



North Dakota 4-H

Nature Trails

Unit 1

Member's Manual

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Welcome to the Nature Trails Outdoor Study Program. This program is designed for boys and girls who live in towns or on farms. This is the first in a series of programs which will help you experience your environment.

Mankind is learning that in order to survive we have to live in harmony with nature. We are a part of the environment and whatever affects the environment will also affect us. In order to understand and appreciate the environment we must study it. This program will be your opportunity. There are a wide range of activities from which to choose. Select those that fit your interests and resources.

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Getting started

PLANNING YOUR PROJECT

1. Page through this booklet briefly and review its contents.
2. Decide what you would like to study and learn about during this next year.
3. Use the North Dakota 4-H Record Form to list your goals.

WHO MIGHT HELP

You may need help with this project if you are taking it as an individual study. There are many people who can help you. Think about those who are interested in the outdoors and might help. They might be:

- Parents
- Brothers, sisters, grandparents, aunts, uncles
- Sports persons, professional wildlife personnel, conservation personnel
- Old adults in your community

Find a person who will be willing to help. Your 4-H leader may assist you in finding someone. Ask them to help you with this project. Show them a copy of this booklet. Give them a copy of the Guide for a 4-H Helper. A leader's guide may also be available for this project.

My 4-H Helper will be _____

Suggested project requirements

1. Study at least eight lessons and complete at least one exercise in each.
2. Select at least one major activity to complete during the year. This may be constructing a feeder, establishing an area for wildlife habitat, studying wildlife and recording your observations or other study.
3. Give a demonstration or talk for your 4-H club or other community organization.
4. Share what you have learned with others by preparing displays, teaching at workshops, writing at workshops, writing news releases or doing radio program.

Guide for 4-H Helpers



A 4-H member is asking you to be their helper. Listen to the request. Find out what the 4-Her is asking you to do. You can make a real contribution to the 4-H member's growth and development. You can share your skills to help them learn to do new things and learn more about themselves. You may have a feeling of sharing, caring and accomplishment. Try it. It could be for you.

- You will want to review their project book and become familiar with the requirements of the project. If you wish to have a copy of the project book, contact the young person's 4-H leader or your Extension county office.
- Help them decide which lessons to study.
- Help them select things that are easy and can be done quickly. Then challenge them to try new techniques and learn additional skills as they make progress in the project.
- Help complete the member-helper-leader agreement.
- Consult with their 4-H leader if you have questions.
- Help the 4-Her learn the skills in this project or activity.
- Help the 4-Her when needed, but don't do the project for them.
- Help the 4-Her evaluate the quality of their work.
- Be patient and support the young person in their learning efforts.



North Dakota 4-H Nature Trails



Autumn Changes

Objectives

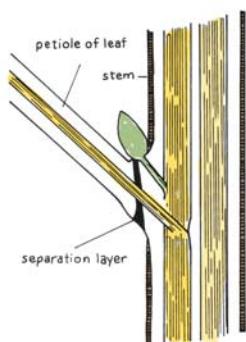
You will become aware of the reasons for

- ! leaf color
- ! animal color
- ! dietary changes and other changes associated with autumn.

Changes in Plant Color

In autumn the leaves of many plants, shrubs and trees change color. The causes for this are not fully known. Two things probably are involved; the loss of leaf vigor or healthiness, and decay of the leaf.

The Loss of Leaf Vigor



The decline of the leaf's healthy condition begins with the formation of a layer of cells to separate the leaf from the branch. This layer forms long before the leaf actually falls. This layer (called the *abscission layer*) is a band of tissue which goes almost through the base of the leaf stalk (the *petiole*). It does not penetrate the tissue that carries food and water.

As the season continues, the separation layer becomes soft. The stalk (*petiole*) of the leaf weakens. The vessels that carry food (*phloem*) and water (*xylem*) may become clogged. The clogged vessels reduce the amount of food for the leaf. This hinders the making of the green-colored material in leaves, a material called *chlorophyll*. Chlorophyll is constantly being destroyed by sunlight. When chlorophyll production is slowed or stopped, the leaves lose their green color.

As the green color fades in a leaf, new colors appear such as bright yellow, yellow-orange, red and brown. These colors are always present in the leaf, but are masked by the green chlorophyll and can be seen only after the green has faded. Red is produced in the leaf with the right conditions. Certain trees are known for their fall colors. Maples are often bright red, ash are yellow and oaks are most often brown.

- ! Leaf color is affected by the amount of light. The leaves of maples and some oaks are red in bright light but yellow in shaded areas.
- ! Brightest colors are formed during bright sunny days rather than dull cloudy days.
- ! Trees with the richest reds are those like the maple, which have the largest sugar resources

- ! Cut veins often affect leaf color. Cut or injured veins in leaves often turn portions of the leaf red. This is due to the sugar still in the leaf. This sugar doesn't leave, and helps the red color production.
- ! The richest colors occur when there is a quick change in temperature from high summer to lower autumn temperatures.
- ! Frost may play a role in color changes. Many leaves do not turn red and yellow before the first frost. An early frost *decreases* color changes in leaves, especially red, because it causes early death of the leaf. The leaf then goes from green to brown.



Decay of the Leaf

Decay of the leaf causes it to turn brown. Dark tannins and resins enter the leaf and turn it brown as the leaf dies. These color changes show that the plant is getting ready for winter.

Summary

Leaf color change is due to:

1. Loss of chlorophyll so that the leaf is no longer green, but yellow and orange.
2. As chlorophyll breaks up, the brightest yellows are formed.
3. The reds form because of bright sunlight and the presence of stored sugar in the leaf.
4. Decay products in the leaf mask other colors and the leaf turns brown.

Exercise

1. Look at trees in the fall. What color are most of the leaves? _____
2. What is the major reason for different leaf colors? _____

3. If you want a variety of fall colors, what trees and shrubs should you plant? _____

Exercise

List 5 common trees in your area and record the leaf color for each.

<u>TREE</u>	<u>DATE</u>	<u>COLOR</u>
1.		
2.		
3.		
4.		
5.		

Exercise

Take fall color pictures of several species of trees or plants. Place on a photo page and identify the types of trees.

Change in Animal Color

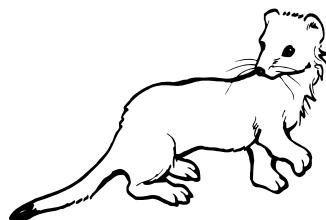


Some animals also change color. The reasons for this color change are not exactly known. Weasels change color from a dark brown to white. The cold temperatures and snow cover have nothing to do with this color change. It results totally from the change in the amount of available light. As the number of hours of daylight shortens in the fall, the weasel's eye receives light for shorter and shorter periods. This reduction in light entering the eye prompts a gland at the base of the brain to shut off the production of color pigment for the new winter coat.

Brown fur is not really replaced. Instead, the fur simply continues growing, but in white.

The process of replacing the fur on mammals and feathers on birds is called *molting*. Animals begin their molt in late August. It takes several weeks for the molt to be completed. The animal must start this molting process early so the full winter coat is in place with the start of winter.

Some fish also change color with autumn. Examples are the rainbow trout and the king salmon. Salmon from Lake Sakakawea turn from a silver gray to black.



The following are some common animals and birds that change as winter approaches.

Short-tailed Weasel

The short-tailed weasel is found throughout our state but especially in woody areas along lakes and streams, and in the prairie pothole region. Short-tailed weasels are also referred to as ermine. Weasels are primarily active during the night. Summer color is dark brown with white under parts. Winter color is white with a black tip on the tail.

Long-tailed Weasel

The long-tailed weasel is found in all parts of the state especially near lakes and streams. Summer color is dark brown with yellowish white under parts. Winter color is white with a black tip on the tail.

Least Weasel

The least weasel is the smallest weasel. It is found in meadows and woods near streams. It likes open prairie and farmlands. Summer color is brownish gray. Winter color is white.

White-tailed Jack Rabbit

The white-tailed jack rabbit is found statewide in prairie areas. It likes the open prairie and farmlands. Summer color is a brownish gray. The winter color is white.

Snowshoe Hare

The snowshoe hare is smaller than the jack rabbit. Its feet are large and long-furred to make travel on snowdrifts easier. Summer color is dark brown with the tail dark on top and lighter below. The winter color is white on the tips of the fur, but dark next to the skin. Ear tips are dark.

White-tailed Deer

White-tailed deer are found in most counties but are more common in the central and eastern portions of the state. They get their name from the white undersurface of the tail which is flashed and carried erect like a flag when the animal is disturbed. Summer color is reddish-brown. In winter the color changes to gray.

Exercise

1. What animals have you seen that change color during winter?

2. What are the advantages of this color change?

3. Can you think of any other animals or birds that have seasonal color changes?

Changes in Diet and Other Changes in Autumn

The availability of food changes with the seasons so animals need to find different foods and often make several changes in their diet.



Moose have a summer diet of aquatic plants, grasses and forbs. They may also eat some agricultural crops. In winter, moose move into woodland habitats where they eat mainly browse (twigs). Elk graze the high mountain grasses in the summer. In winter, elk move to valleys where they feed on sagebrush, pine, aspen, willow and nearly anything that is edible.

Bighorn sheep graze on grasses in the summer. They browse on shrubs and trees in the winter. Pronghorn antelope graze on grasses and sagebrush.

Mule deer browse and graze rangelands in the summer. In winter they live mainly on shrubs, grasses and forbs which are not covered by snow. They may also paw through the snow to reach food. White-tailed deer graze and eat agricultural crops such as sunflowers and corn in summer. They browse more in woodlands during the winter.

The gray fox eats more insects and fruits in the summer. They switch to a primarily animal diet in the winter, mainly rodents and rabbits.

Squirrels do not change diet with the coming of autumn and winter, but they do change their behavior by beginning to bury the nuts they collect. This is called *caching*.

Birds also change their diet in the autumn. Sage grouse eat seeds, legumes, sage, weeds and grasses in the summer, but change to sagebrush leaves in the winter. Sharp-tailed grouse eat berries, seeds and small grains in summer, but during winter months eat whatever can be found in their brushy habitat.

Lesser snow geese will eat grasses and sprouting grains in the summer. They often glean the stubble fields and eat underground aquatic plants in the summer. In winter, their diet is grasses and sedges.

Many birds and animals change their location (migrate) so that they can still find the food they need for survival.

Exercise

1. Name a species of mammal and note their dietary changes.

2. Why would animals change their diets?

3. Why do birds diets change?

4. Name several species of North Dakota birds that migrate.



North Dakota 4-H Nature Trails

Waterfowl Identification



Objectives

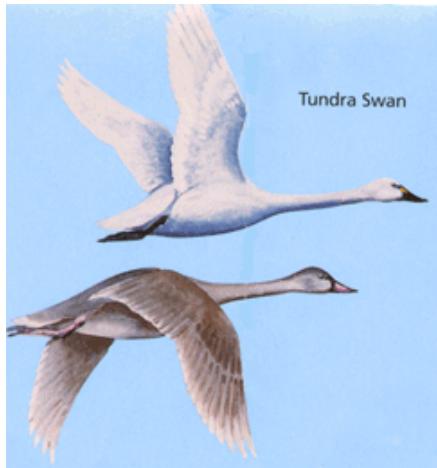
You will learn to distinguish between swans, geese, puddle ducks, diving ducks and mergansers.

