plants in winter; occasionally insects, berries, and fungi.
EATEN BY: Owls, jaegers, gulls, arctic foxes, weasels.
"GEE WHIZ": Some species of lemmings turn white in winter and grow shovel-like claws for digging through snow and ice.

84. Red Squirrel F

TRAITS: Small mammal with long front teeth; short legs, large bushy tail; red brown on back, whitish underneath.
HABITAT: Coniferous forests.
FOODS: Mainly seeds of spruce and other conifers; berries, mushrooms; less often, bird eggs and young.
EATEN BY: Marten, goshawks, great horned owls.
"GEE WHIZ": When carrying and caching its food, this animal helps scatter seeds of spruce and berry-producing plants.

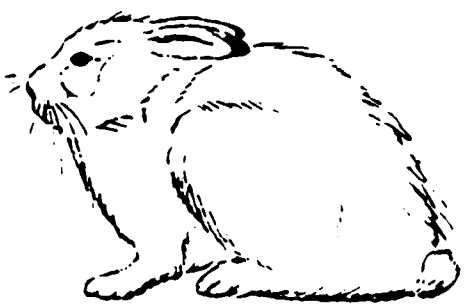


85. Northern Flying Squirrel F

TRAITS: Small mammal with long front teeth; long bushy tail, short legs connected by a folded layer of loose skin used for gliding ("flying") between trees.
HABITAT: Requires old trees with holes for its den sites; small forest openings.
FOODS: Mainly mushrooms, truffles, and other fungi; lichens, berries, green vegetation, seeds, buds; also insects, and small, live or dead mammals and birds.
EATEN BY: Owls, goshawk, marten.
"GEE WHIZ": Nests and roosts in abandoned woodpecker holes in dead trees.

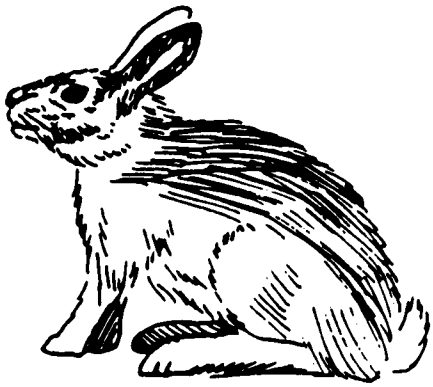
86. Arctic Ground Squirrel T

TRAITS: Large reddish ground squirrel, flecked with white.
HABITAT: Well-drained soil of lowland and alpine tundra.
FOODS: Mainly shoots and leaves of tundra plants, but also berries, insect larvae, bird eggs, and dead animals.
EATEN BY: Foxes, wolves, wolverines, brown bears, golden eagles, rough-legged hawks, snowy owls.
"GEE WHIZ": Hibernates for 7 months every year.



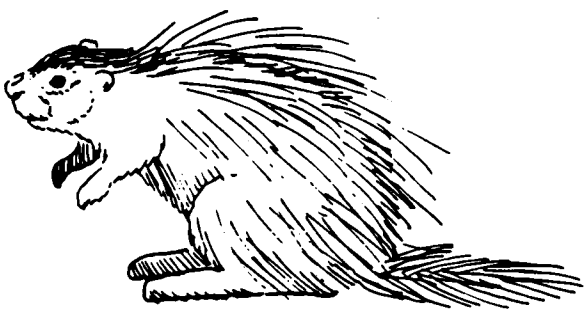
87. Tundra Hare T

TRAITS: Relatively short ears, dense fur, and white winter fur.
HABITAT: Windswept rocky slopes and dry lowland tundra of western and parts of northern Alaska.
FOODS: Willow shoots, and the leaves, flowers, and shoots of other tundra plants.
EATEN BY: Wolves, snowy owls, golden eagles.
"GEE WHIZ": The young of tundra hares are covered with fur at birth and have their eyes open; other rabbits give birth to young that lack fur and have their eyes closed.