Introduction

Our enjoyment and appreciation of North Dakota's natural environment can be greatly enhanced if we know how to identify the many species of waterfowl that are found in the state. It is recommended that beginners first learn to recognize waterfowl in spring plumages since in spring the males are usually more highly colored than in the fall.

There are many publications that are helpful for learning to identify waterfowl. You may get a copy of the booklet "Waterfowl Identification in the Central Flyway" free from the North Dakota Game and Fish Department.

For purposes of identification, waterfowl are divided into two groups: 1) **swans and geese**, and 2) **ducks**. Ducks can be divided into three further groups: 1) **dabbling ducks** (puddle ducks), 2) **diving ducks**, and 3) **mergansers**.



Swans and Geese

The adult tundra swan is a large snow-white bird with an exceptionally long neck. The young can be distinguished from the adults during the fall by their more dusky plumage. Often during migration a pair of adults and their young-of-the-year travel as a family group. The voice of the tundra swan is quite distinctive and once it is known one can recognize these birds at a great distance. It is varied, sometimes quite loud and striking, and at other times it is a soft trumpeting.

The only white birds in our state for which it is likely to be mistaken is the lesser snow goose, or white pelican. The snow goose is smaller (4 – 6½ pounds) and has black wing tips. Tundra swans often weigh from 11 to 20 pounds. The tundra swan is among the first waterfowl to arrive in the spring and the last to leave in the fall.

It nests far north and passes through the state in spring and fall. A flock of large white birds with long necks and all-white wings is very likely to be tundra swans.

The geese most frequently seen in North Dakota are **Canada geese**, **snow geese** and **blue geese**. The voice of the snow and blue goose is harsh, high pitched and quite distinctive. These two geese are of the same species but have different colors. The adult snow goose is white with black wing tips, while the young-of-the-year is dusky white. The adult blue goose has a white head and neck with a darker blue-gray body. The young blue goose may be dusky throughout.

Blue and snow geese generally fly together in mixed flocks. If a flock of geese contains both white and dark birds and the call is high pitched, it is most certainly this species.



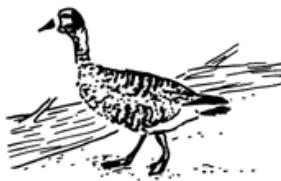
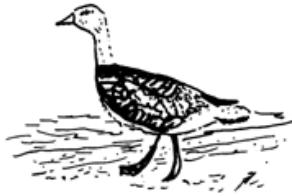
Canada geese of all kinds have a black head and neck and white patches on the cheeks. Several subspecies ranging in size from 2 ½ to more than 15 pounds pass through North Dakota in the spring and fall. The giant Canada goose is the largest of these and is the only one that nests in the state.

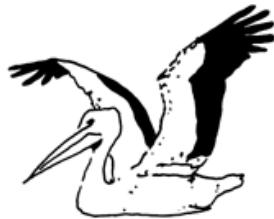
The white-fronted goose is rather uncommon but some pass through the central part of the state in spring and fall. They are small gray geese, usually weighing 4½ to 7 pounds. They have some white feathers on the face near the base of the bill and the breast is often flecked with dark feathers. The call note is quite distinctive being generally of two syllables and quite melodious.

Exercise

On the line below each sketch write in the correct identification. Choices are:

BLUE GOOSE, TUNDRA SWAN, CANADA GOOSE, SNOW GOOSE, WHITE-FRONTED GOOSE and AMERICAN WHITE PELICAN.





Ducks

The first step in duck identification is learning how to distinguish between dabblers, divers and mergansers. It is helpful to have some knowledge of the structure of the bird. Become familiar with the terms used to denote the different parts of a duck's plumage and body. Make special note of the part of the wing plumage known as the *speculum*. It is one of the most distinguishing marks.



Geese and swans are generally much larger than ducks and both sexes are marked alike. In spring, the plumage of male ducks is much more colorful than the rather drab plumage of the females.

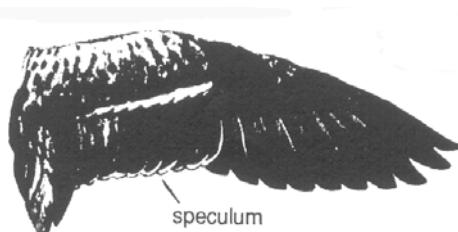
Drakes (males) of nearly all species of ducks lose their colorful spring plumage after the mating season is under way. For about a month during the summer they are in the "eclipse" plumage. The eclipse plumage is rather drab and resembles that of the female and young-of-the-year birds. The colorful breeding plumage is acquired over an extended period in the fall. It is well into the fall season before most adult and young males have

this distinguishing attire. Males which hatch early may develop colorful plumage sooner than those which hatch later in the season.

The dabbling ducks (puddle ducks) include the mallard, black duck, gadwall, American widgeon, pintail, green-winged teal, shoveler and wood duck.

The diving ducks include the redhead, ring-necked duck, canvasback, lesser scaup, greater scaup, common goldeneye, bufflehead, white-winged scoter and ruddy duck.

The body feathers are shed twice each year to produce seasonal differences in plumage. The wing feathers are molted only once. The wing patterns, therefore, retain their identifying features and provide the best clue to a duck's identity. The speculum on most species contains distinguishing colors and feather markings. Wing patterns vary somewhat between young and old, males and females, but the basic markings are present.



Comparison of identifying characteristics of dabbling and diving ducks

	Dabbling Ducks	Diving Ducks
Species	Mallard, Black Duck, Gadwall, American Widgeon, Pintail, Green-winged Teal, Blue-winged Teal, Shoveler, Wood Duck	Redhead, Ring-necked Duck, Canvasback, Greater Scaup, Lesser Scaup, Common Goldeneye, White-winged Scoter, Ruddy Duck.
Feeding habits	Feed in shallow water by tipping or dabbling	Dive for food in deeper water
Posture on the water	Tail carried high giving the body the appearance of being tipped forward	Tail held low in the water so back is more sloping than in dabblers
Rising from the water	Jump upward and are quickly in flight	Patter along the surface of the water for some distance before becoming completely air born.

Flight	Wings beat slower than in divers. Neck may be inclined upward	Wings beat rapidly. Neck held straight out
Placement of legs	Near center of body. Facilitates walking.	Toward rear of body. Facilitates swimming and diving but walking often appears difficult
Speculum	Generally colored and iridescent	Generally gray, white or black and lacks iridescence
Hind toe	Without lobe	Lobed
Foot	Small	Large

Exercise

Distinguish dabbling ducks (puddle ducks) from diving ducks. On the line below each sketch write in the word "diving" or "dabbling" to indicate which group the drawing portrays.



Some Common Species

Following are descriptions of some of the more common species of dabbling (puddle) ducks, diving ducks and mergansers. For further reference, consult the booklet "Waterfowl Identification in the Central Flyway."

Dabbling (Puddle) Ducks



The **mallard** has a purplish-blue iridescent speculum bordered before and behind with white bars. The male in breeding plumage has a glossy green head, a white collar ring and a chestnut breast. The female is a buff-brown color with similar distinguishing wing markings. Early in the hunting season drakes and hens may resemble each other.



The **pintail** is a fairly large, elongate duck with a long slender neck and fairly long and pointed tail. The adult male has a speculum of violet, bronze and green bordered in front by a cinnamon-buff bar and behind by a white bar which forms a trailing edge of the wing. Females and young-of-the-year may have duller speculum but they all have a white trailing edge on the wing. The male has a brown head, white breast and belly. Females are a drab grayish brown. Pintails are recognized in flight by their slender profile, pointed tail and white trailing edges of the wings.



Blue-winged teals are recognized by their small size. There is a large chalky-blue patch on the forepart of the wing and the speculum is green. The drakes have a white bar between the speculum and the blue patch on the part of the wing plumage known as greater coverts. On the female these feathers are dark but are tipped with white, giving a mottled appearance. The adult male blue-wing in spring has a distinct white crescent on the forepart of its otherwise purplish head.

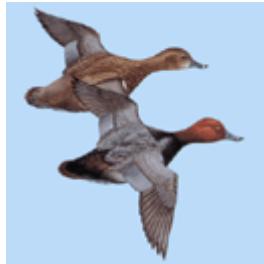


The male **wood duck** is one of the state's most brilliantly colored ducks. The females are rather plainly marked but have a conspicuous white eye-ring. Probably the best marking for identification of any wood duck is the silvery gray or whitish outer tips of the *primaries*, or main flight feathers. In flight it appears as a dark bird with a pale underside and a rather long squarish tail. It holds its head above the level of its body and often gives a "whistling-mewing" call.

Diving Ducks



The **canvasback** is a large duck. The adult male has a whitish back and reddish head but females and young are rather plainly marked and brownish birds. The speculum area is a plain solid gray and has no distinctive markings. The best identifying feature is the shape of the head which is elongate with a long sloping profile and rather long bill. As the name "canvasback" implies, the males in full plumage have a whitish back.



The **redhead** is a medium-sized duck. The adult male has a reddish head but the females and young are rather plainly marked. Color of speculum area is plain solid gray and there are no distinctive markings. The best identifying feature is the shape of the head and bill. The head is rather round with a rather high and abrupt forehead. The bill is shorter and broader than in the canvasback. Bills of adults, both male and female, have a whitish ring bordering the black tip.



The **lesser scaup** or bluebill is a medium-sized duck. The male in spring has a purple-black head and neck, black breast and tail area and a light colored back and sides. The female has dark brown plumage. It is easily distinguished by its white speculum. This white speculum is sometimes less distinct for young birds but it is always a good identification mark. The white speculum is found on the **secondaries**, which are the flight feathers nearest to the body. This marking is easily recognized in flight.



The **ruddy duck** is small and easily distinguished by its tail feathers. The fanlike tail is often held stiffly erect when the bird is on the water. In spring plumage the male is a striking bird with chestnut back, sides and neck, a white cheek patch and a bright, light blue bill. The female is brownish gray and has a dark line across the cheek.

Other species often seen in the state are the **gadwall**, **American widgeon**, **green-wing teal**, **ring-necked duck**, **bufflehead**, **Barrow's goldeneye** and **common goldeneye**.