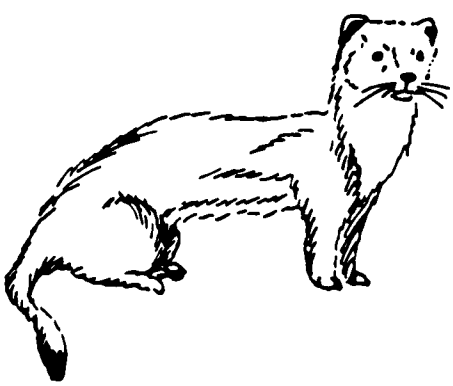
88. Snowshoe Hare F

TRAITS: Small mammal with long front teeth for clipping twigs; large, long ears; short tail; long hind legs and large hind feet; changes to white in winter.
HABITAT: Requires a forest mosaic that includes early successional forest where branches of willows, birch, and aspen are at heights it can reach.
FOODS: Buds and twigs of birch, willow, and aspen.
EATEN BY: Lynx, goshawks, great horned owls, red fox, coyote.
"GEE WHIZ": These animals depend upon microscopic organisms that live in their intestines to produce certain vitamins needed for survival.



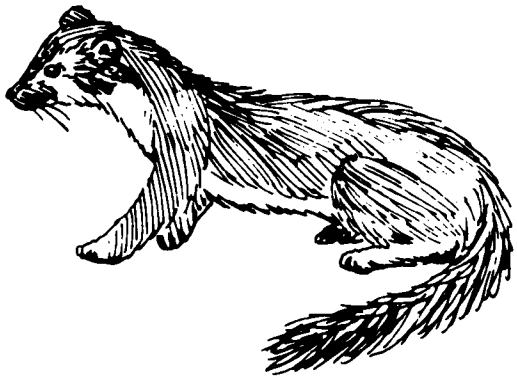
89. Porcupine F

TRAITS: Small mammal; large front teeth for gnawing, short legs, back and tail covered with quills.
HABITAT: Coniferous forests that include large hollow trees or small caves under rocks or logs that it can use for denning.
FOODS: Green vegetation in spring and summer; the inner bark of spruce and birch trees in the winter.
EATEN BY: Lynx, coyotes, wolves, wolverine.
"GEE WHIZ": The wounds this animal inflicts on tree bark allow fungi, insects, and other small animals to enter trees.



90. Ermine (Short-tailed Weasel) *

TRAITS: Small furbearing mammal; sharp teeth, black tip on tail; turns white in winter.
HABITAT: Open areas, including early successional stages of boreal forest, wetlands, and tundra where water is available for drinking.
FOODS: Voles, shrews, jumping mice, deer mice, and other small mammals are the main foods; birds, insects, and plants are also eaten.
EATEN BY: Great horned owls, hawks, red foxes, goshawks.

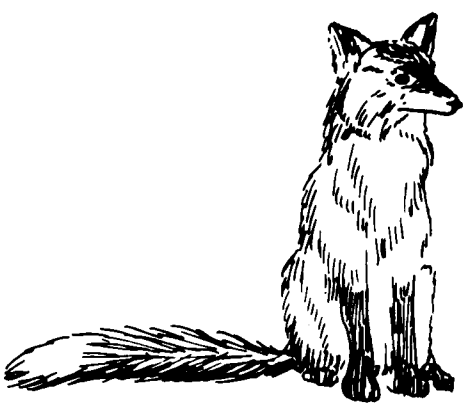


91. Marten F

TRAITS: Small mammal; sharp teeth, short legs, yellow to brown fur, long tail.
HABITAT: Coniferous forests; requires a high population of voles near forest.
FOODS: Meadow and red-backed voles are their primary prey; berries, small birds, bird eggs, squirrels, and dead animals are occasionally eaten.
EATEN BY: Foxes, coyotes, lynx, eagles, great horned owls.
"GEE WHIZ": Uses squirrel middens (piles of scraps left by squirrels) for winter den sites.