Green-winged teal

Gadwall

Bufflehead

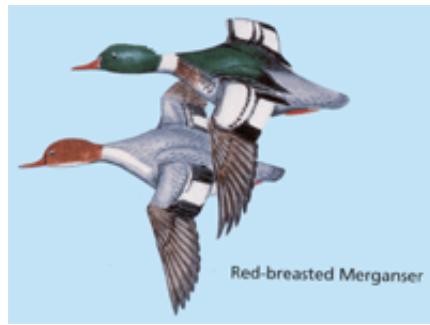
Ring-necked duck

Common goldeneye

Mergansers



Common Merganser



Red-breasted Merganser



Hooded Merganser

The **mergansers** are easily recognized by their long, narrow and nearly cylindrical bills which are unlike those of other ducks. Plumages are bright for adult males but vary with the sex and age. There is always some white on the wings. The hooded merganser is the smallest of the three species found in North Dakota, being about the size of a wood duck. The largest is the **common merganser** which sometimes weights as much as four pounds. The **red-breasted merganser** is intermediate in size between the other two species. In its fall plumage it is often very difficult to distinguish it from the common merganser.

Common mergansers and red-breasted mergansers have a substantial amount of white on the top of the wing which is quite conspicuous in flight. The **hooded merganser** also has some white on the wings and it can be further distinguished by its long tail and pale underside.

The hooded merganser is the only one of the three species that nests in our state. They normally nest in tree cavities but will use nest boxes provided for them or for wood ducks.

Exercise

Plan a field trip to observe and identify wild waterfowl. For the beginner a good time to observe waterfowl in the field is April or May when the spring migration is in progress. You may go in the field individually or as a part of a group. You may want to set up an observation route that leads to several ponds.

Materials needed include binoculars, waterfowl identification booklet, notebook and pencil and means of transportation. Waterfowl encountered should be examined carefully to determine species, sex and behavior. Record all observations in a field notebook and include:

1. Date _____
2. Place _____
3. Species _____
4. Number(s) seen and sex _____

5. Behavior (i.e., feeding, courtship, flying) _____

6. Notes about the habitat (small pond, large marsh, field, etc.) _____



North Dakota 4-H Nature Trails Firearm Safety



Objectives

You will learn about 1) the safe methods needed when handling firearms and 2) the proper care and storage of firearms.

Introduction

Many Americans own firearms. It is very necessary that they be handled properly to avoid accidents. Become familiar with the requirements for safe handling and storage of firearms. All firearms should be treated as if they are loaded. **NEVER POINT A GUN AT ANY PERSON.**

Ten Commandments of Firearm Safety

The following is a list of basic rules to follow when handling firearms.

1. Always **POINT** the muzzle in a safe direction. Be able to **CONTROL** the direction of the muzzle even if you should stumble.
2. Treat every firearm as though it were **LOADED**.
3. **UNLOAD** firearms when they are not in use. Keep the action open when the firearm is stored and carry it in a case to the shooting area.
4. Be sure the barrel and action are **CLEAR** of obstruction and that you have the **PROPER** ammunition for the firearms you are carrying.
5. Be sure of your **TARGET** before you pull the trigger.
6. Never **POINT** a firearm at anything you do not want to shoot. Avoid all horseplay with a firearm.
7. Never **CLIMB** a fence, tree, or **JUMP** a ditch with a loaded firearm. Never **PULL** a firearm toward you by the muzzle.
8. Never **SHOOT** a bullet at a flat, hard surface or at water.
9. Store firearms and ammunition **SEPARATELY**.
10. **AVOID** alcohol and other drugs before or during shooting.

1. Think about each rule for firearm safety. Give one reason for each rule. What can go wrong if you ignore these rules?

REASON	WHAT COULD GO WRONG?
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Primary Rules

All firearm accidents could be avoided by knowing and observing the simple safety principles of holding appointing a firearm. You need to learn and **practice** these commandments.

1. **Always point the muzzle in a safe direction.** A “safe direction” means in a direction that, if the firearm discharges, it will not cause injury or damage. Anticipate the worst. Assume your gun may go off. Take precautions so that no one would get hurt if it goes off. Inside a building a firearm should **NOT** be pointed where the bullet might penetrate and hurt someone on the other side. Instead, firearms should be pointed at exterior walls. Safety-conscious firearm handlers will never point the muzzle of a firearm at another person. They will not allow a gun to be pointed at them. Students of firearm safety should know and recognize when a firearm is not being handled safely. It is their responsibility to inform others.
2. **Make sure the firearm is unloaded before handling it.** Safe firearm handlers check every firearm by opening the action. Look and feel inside the breech or chamber to make certain the firearm is not loaded. **NEVER take another person’s word for safety.** Safe firearm handlers assume the responsibility themselves. “I didn’t know the gun was loaded” is never an acceptable excuse.
3. **Always treat the firearm as though it were loaded.** This is a good basic rule of thumb to avoid the accidents that may happen because of mechanical or human error. Always follow this rule to be prepared for any situation.

Safety at Home

Home is where youth will probably come across a firearm. It is estimated that three out of every four households nationwide possess one or more firearms. How firearms are stored, cleaned and handled in the home needs to be studied by every family.

Safety in the home should begin by locking up all firearms. Store ammunition in a **separate, locked** location. Drawers, closets, under beds or in corners are not safe places to leave guns. Ammunition should not be left within reach.

Firearms kept as collector’s items should always be stored unloaded. Treasured relics and war-time souvenirs should be displayed out of reach or kept locked with other firearms.

Safety in the Field

There are times when you need to be on guard against possible accidents. These times include:

- When you've had just enough experience to think you know all the answers. Accidents in the field can happen if you don't follow all the rules.
- When carrying a gun. Be very careful handling guns around the home, camp or near the car. Be alert for rocks, holes and other hazards when in the field.
- When plinking. Plinking is shooting at informal targets. Beware of the temptation to "horse around." Never allow yourself or your friends to cause a tragedy.
- When you are tired. At the end of a long day's hunt, reflexes may become dulled. Gun carrying is relaxed. Watch for carelessness and try to avoid it.
- When you first spot game. The excitement sometimes causes you to rush into a careless shot. This eagerness cannot be felt in a class or on the training range. It comes naturally when spotting game. When you first see game, double your caution. Be sure to carefully identify your target.
- When a hunting buddy forgets or ignores the safety rules. Tell him immediately. He may be a close friend, but anyone careless with a gun is careless with your life. If he can't improve, be his friend someplace other than around firearms.

Two-handed Carry



You need to learn how to carry firearms when you go out in the field. The safest way to carry is probably the two-hand carry which gives the best control of the gun and the muzzle. With this carry, the small of the stock is gripped with the trigger hand. The fore end is held with the other hand. The gun is carried diagonally across the body with the muzzle pointed up and away. Other carries are the cradle carry, the side carry, the trail carry and the sling carry.

Cradle Carry



Shoulder Carry



Side Carry



Trail Carry



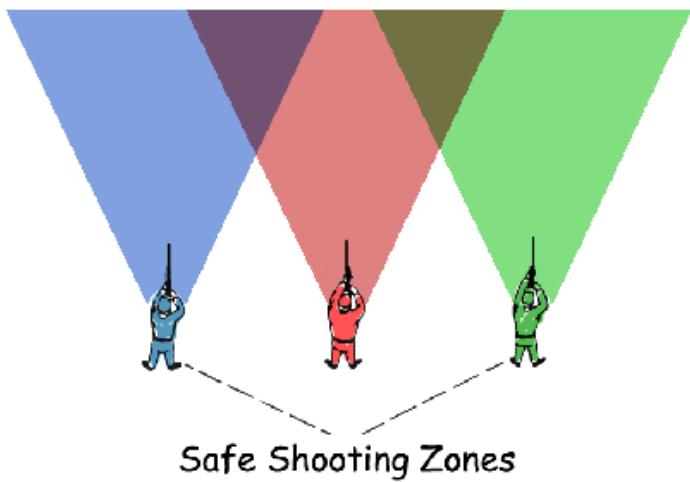
Sling Carry



In all carries the following rules apply:

1. **Keep the muzzle under control** and pointed away from all people, animals and your self.
2. **Keep the safety on** until ready to fire. BE CAREFUL! Most safeties block the trigger and nothing else. A hard blow in the right place can still fire the gun. A safety can wear out or it may not work. Handle every gun as if it were loaded and the safety off.
3. **Keep the fingers outside the trigger guard** and not on the trigger. Fingers should only touch the trigger when firing. Covering the trigger guard with the hand will help prevent other objects from hitting the trigger.
4. When target practicing, **all firearms should be left unloaded until shooters are ready to fire** at the targets. Placement of targets is also important. Make sure that nothing behind the targets can be injured or damaged or cause bullets to ricochet.

Watch Where You Shoot



If you are hunting with other people, everybody should agree BEFORE the hunt on the area each shooter will cover. Don't move to any other position. This is very important. Care must be taken so that others are not mistaken for game.

This illustration shows the common shooting zones used with two or more hunters.

Never shoot at a bird that flies back across the line of hunters. If a bird flies low between two hunters, forget the shot. Never let any gun point at another hunter. If you are following game with your gun, shoot only in your zone. Never swing your gun out of your zone. Keep your muzzle under control. Don't shoot if you can't see the target clearly.

Obstacles in the field can cause safety problems. Weather can produce hazards to the shooter. Wet, slippery ground is a danger. Mud, snow and ice can make walking difficult. Formations and obstructions such as steep banks, downed timber or ditches all need to be handled carefully. Crossing a fence, entering a boat or climbing a tree are particularly dangerous when carrying a gun.

Unload your gun when traveling on slippery ground, steep hillsides, uneven or unstable ground. If you should fall, hold the gun securely. DON'T throw the gun away from you. Afterwards, check the action and barrel for damage, dirt and obstructions.

When hunting with another shooter, unload your gun and open it before handing it to your companion. Take both unloaded guns while your partner crosses a fence. Never point the gun at another person.

When entering and leaving a boat, handle your gun by the muzzle. In the boat, guns should be held carefully. Always point them in a safe direction.

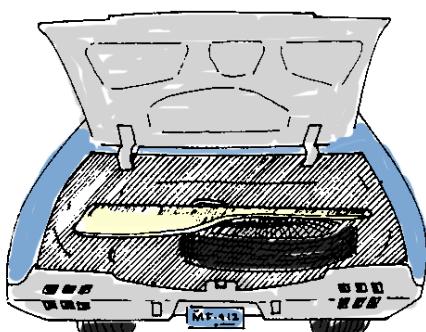
Exercise

1. Why would the shoulder carry be dangerous if you were in front of someone?

2. Why would the side carry be dangerous if you were behind someone?

3. Why is the two-handed carry also called the "ready" carry?

Transporting Firearms



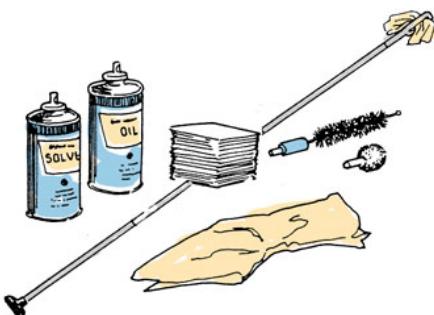
Transport firearms in a case in the trunk.

You are responsible for your firearm at all times. A firearm should be unloaded before it is put into a vehicle. The best way to transport a firearm in a vehicle is unloaded, inside a case, in the trunk. This keeps it safe and out of sight.

Firearms should not be leaned against automobiles, trees, fences or other insecure rests. Firearms that are taken care of properly are not only safer, but also last longer and need fewer repairs.

Gun Cleaning and Storage

A gun should be cleaned inside and out if it has been exposed to mud, sand, rain or snow. If moisture has formed on the metal parts (sweating occurs when a cold firearm is brought into a warm home) or if the gun has been stored uncovered and exposed to the air for a long time it should be cleaned before it is used.



Cleaning equipment should include a cleaning rod, flannel patches, powder solvent and light gun oil. A cleaning cloth treated with silicone is also advisable. Always check to be sure that the gun is EMPTY. Make sure that no ammunition is nearby.

Clean the firearm from the breech end (rear of the firearm). Too much oil or grease can be dangerous – just a few drops will do for most jobs. Too much oil on the safety can stop its action.

Fingerprints left on a firearm work as an acid and can corrode the metal.



Clean barrel and metal parts with good commercial solvent.



Clean bore until dry patch comes through as clean as possible



Run oily patch through barrel



Bore should be cleaned through breech end where possible



All metal parts should get a light coat of oil



Store guns in a horizontal position



After storage run clean patch through bore before firing



Remove all excess grease and oil

When storing firearms, make sure they are UNLOADED. Store firearms in a locked cabinet. Be sure to store ammunition separately in a locked compartment. When different types of ammunition are stored together, each kind should be kept separate. Each kind should be in its own container to avoid mixing.

Exercise

1. Circle the unsafe firearm practices in each of the following situations.





North Dakota 4-H Nature Trails

Winter Changes



Objectives

You will learn about 1) hibernation, and 2) survival of wildlife.

Introduction

Winter brings many changes. Some of these are hard on animals. The lower temperatures stress animals. They adapt in different ways to handle the cold.

Hibernation (seasonal torpor)

Torpor (pronounced tor-per) is a physical state during which metabolism (digestion), heart rate and breathing slows down. When the animal's body systems slow down it goes into a sleep-like state called torpor. Torpor in the summer is called *estivation*. Torpor in the winter is called *hibernation*.



Winter is often very hard on animals. They must find ways of surviving. Winter torpor also includes *hypothermia*, or the lowering of the body's temperature. Some animals use hypothermia daily and some seasonally. Hibernation is the seasonal use of hypothermia to reduce body temperature.

When an animal gets cold it usually shivers. Shivering is a mammal's way of warming its body quickly. When body temperature lowers during hibernation, shivering is stopped, since shivering takes energy. Mammals need this stored energy during hibernation.

Hibernation can be brought on by a shortage of food, and the onset of cooler temperatures. Body rhythms make some animals sensitive to falling temperatures. Hibernation does not always occur at a set time. Harsh conditions may hurry it and nice weather may delay it.

Hibernation is caused by several things. Sometimes a signal (*stimuli*) causes hibernation to start. Different animals react to different stimuli. The arctic ground squirrel, for instance, reacts to shorter days and cooler temperatures.



Woodchucks hibernate but not always deeply. Other members of this family also hibernate, including the thirteen-lined ground squirrel, Franklin's ground squirrel and Richardson's ground squirrel, as well as the least chipmunk, North Dakota's smallest chipmunk.

Some animals fall into a heavy sleep for several days in winter, and when the weather improves, wake and leave their den. This is not true hibernation. Badgers, for example, often sleep during harsh winters. Several badgers stayed underground for 70 days one winter. Raccoons also sleep during cold winter months. Before sleeping, they begin to store large amounts of fat. They are not considered true hibernators.

Hibernation is different in different mammals. All lower their body temperatures, but they don't all go down to the same temperature. Bats' body temperature gets very low. It is the lowest in deep hibernation. Bats would die in our area when the food supply decreases. Hibernation allows bats live here. By hibernating they can survive with a low food supply. Lower body temperature reduces the need for food.

Animal Winter Survival

There are several ways of dealing with winter. Hibernation and sleeping during the coldest part on the winter are two ways. Denning up is another way. The entrance to the animal's underground den is closed off and the air stays warmer inside the den. Usually the animal has stored up a supply of food.

Sometimes the food is stored in a separate passage of the den. Examples of animals that den are:

- Ord's kangaroo rat
- Pocket gophers
- Prairie dogs
- some mice
- all tree squirrels

Mice avoid cold by sleeping through it. Some scientists think that mice hibernate. Others think that they den up.

Other animals handle winter differently. Pronghorns belong to the deer family. They are named for the distinctive prong of the male's horn. It is a true horn. The core is bone surrounded by a horny cover. Unlike cattle, the horny sheath is shed each year. As winter comes, pronghorn hair lengthens. The hair protects the animal. The coarse hair has a large central air cell. These cells provide a dead air space within each hair that is important for insulation. They keep the animal warmer. The pronghorn can also raise its hair. That also helps insulate it from the cold.



Striped skunks avoid harsh weather by sleeping in their dens. They can only do that for a few days at a time. Tree squirrels also avoid cold by sleeping in their dens.

There is much controversy about whether or not bears are true hibernators. Although their heart rate slows during hibernation, they only lower their body temperature by 9 degrees Fahrenheit. This is a small change. Other hibernators drop their temperature much lower. Bears also wake very rapidly. Other hibernators are very slow-moving when they first wake up.

Bears go into a feeding frenzy in the fall. They gain many inches of fat. The fat is important in hibernation since it can be broken down into energy, carbon dioxide and water. The bear gets all the water it needs by breaking down the fat.



Hibernating bears are studied as part of space research. While the bears are inactive, you would expect their bones to weaken. When we don't get enough exercise our bones lose calcium which gives bones strength. Studies have found that hibernating bears do not lose calcium. Scientists are hoping to find the compound that controls the bone calcium in bears since this might help astronauts survive long space voyages. Astronauts lose calcium from the loss of gravity.

All hibernating mammals have brown fat. Brown fat's job is to produce heat quickly. Some hibernators have brown fat in their neck or shoulders. Bats have brown fat between their shoulder blades. There are two ways mammals wake up during hibernation. One way is to burn the brown fat. This produces energy to wake up the animal. Another way is to start shivering. Shivering warms the body. Then the animal will wake up.

Exercise

Winter Word Find

1. Find and circle the following words:

BADGER

BATS

BLACK BEARS

BROWN FAT

DENNING

GROUND SQUIRRELS

HIBERNATION

HYPOTHERMIA

LESS FOOD

LIGHT

LOW TEMPERATURES

MICE

SIGNALS

STIMULUS

TORPOR

WAKE

WINTER

C	L	A	B	X	I	O	T	W	L	H	S	T	U	N
H	I	B	E	R	N	A	T	I	O	N	T	V	K	L
A	G	L	P	A	R	T	O	N	W	A	O	W	Y	M
D	H	A	P	P	T	I	N	T	T	E	P	X	G	B
K	T	C	C	A	R	D	A	E	E	E	C	C	O	F
T	A	K	E	A	P	F	A	R	M	R	A	I	Z	I
D	O	B	A	N	N	I	K	T	P	N	D	H	M	J
N	O	E	R	W	A	K	E	T	E	A	K	A	K	S
T	O	A	O	N	R	X	D	O	R	N	P	N	A	O
V	I	R	E	T	N	A	G	E	A	K	N	V	A	P
G	B	S	I	G	N	A	L	S	T	E	D	W	B	S
M	R	T	K	O	T	R	S	T	U	T	T	Q	R	T
P	O	O	D	G	G	T	R	U	R	N	B	U	H	I
A	K	R	U	A	E	I	O	V	E	H	O	F	G	J
P	P	P	K	N	B	I	N	H	S	Y	B	K	N	N
O	W	O	I	N	D	T	U	A	V	P	A	P	I	O
K	O	R	N	L	E	S	S	F	O	O	D	W	N	Y
P	N	O	K	A	N	I	Q	E	E	T	G	Z	N	V
L	E	S	V	U	V	S	T	U	A	H	E	C	E	B
A	N	V	A	B	A	T	S	K	I	E	R	T	D	E
S	I	G	M	A	M	I	N	A	M	R	E	N	O	S
L	I	G	N	T	S	M	O	P	S	M	R	P	Q	R
S	I	N	A	L	R	U	A	N	O	I	P	E	A	B
P	A	R	T	S	E	L	G	A	Q	A	U	R	L	C
Q	U	I	N	T	R	U	P	L	A	Z	K	O	N	S
H	A	R	D	T	O	S	T	O	P	N	O	W	X	Z

2. Go to a wooded area or marsh. Look for animal tracks in the snow. A wildlife track guide book can help you find out what kind of animal made the tracks. Follow the tracks. Observe where the animal may live and what foods it may eat. Fill out the following chart.

Winter Survival for Birds

Some birds *migrate* out of the state to escape the cold winter. Migrate means to move from one area to another. Others move to more heavily wooded areas. Some waterfowl overwinter on the Missouri River. They will stay where there is open water and enough food. The open water needs to be ice-free.

North Dakota is a good winter home for some other birds. These include English sparrows, blue jays, chickadees, finches and other song birds.

Sharptail grouse are birds native to our state. They are widespread over the state. Their name comes from their tail feathers. The tail has two long central feathers. The feathers are much longer than the other tail feathers. Sharptails have a white belly. The white tail and long central feather are important identification marks. Sharptails burrow into snow banks to avoid harsh weather. They also take shelter in woody areas.



A ring-necked pheasant relies on tall grasses or shrubs for winter protection. If such cover is not available, many of these birds will die during harsh winters.

Exercise

1. Observe birds in your backyard. Identify the birds using a bird key book. List those you have observed.

NAME	COLOR	NAME	COLOR

2. Can you tell what they eat? _____

3. Do you feed them? _____

Internet Resources:

Birding on the Internet: Links to other websites
<http://www.ndparks.com/Nature/Birding.htm>

North Dakota Wintering Songbirds
<http://www.npwrc.usgs.gov/resource/1998/backyard/winter.htm>

Hawks, Eagles and Falcons of North Dakota
<http://www.npwrc.usgs.gov/resource/othrdata/hawks/hawks.htm>

Homemade Nest Boxes for Cavity Nesting Ducks
<http://www.npwrc.usgs.gov/resource/tools/nestbox/nestbox.htm>



North Dakota 4-H Nature Trails

Feeding Wild Birds



To attract birds year-round one must provide for their basic needs of food, water and cover. Bird feeders, bird houses, a source of water and various plant materials can provide habitat needs for your backyard birds. This lesson provides information on common winter birds, bird feeders and feeding.

Common Winter Birds that Visit Feeders

A number of birds do not fly south for the winter, or in some cases fly only as far south as our state. Some of the more common birds that we can attract to backyard feeders are pine siskins, brown creepers, purple finches, nuthatches, chickadees, cardinals, blue jays, woodpeckers, red poll, juncos, goldfinches and red crossbills.