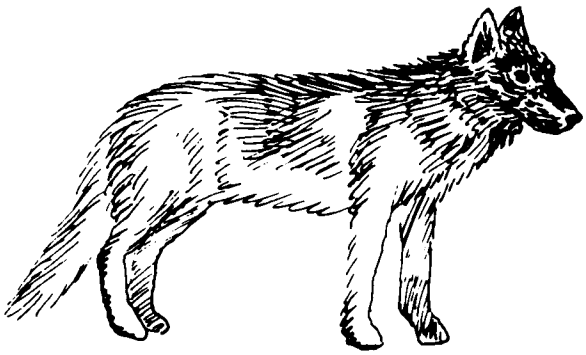
92. Beaver F

TRAITS: Small mammal with long front incisors, webbed feet, and long, flat tail.
HABITAT: Forests and shrublands along streams, rivers, and lakes where there are adequate stands of willows, birch, or aspen for food; not found north of the Brooks Range.
FOODS: The inner bark of willow, aspen, cottonwood trees and shrubs; also aquatic plants.
EATEN BY: Wolves, lynx, wolverine, bears, humans.
"GEE WHIZ": Ponds made by these animals provide habitat for a variety of pond-dwelling wildlife; the trees beavers kill provide habitat for beetles, fungi, and woodpeckers.



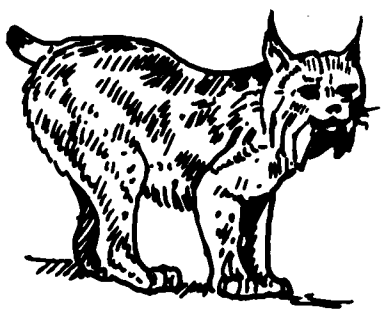
93. Red Fox *

TRAITS: Dog-like mammal with long tail, sharp teeth, red to black fur, long legs.
HABITAT: Early successional stages of boreal forest, or tundra areas where their prey are abundant.
FOODS: Voles and lemmings are their preferred foods; muskrats, squirrels, hares, birds, eggs, insects, berries, and dead animals are also eaten.
EATEN BY: Wolves, coyotes, lynx, wolverine, bears.



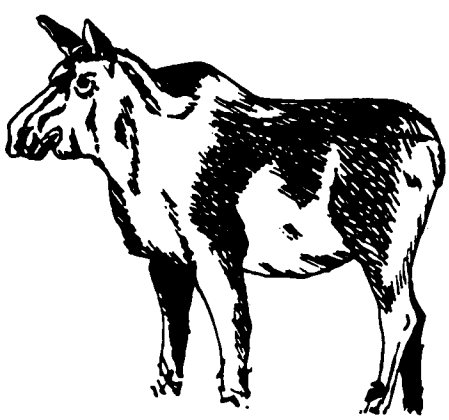
94. Wolf *

TRAITS: Large, dog-like mammal, sharp teeth, long bushy tail, long legs; lives and hunts in packs.
HABITAT: Alpine and lowland tundra and forests throughout Alaska.
FOODS: Moose, deer, caribou, goats, and Dall sheep (adults and young); also marmots, voles, hares, birds, and fish during summer.
EATEN BY: Other wolves occasionally.
"GEE WHIZ": Smaller animals such as foxes, weasels, ravens, and jays often feed on scraps left by these large predators; social hunting behavior—hunting in packs—allows them to prey on large animals such as moose and caribou.



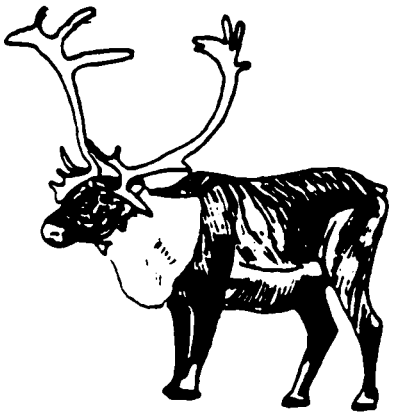
95. Lynx F

TRAITS: Medium-sized mammal in the cat family; tufted ears, long legs, large feet and short tail; sharp teeth.
HABITAT: Requires a mosaic of old conifer forest and early successional stages where prey are abundant.
FOODS: Eats snowshoe hares almost exclusively; when hare populations are low, lynx may also eat small mammals, birds, and rarely moose or caribou.
EATEN BY: Young may be eaten by great horned owls or wolverines.