By offering food to these birds in winter we can help them survive the cold, while we take pleasure in having them around. Their songs, colors and lively actions add great deal of enjoyment to our winters.

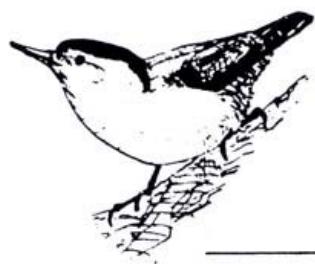
Birds' Favorite Foods

- Goldfinch – hulled sunflower seed, oil-type sunflower seed and thistle seed
- Chickadee – oil-type sunflower seed and beef suet
- Evening grosbeak – sunflower seeds of all types
- Blue jay – whole peanut kernels, sunflower seed and cracked corn
- Purple finch – oil-type sunflower seed
- Downy and hairy woodpeckers – beef suet
- White-breasted nuthatch – beef suet
- Red poll – oil-type sunflower seed, thistle seed, beef suet
- Juncos – red proso millet, oil-type sunflower seed
- Brown creeper – beef suet
- Red crossbills – oil-type sunflower seed

Exercise

On the next page are sketches of birds often seen at winter feeders. Try to identify each using a bird identification book or your library, if needed. Write the name under the picture.

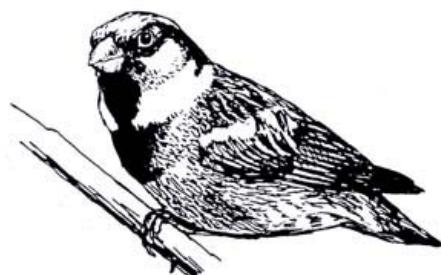


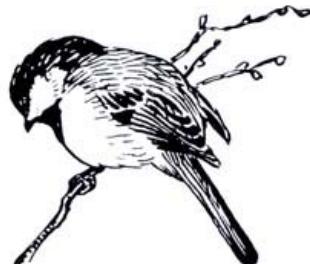












Feeding Wild Birds

Most important of the three essentials for bird life is food. Water and shelter play a lesser role. Winter is the most important time for feeding. Begin in early fall to attract and hold birds that would otherwise migrate further south. Once lured from their natural wintering areas, birds concentrate around feeders in larger numbers than the area can naturally support. They are now your dependents. Feeding must continue until spring when natural foods are again abundant.



Selecting the Right Foods

Feeding birds is largely an art which must be learned through experience and observation. On the basis of diet, birds may be roughly separated into seed eaters and insect eaters. This division is not a clear one, for most birds fit into both categories at some time during their life. The use of several different feeders or combination feeders should satisfy the requirements of all.

Suet – Insect eaters like nuthatches and woodpeckers will consume large amounts of suet when insects and larva are not available. Suet is the fat from beef. Avoid stringy suet. It is hard for birds to eat. Suet may be made available plain or in any large mesh container. A better way is to grind it, melt it in a double boiler and pour it into molds to harden. It is more durable if melted before molding into cakes. Small frozen food dishes make good molds. Suet-seed cakes may be made by adding to the melted suet any of the seeds listed below. Melted suet or suet-seed mixtures should be placed in suet stick feeders while in a semi-liquid state. Stick feeders can be made by drilling holes in a small log or in 2" x 2" lumber.

Peanut Butter – May be used in place of suet in the manner described above. It is much more expensive, however. It should never be fed alone. Mix it with cornmeal or oatmeal.



Seeds – Even insect eaters consume some seeds, especially in winter. Seeds will attract many different kinds of birds. Grocery, pet and feed stores will carry the following material for seed feeding.

Sunflower
Wheat
Millet
Cracked corn

Grain sorghum
Thistle seed
Commercial birdseed mixtures

Dog biscuits, rabbit food and other such items are also used in mixtures. A good homemade mixture is three parts sunflower seed, three parts millet and one part cracked corn. Experiment with several mixtures to find which one is preferred by the birds in your area.

Grit – Fine gravel or crushed charcoal should be added in small amounts to suet-seed cakes or seed mixtures to complete the diet. Birds have a gizzard and the gravel helps in the digestion of food.

Serving Bird Foods

Having attractive bird foods on hand is, of course, most important. Placement of those foods is important, too. Just as birds vary in size, shape, color, song and preferred food, so do birds differ in feeding behavior. Some feed almost exclusively in trees; others nearly always on the ground and others are opportunists, feeding wherever they can find acceptable food. You may wish to put up a variety of feeders.

Most common birds will visit platform feeders. They are simple to build. You can buy hopper-style feeders that can be suspended by a wire or placed on a pole. Some birds, like juncos, prefer to feed on the ground on seed either kicked from platform feeders by other birds or placed on the ground for them.

Hanging tube-type feeders attract American goldfinches, chickadees and a variety of other species. Tube feeders permit goldfinches to avoid competition with blue jays and grackles which take over the platform feeders. Tube feeders will also attract pine siskins and red polls when they are in the area.

In general, birds which are ground feeders prefer white millet whereas birds attracted to tube feeders prefer oil-type sunflower seeds. Therefore, white millet and mixes rich in millet should not be used in tube feeders or other elevated feeders with small perching surfaces. Suet attached to tree trunks in wire baskets or in other feeders is attractive to woodpeckers and, unfortunately, starlings. In addition to food, birds readily use water placed near feeders.

Most people concentrate their feeding efforts during the winter months. Satisfaction comes not only from attracting good numbers of birds, but also because winter feeding helps birds survive the rigors of cold, icy and snowy weather. Actually, feeding birds year-round is enjoyable. Naturally produced seeds are not available in the spring and summer. Flocks of goldfinches and house finches will visit tube feeders filled with oil-type sunflower seeds during spring and summer months. Cardinals and chickadees will visit daily. Young birds, often with clumps of down still attached, will come with their parents.



Selecting Your Bird Feeder



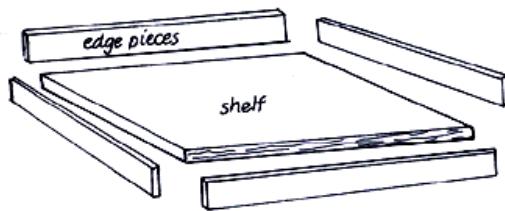
Many types of feeders are available commercially or can be made at home. Simple seed feeders can be made from an empty milk carton or other container. Others can be a piece of wood about 18" x 18" used as a platform. Many seed feeders protect the seeds from rain or snow and are easy to fill and clean. They provide a means to dispense feed gradually so spillage is reduced. Some spillage is OK because birds such as juncos prefer to feed on the ground. A feeder should also have a pleasing appearance.

Hopper-type seed feeders of various designs are the most common and versatile. Some of these limit feeding to certain birds. One type is surrounded by dowels or wire, spaced so that only small birds can enter. Another type has a counter-balanced perch that allows only lightweight birds to feed. Heavier birds trip the perch which closes the feeder door. Other specialty feeders include finch feeders that dispense very tiny seeds such as thistle or *niger* seeds, hummingbird feeders for sugar-water mixtures and suet feeders.

Building Feeders

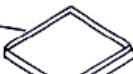
The next page contains a variety of plans for making a feeder. Construct one or more to place in your yard.

BUILDING FEEDERS



dowels, half-rounds, or quarter-rounds for edges

Support from ground with metal pipe and floor flange (from plumbing or hardware store)



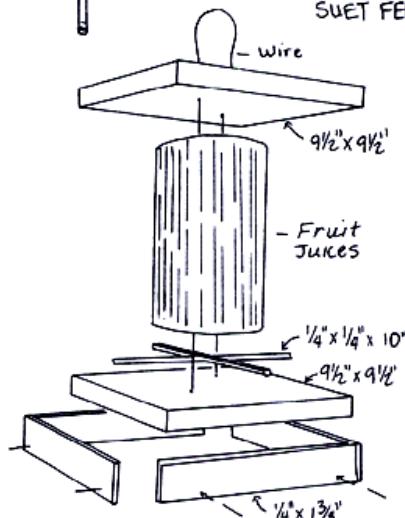
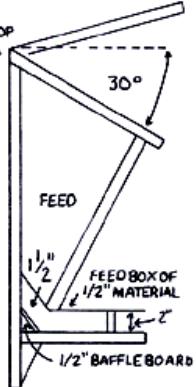
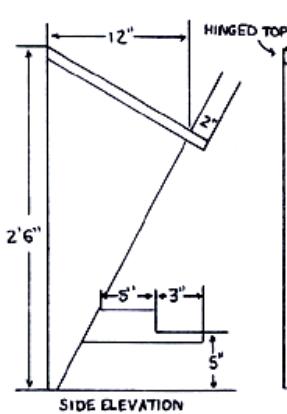
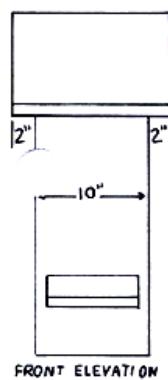
Materials

Base 1-18" x 18" x "
 Edge 2-18" quarter round } APPROX.
 2-17" quarter round } MEASUREMENTS
 1 floor flange
 1 pipe

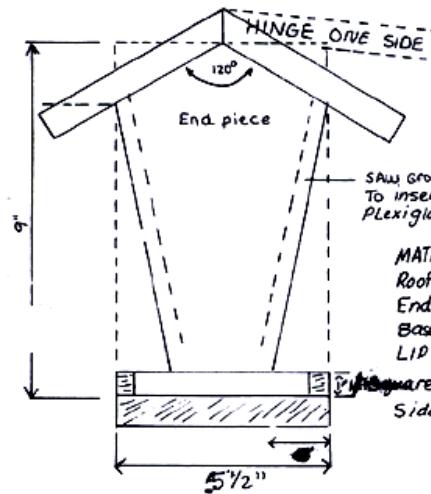


ORANGE or ONION BAG
SUET FEEDER

OPEN FEEDER

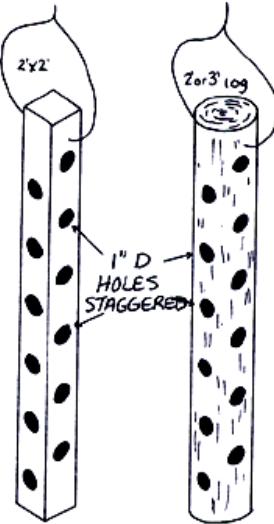


WATER PROOF FEEDER



MATERIALS
 Roof 2- 1" x 6" x 10" }
 End 2- 1" x 6" x 9" } From 4' long 1" x 6"
 Base 1- 1" x 6 x 9" }
 Lid 2- 1" x 1" x 9"
 Square 2- 1" x 1" x 4"
 Sides 2- 9" x 6 1/2" Plexiglass

31



MIXED FEED or SUET FEEDER

Tips to Remember

1. Place the feeder where cats cannot hide and harm the birds when they come to feed. Try to situate it so the feeding birds are protected from strong winter winds. A good spot is in a somewhat open area with bushes or shrubs nearby for shelter and escape.
2. Begin feeding early – about October or November – and continue without interruption until spring. Birds develop feeding patterns and become dependent on feeders for their food. Interruptions in the food supply will cause them to abandon feeders.
3. Use a variety of feeders. Aggressive or “bully” birds may prevent other birds from feeding if only one feeder is used. And, as birds have different feeding behaviors, a variety of feeders will attract a more kinds of birds. Small feeders without perches are good places for small grasping birds to feed. Feeders placed low to the ground will attract ground-feeding birds such as juncos and native sparrows. Larger over ground feeders will draw in the cardinals, grosbeaks and other larger birds.

Exercise

Keep a record of birds that visit your feeding area(s). Use the following chart to record the date, time, type of feeder used, its location, amount and kind of food eaten and the numbers of different kinds of birds seen. Keep a record of observations throughout the winter months.

Feeder Record

Questions

1. How many different species were observed? _____
2. Were different birds recorded at different times of the year? _____ Explain _____



North Dakota 4-H

Nature Trails

Managing Land for Wildlife



Objectives

You will learn 1) wildlife's requirements for food, water and shelter, and 2) how we can manage land to protect wildlife.

Introduction

Wildlife habitat is the place where an animal lives. Before we can begin to manage land for wildlife, we must understand their habitat needs. Wildlife habitat management is the science of making land suitable to meet the wildlife habitat needs. It is a science that, in order to be successful, must involve the landowner, sportsmen and professionally trained managers.



The total number of animals that are able to live in a habitat is called the **carrying capacity** of that habitat. Man is constantly changing the landscape and with it, wildlife habitat. These changes affect the habitat carrying capacity. Depending on the changes made, wildlife can be either benefited or harmed.

Kinds of Wildlife

Migratory – species that leave the area in which they were raised and travel to another area on an annual or seasonal basis. Most leave in late summer or fall and return to the area in early spring. Some species like waterfowl, shorebirds and songbirds travel great distances. Others, such as antelope or elk may only move a few miles between summer and winter ranges.

Resident – species that spend their entire lives within a few miles of the area in which they were raised. Examples are deer, sharp-tailed grouse, ring-necked pheasants, ground squirrels and fox.

Within each group of wildlife there are animals that are classified as being *game* or *non-game*.

Non-game – those wildlife species which are not hunted by man for meat, fun or enjoyment.

Game – those wildlife species that are hunted in specific seasons and according to bag limits set by the Game and Fish Department to regulate the harvest.

Wildlife Requirements

Food - Resident wildlife generally can find enough food. They eat green plants, weed seeds, wild fruits, waste grain or other animals. Usually when there is adequate cover there is adequate food supply. Food areas need to be located near cover that will furnish protection from enemies and weather. Food patches without enough protective cover sometimes end up being a trap for wildlife.

As winter progresses, food supplies become harder to find. During this time of year there are no insects and much of the plant life is gone. Occasionally we experience a severe winter storm that will reduce food supply area. Healthy game animals are well equipped to withstand winter. Most wildlife have the ability to endure many hardships.

Water - All wildlife have need for water. Most animals drink it, but some get the required moisture by eating water-filled plants or by licking dew off leaves. A stable water area, surrounded by a good growth of vegetation usually produces and supports a rich wildlife population. Wildlife needs good quality water which is free of pollutants.



Winter cover - Proper proportions of food and cover are all that is necessary to prevent excessive winter deaths. Idle fields with heavy weed growth, brushy woodlots, brush growing along roadside ditches and streams, wide shelter belts and shrubs growing along fence rows all provide cover against most winter storms.

Animals die in the winter mainly for these reasons:

- Starvation from lack of food
- Smothering by being covered with snow or ice
- Entrapment. They become covered by snow and can't escape
- Exposure. Low temperatures, no cover and a bitter storm can cause death

Spring cover - Spring can be an especially dangerous time for wildlife. Good wildlife cover is hard to find during early spring. Extreme weather conditions at this time can cause new hardships. Food is still scarce and snow has pushed down cover. New plant growth has just begun. Predators find this time of year to their advantage since there are few places available for game to hide. Many animals may have used up most of their body reserves during the long winter and may be very weak and thus are easy prey.



Nesting cover - Tall, dense undisturbed cover is needed to increase upland nesting bird numbers. Pheasants and other birds use early spring growth for nesting sites. Ducks use grasslands and haylands. Farming often destroys possible nesting sites and may kill the nesting hens and destroy the nest.

Safe nesting cover can be provided by leaving borders around fields, roadsides and waterways. Planting grass species which have a tendency to stand erect throughout the winter and into the nesting season will provide cover. Weeds and legumes will improve the quality of nesting sites. The use of no-till or conservation tillage has also provided many upland nesting wildlife with new nesting sites.

Escape cover - Escape cover protects wildlife by providing a place for them to hide from predators. This type of cover may be a den for a cottontail, a forest for a herd of elk or vegetation growing in a pond for fish. Cover includes an area of protection from predators and the elements of nature.



Travel lanes - Good travel lanes form an important part of the cover for game. Isolated sites offer excellent winter, refuge, nesting and food areas, but are often far apart. Fence rows often act as travel lanes. To be effective, a travel lane must be a route with enough cover for game to travel through with safety. Lanes left for game serve to connect smaller areas of suitable habitat.

Exercise

1. Keep a record of wildlife observations in the chart below.

Record of Wildlife Observations

Date	Time	Weather	Kind of wildlife	How many seen?	Where seen?	What was the animal doing?	Where did the animal hide?
Example: Aug. 7	7:00 am	Cloudy	Deer	1	Near forest	Eating	In forest
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							
12.							
13.							
14.							
15.							
16.							
17.							

Wildlife Management Practices and their Effect on Habitat

Now that you know some of the requirements of wildlife, how do you provide them? The following are some ways habitat can be improved.



Controlled Burning (every 3 – 5 years) - Burning under cool, moist, low wind conditions. This should be done no later than February so ground nesting is not destroyed.

Photo courtesy of J.S. Aber
<http://academic.emporia.edu/aberjame/ice/lec18/lec18.htm>

- Advantages of burning:
 - a. Causes sprouting of some shrubs
 - b. Releases nutrients into the soil
 - c. Removes leaves and other organic matter so seeds can reach the soil
 - d. Breaks down outside coating of some seeds so they can grow
- Effect on habitat:
 - a. Helps keep plants grassy and weedy
 - b. In pines, keeps the shrubs thinned out; provides grassy-weedy undergrowth
 - c. Makes brushy growth more dense

Food Plot (1/8 to 1/4 acres) - Plot should be square or rectangular and should be located at the edge between two or more kinds of habitat. Best if located next to natural cover such as brush or honeysuckle. Plant corn, grain sorghum, millet, oats or rye.

- Effect on habitat:
 - a. Useful in areas of natural plant succession where row-cropping is scarce
 - b. Useful in areas with no brush

Nesting Boxes - Some species nest in cavities. If natural cavities are not available, artificial cavities can do the job. Different nest boxes are required for different wildlife.

- Effect on habitat:
 - a. Good for birds in areas of new woods. Trees are not old enough to have cavities.
 - b. Helps birds in areas with no trees.

Plant Shrubs - Shrubs benefit wildlife if properly located. All shrubs should be planted in the spring after danger of frost has passed (April – June).

- Effect on habitat:
 - a. Useful next to fence rows and field edges.
 - b. Deer, rabbits and grouse benefit from shrubs.

Plant Trees that Provide Food - Trees can provide food as well as shelter for wildlife. Consider planting fruit trees, buffalo berry, juniper and others.

Common Wildlife Foods

The following table lists some of the common wildlife species and the foods they prefer.

Exercise



1. List the management practices you would use to make the picture area suitable for deer.

2. What practices could be used for pheasants? _____

Exercise

Name the regions shown in the photos and indicate one or more birds and/or animals that might live there.



A. 1. _____
2. _____



B. 1. _____
2. _____



C. 1. _____
2. _____



D. 1. _____
2. _____



E. 1. _____
2. _____

Exercise

Examine the photos and list the animals that would do well in each environment.



Animals

Plants



Animals

Plants



North Dakota 4-H Nature Trails

New Growth

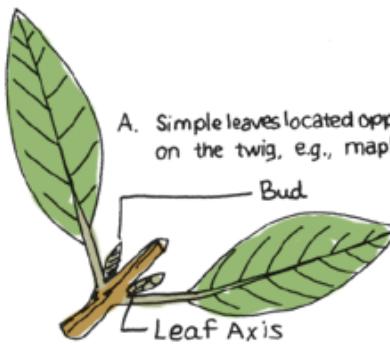


Objectives

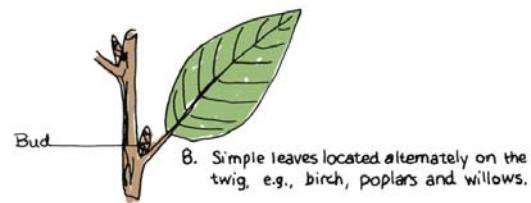
You will learn about 1) buds on twigs, 2) the structure of a bud, and 3) the parts of a flower.

Introduction

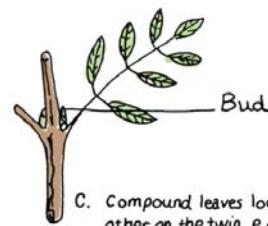
One of the first signs of spring that you will probably notice is budding. The buds have actually been there all winter. In spring they are enlarging and beginning to mature.



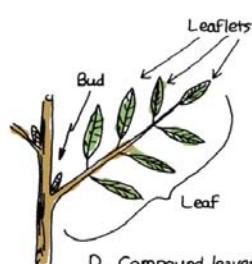
A. Simple leaves located opposite each other on the twig, e.g., maples and catalpa.



B. Simple leaves located alternately on the twig, e.g., birch, poplars and willows.



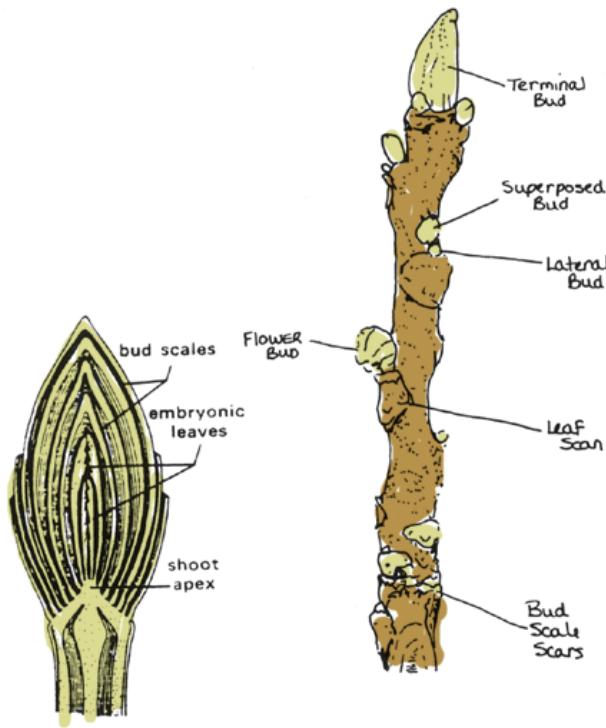
C. Compound leaves located opposite each other on the twig, e.g., ash and buckeye.