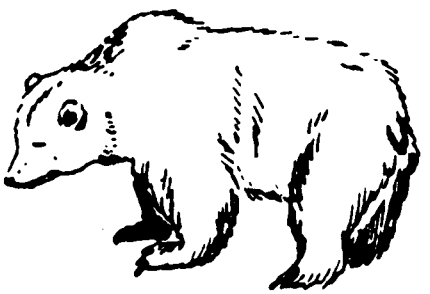
96. Moose *

TRAITS: Large, hoofed mammal; long legs, drooping nose, large palmate antlers on male in fall.
HABITAT: Prefers tall shrub thickets found 10-30 years after a forest fire or other disturbance and thickets along rivers; also seeks shelter in forest, particularly during winters with heavy snowfall.
FOODS: Browses on woody vegetation, especially willow, birch, and aspen year-round; in spring, grasses, sedges, horsetails, and aquatic plants are eaten.
EATEN BY: Wolves, brown bears, and humans.



97. Caribou *

TRAITS: Large size, long dense fur, short tail.
HABITAT: Lowland and alpine tundra and boreal forest, mainly in northern, central, and northwestern Alaska; requires cool windblown sites or snow fields to escape summer insect harassment.
FOODS: Grasses, sedges, herbs, and woody plants in summer; during winter, lichens are an important food.
EATEN BY: Wolves, brown bears, wolverines, humans; calves may be eaten by golden eagles.
"GEE WHIZ": Depends on microscopic organisms in its digestive system to help it digest its food.

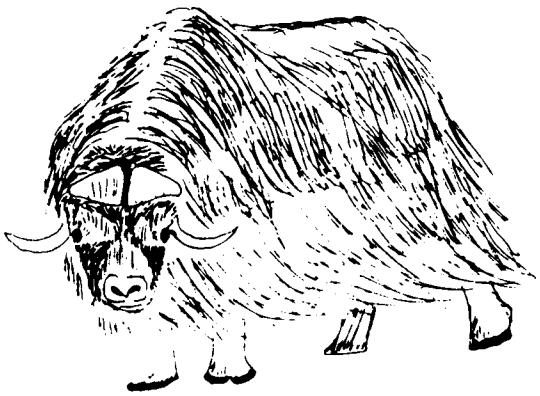


98. Brown Bear (Grizzly) *

TRAITS: Large mammal; sharp teeth, long claws on feet, large hump over shoulders, dish-shaped face.
HABITAT: Tundra and forest throughout Alaska; each individual may use 104-390 sq km of these habitats.
FOODS: In spring, over-wintered berries, roots, and fresh green vegetation; salmon and berries in fall; also young of moose, caribou, and deer; ground squirrels and any dead animal.
EATEN BY: Brown bears.
"GEE WHIZ": Brown bears survive winter by remaining dormant in an underground den.

99. Dall Sheep T

TRAITS: White color, dense fur, sharp hooves specially designed for climbing.
HABITAT: Uses separate summer and winter ranges in alpine tundra in much of Alaska; requires cliffs for escape cover and windblown ridges where food is available during winter.
FOODS: Mainly alpine grasses and sedges, but also flowering herbs, willows, and mosses of alpine tundra.
EATEN BY: Wolves, wolverines, bears, humans; golden eagles will eat lambs.
"GEE WHIZ": Depends on microscopic organisms in its digestive system to help digest its foods.



100. Muskox T

TRAITS: Large size, long dense fur, short legs a
HABITAT: Lowland tundra of northern and west
Alaska; prefers floodplains and river bottoms in s
requires windblown, snow-free areas in winter.
FOODS: Grasses, sedges, herbs, and woody pl
as willows.
EATEN BY: Wolves and humans.
"GEE WHIZ": Depends on microscopic organis
digestive system to help it digest its food.

101. Humans *

TRAITS: Large mammals that walk erect on two
have forearms with opposable thumbs. Have littl
comparison to other mammals.
HABITAT: Humans use tools to make clothing, b
shelters, and catch or grow food, and thus are al
in a wide variety of environments around the wor
FOODS: Moose, caribou, salmon, geese, many
and domesticated animals.
EATEN BY: Bears and other large, wild animals l
humans on rare occasions, but humans have no t
predators.
"GEE WHIZ": Humans have the ability to coope
together to accomplish big jobs.