D. Compound leaves located alternately on the twig, e.g., locusts and walnut.

Buds are new (*embryonic*) shoots. Embryonic shoots are the first part of the leaf or flower to develop. First you see the shoot. Then the leaf or flower grows. Buds are found in the *axis* of the leaf (see drawing).

Twigs grow in length after the bud opens. The shoot tip has cells that rapidly multiply. Study the following illustrations and term definitions.



Definitions

Bud scales - The leaf-like covering over the bud. (Note: these scales are not always present. Buds without scales are called *naked*.)

Embryonic leaves - The beginnings of the new shoot.

Shoot Apex - The dome of plant tissue inside the bud. This is the area of growth in the new shoot.

Terminal Bud - A bud located at the end of the stem or twig.

Lateral Bud - A bud found at the side of the stem or twig.

Lateral Bud - A bud found at the side of the stem or twig.

Leaf Scar - The mark on the stem left after the leaf has fallen off.

Superimposed Bud - A bud located above another bud. These open only if the original bud or leaf is damaged.

Flower Bud - Contains the flower parts.

The Structure of a Bud A Common Twig

Exercise

1. Study several twigs from different trees. What types of buds did you find?

Types of Buds

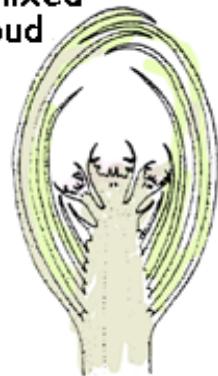
There are three different types of buds.

leaf bud



Leaf buds develop into leaves. Under the bud scales, you can find tiny leaves that surround the tiny shoot.

mixed bud



Mixed buds contain beginning leaves and flowers. Examples of plants with mixed buds are apple, grape and blackberry. The leafy shoot grows up and produces a flower cluster on its tip.

Flower buds develop into flowers. Sometimes these buds look different from the leaf buds.

Exercise

1. Study the following illustrations. Under each indicate if it is flower or leaf bud.



What Kinds of Plants Have Buds?

Woody plants like trees have buds. They live more than one year. Their stems are hard.

Herbaceous plants (pronounced *her-bay-shus*) have naked buds. Naked buds have no scales. These plants have softer stems. The stem shoots up out of the ground and dies at the end of one growing season. These plants usually have many lateral buds.



Monocots are grasslike plants. In our area, monocots are very important. They include the cereal grains (wheat, oats, and so on). The cereal grains have an interesting growth pattern. It is called *tillering*. Tillering is the growth pattern in which the main shoot branches underground. Tillering is important because the plant can expand to fill all the available growing space. Each branch produces grain, which increases the yield.

Exercise

Use a hand lens or a magnifying glass to examine several buds from trees, shrubs, herbaceous and monocot plants. Carefully cut the bud in half and locate the following structures.

- Bud scales
- Embryonic leaves or flower parts
- Shoot apex

Draw a sketch of two different types of buds which you studied.

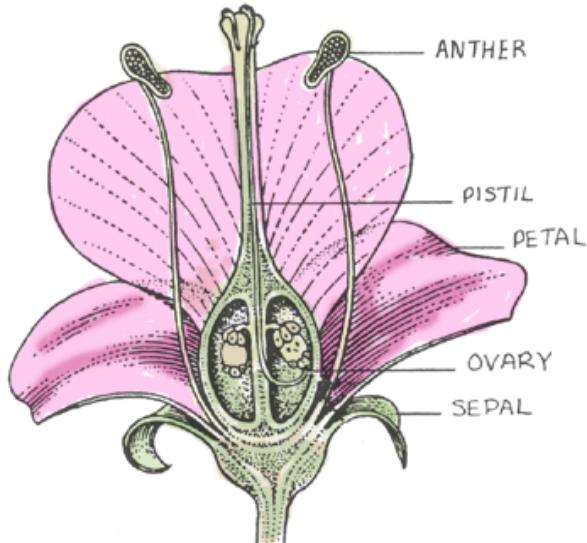
Plant Flowers

Plants reproduce by seeds. The seeds are found in the fruit of a plant. This fruit is produced from a mature flower. The flower is usually a branch stem which has leaves especially adapted to reproduce.

The Structure of a Flower

The lower leafy layer of the flower is called the *sepals*. These protect the flower. They are usually green, but sometimes they are the same color as the petals.

Above the sepals are the *petals*. Petals can be a variety of colors. Their function is to attract insects or other pollinators.



Pollen is produced by the *anthers*. Anthers are the male parts of the flower and are usually found at the end of long stalks under the flower. Some flowers have both male and female parts on the same flower. The pollen is transferred to the top of the *ovary* of the flower. The ovary looks like a small vase. Its top is sticky so that pollen will land and go down the tube. Inside the ovary, seeds are formed after the pollen has reached the inside of the ovary.

Exercise

1. Study some flowers. Can you find the same parts as on the diagram? Record your observations below.

Flower	Color of Sepal	Color of Petal	Ovary Present	Anther Present
1.				
2.				
3.				

2. What flowers are the first you see in the spring? _____



North Dakota 4-H Nature Trails

Birds and Bird Nests



Objectives

You will learn about 1) where birds build nests, 2) the materials they use, 3) different nest characteristics and 4) how to observe nesting activity.

Introduction

Birds hatch their young in nests. Nests can vary from a smoothed place on the ground to the elaborately woven nests of the oriole. A nest is not a permanent "house" for a bird. Rather it is a nursery. Birds do not live in the nest once the young are grown and gone. Most birds use a nest only once, but a few keep adding to it from year to year.

This lesson provides information on some birds common to North Dakota and the types of nests they build or select to raise their young.



Where Do Birds Live?

Each species of bird has a very special place where it lives, finds its food and raises its young. This is called its *habitat*. A meadowlark lives in the open prairie, builds its cup-shaped nest on the ground and likes a fence post for its singing perch. You would not look for it in a wooded area. You would know that any nest found in a tree or under a bridge does not belong to this beautiful songbird.

A wren is a very adaptable bird. It might build its nest in a birdhouse, in hole in a tree or even in the pocket of a coat you hung up in a shed and forgot. You wouldn't look for it in the middle of a pasture.

Some birds nest in brush or the lower parts of trees. Others prefer treetops. Some like the shady deep forest and others prefer a single tree or bush in a forest clearing. Many birds like the edge of a windbreak or wooded area, next to an open area. Once you know the habitat of a particular bird, you know where to look for it. If you change the habitat, you will change the kinds of birds in that area. This could happen when you plant a new windbreak that includes a lot of berried shrubs and evergreens. The opposite happens when an old grove or windbreak is bulldozed out. Habitat also changes when you drain a swamp or pothole. Birds will not stay where they can't find the right foods, nesting places and shelter from their enemies.

Bird Nest Characteristics

Nests can vary greatly in construction. Some, such as a mourning dove next, are very simple structures made of sticks placed on a limb.



The bald eagle's nest is made of branches and twigs placed high in a tree. The eagle often uses the same nest for more than one year.



The robin's nest is more complicated. It is composed of grass, sticks and mud woven together. The nest of a rose-breasted grosbeak is saucer-shaped and is made of grass and twigs. It is found in bushes or trees.



Wood ducks usually lay their eggs in tree cavities. The female constructs the nest using pieces of wood bark or other material found in the tree cavity. It is then lined with down plucked from her breast.



The barn swallow builds a cuplike nest of mud mixed with grass. It is lined with grass and feathers. Nests are usually built under the roof of a building or on the rafters. The bank swallow builds its nest in a hole in a river bank. It usually nests in colonies with several nesting cavities found in the same area.

The killdeer does not build a nest. It usually lays its eggs on a sandy beach or shoreline.

You can see from these examples that nests are constructed in many different forms and materials and can be built on the ground, in shrubs or trees, in cavities, steam banks, on buildings and almost anywhere. Each species has its own requirements.

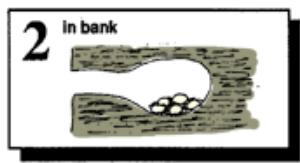
Exercise

On the next page are pictures of 8 birds and 8 bird nests commonly found in our state. Place the letter of the bird that built the nest in each of the boxes.



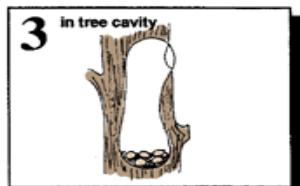


A. Barn Swallow



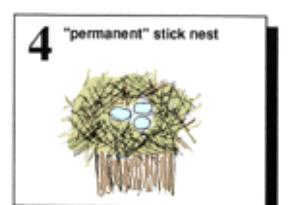


B. Meadowlark



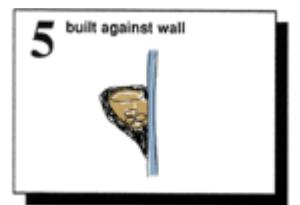


C. Bank Swallow





D. Rose-breasted grosbeak



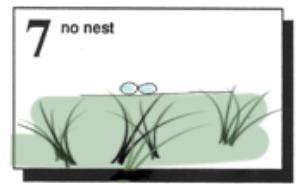


E. Killdeer



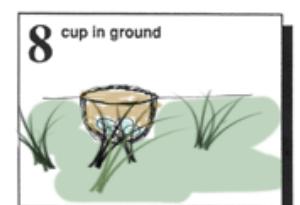


F. Wood Duck





G. Baltimore oriole





H. Bald Eagle

Bird Nest Identification



It is not too difficult to identify nests if the birds are using them. If the birds have gone, look for the following characteristics. The size of the nest is an obvious clue to the size of the bird. The habitat in which the nest is found is another clue. Note the location of the nest which might be on the ground, in a shrub or a tree. The type of construction is also important. Observe the depth of the nest and the kinds of nesting materials used.

Study the nests of different birds. The best time to study nests is in the winter when the birds are not nesting. You will also want to observe the nest in summer, but do so with caution. Avoid scaring the bird by getting too close to the nest. Observing the nest from a distance with a pair of binoculars is best.

In locating nests, the singing stations of the male birds may give a clue. The killdeer may disclose the site of its nest by feigning injury when you are near it.

If you have robins or other birds that nest in your area, try to observe these birds building their nests. **THE NESTS SHOULD NOT BE COLLECTED.**

It is quite interesting that birds need not be taught how to build nests by their parents. Even a hand-raised bird will build a nest similar to others of its kind.

Cautions

1. It is against the law to collect bird nests.
2. Open birdhouses only when the parent birds are away from the nest.
3. Avoid disturbing nests and their surroundings any more than necessary.
4. If you scare the parent bird away from the nest, work carefully and quickly and leave so the parent can return.

Exercise

1. Find a place where birds may nest. Walk around a park, nature area or any suitable habitat. Look for nests or signs of them, such as wood peckers entering hollow trees.
2. Find one or more nests that you can observe. Sparrows or pigeons are good for this purpose.
3. Complete the Nesting Observation Sheet.
4. Compare your findings on this nest observation sheet with others you or your friends have made.

NESTING OBSERVATION SHEET

(Complete one for each nest)

Date observation began _____ Bird species _____

Nest Location _____

Latitude _____ Longitude _____ (optional)

1. *Describe the nest:*

Shape _____ Size _____

Materials _____

What is the nest attached to and where? _____

Why is it built and located where it is? _____

2. *Describe how the bird built the nest* (if you were able to observe the building process).

3. *Describe the bird eggs:*

Number _____ Size _____ Shape _____ Color _____

Dates they were laid _____

Dates they hatched _____

Number of days to hatch _____

4. *Describe what the parent birds do.*

Who sits on the eggs? _____ How long? _____

Do they take turns? _____ Who brings food? _____

How much food? _____ How often? _____

What do they do when their nest is threatened? _____

How do they feed their young? _____

5. How many days after hatching do the young leave the nest (fledge)? _____

Things to Remember

1. Reproduction is an important part of the bird's life cycle.
2. Nesting is the way birds raise their young.
3. Spring is the most frequent bird nesting period in North Dakota, but some birds nest at other times during the year.
4. Each species has its own nesting habits.
5. Some birds use nests for more than one year.

Common terms you may find useful:

CLUTCH – the eggs a bird lays in a single nesting effort

INCUBATION TIME – the number of days a bird sits on the eggs for hatching

NESTLING – a young bird in the nest

FLEDGLING – a young bird that flies from the nest

PRECOCIAL (*pre-KO-shul*) – birds ready to leave the nest and feed themselves immediately after hatching (ducks, partridge, killdeer)

Exercise

Complete the following questions.

1. Birds use nests to _____

2. Why is winter the best time to study nests? _____

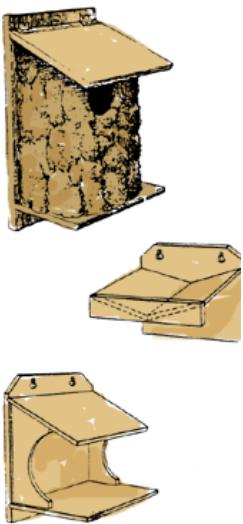
Challenge Activities

1. Research the following birds and describe their nests. Libraries are a good source of information.

BIRD	NEST DESCRIPTION
Yellow Warbler	_____
American Avocet	_____
Wild Turkey	_____
Screech Owl	_____
Ruby Throated Hummingbird	_____
Common Flicker	_____
Eastern Bluebird	_____
Ruddy Duck	_____

Build houses for birds and place them in yards, parks, along roadways or on public land.

Do this on your own, or as a club project for a community service. Get permission before placing bird houses. Use North Dakota Extension Service circular WL-964, "Homemade Nest Sites for North Dakota Songbirds, Vol. I."





North Dakota 4-H Nature Trails



Fish and Fishing

Objectives

You will learn about 1) some of the common species of fish in our state and 2) spin fishing techniques.

Introduction

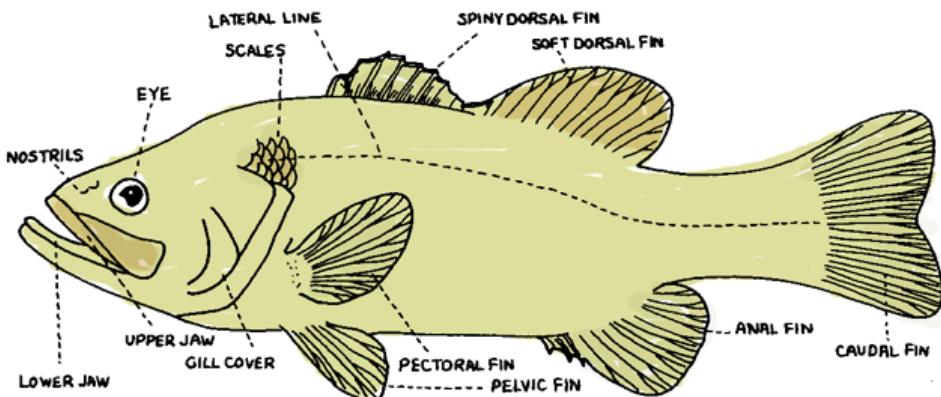
Fish are the lowest group in the family tree of vertebrates. They are cold-blooded. Most fish have a large part of their body covered with scales. In their water habitat, fish breathe by a system of paired *gills*. Their oxygen required to sustain life is obtained from the dissolved air in the water. Fish can actually smother and die in water which contains too little dissolved oxygen. This often happens where fish are too crowded. Bubbling, sprayed or fast moving water will pick up oxygen from the air. This makes it available to the fish as dissolved oxygen. Aquatic plant life also adds oxygen to the water through the process of *photosynthesis*. During photosynthesis plants take in carbon dioxide from the water and give off oxygen.

Here's the way a fish breathes. Water containing dissolved oxygen is passed over a series of filaments called *gills*. Gills are a network of many fine vessels with walls so thin that oxygen can pass from the water into the blood system of the fish and carbon dioxide can pass out.

One structure peculiar to fishes is the air bladder or swim bladder. The entire function of this organ is not known, but in some primitive fish it serves as a reservoir of oxygen.

Fish Identification

The illustration below shows the parts of a fish. Knowing the parts will help you identify the common species of fish found in North Dakota.

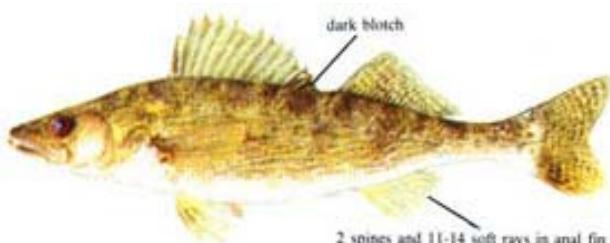


A wide variety of fish species is found in our state. A few of the more common ones will be discussed here.

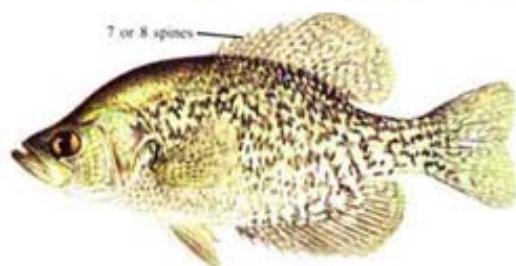
Northern Pike – Pike are marked with horizontal body spots and never have more than five pores on each side of the lower jaw. Pike have scales covering their entire cheek. The northern pike was named our state fish by the 1969 legislative assembly. Other names are northern, pike, jack, snake, pickerel and hammerhandle.



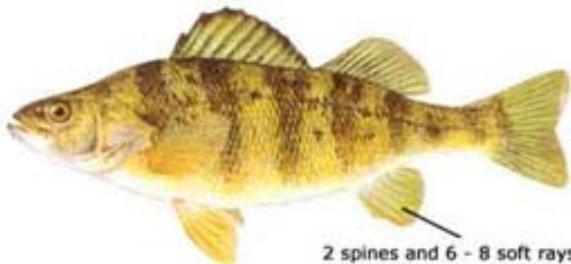
Walleye – Walleye are dark olive in color with an overall golden-brown mottling and a white belly. A black blotch on the lower rear portion of the front dorsal fin helps identify the walleye. They prefer sand and gravel bottom areas, commonly found in our large reservoirs. They are also called wall-eyed pike.



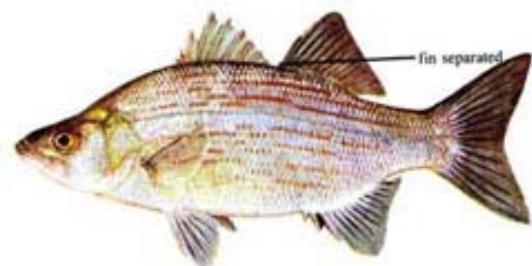
Black Crappie – Flat and silvery in appearance and marked with irregular dark spots, the crappie is a very attractive and desirable fish. The black crappie has seven or eight spines in the dorsal fin. It prefers clear water conditions.



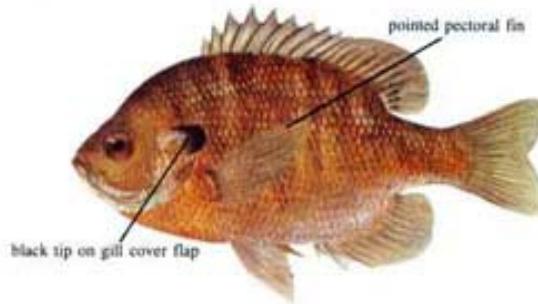
Yellow Perch – Yellow-green in color, perch have six to eight dark bars running up and down their sides. They have two spines and six to eight soft rays in the anal fin while walleye and sauger have two spines and 11 to 14 soft rays in the anal fin. Being easy to catch in both summer and winter and of good eating quality, the yellow perch is a popular fish. However, it is often stunted and needs heavy fishing pressure to keep its numbers in line with available food.



White Bass – This beautiful silver-gray fish has rows of dark narrow stripes running the length of its body. At times it reproduces abundantly and good catches are made – then the population seems to almost vanish until conditions favor it again. It has done well in our large lakes and reservoirs. It is also called silver bass.



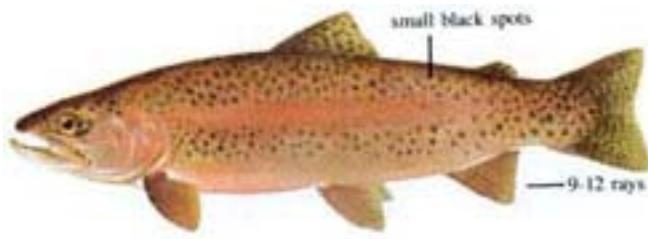
Bluegill – This wonderful and scrappy little fish varies in coloration but usually is dark olive above with dark vertical bars on the upper sides and orange or yellow on the throat and belly. Its gill covers are blue with a black tip on the flap. It is probably the most popular member of the sunfish family, but at times it may be stunted due to overpopulation. It is also called bream, sunfish and sunny.



Rainbow Trout – The rainbow from the Pacific coast has been widely stocked in many states and has been most successful. It varies in coloring but usually has pinkish streaks on its sides and small black spots on its sides, fin and tail. The rainbow has 9 to 12 rays in its anal fin. Steelhead trout are a variety of rainbow that spend time living in the salt water of an ocean. Other rainbows are named according to where they originate, such as **Kamloops trout**, or by a descriptive term such as red band trout.

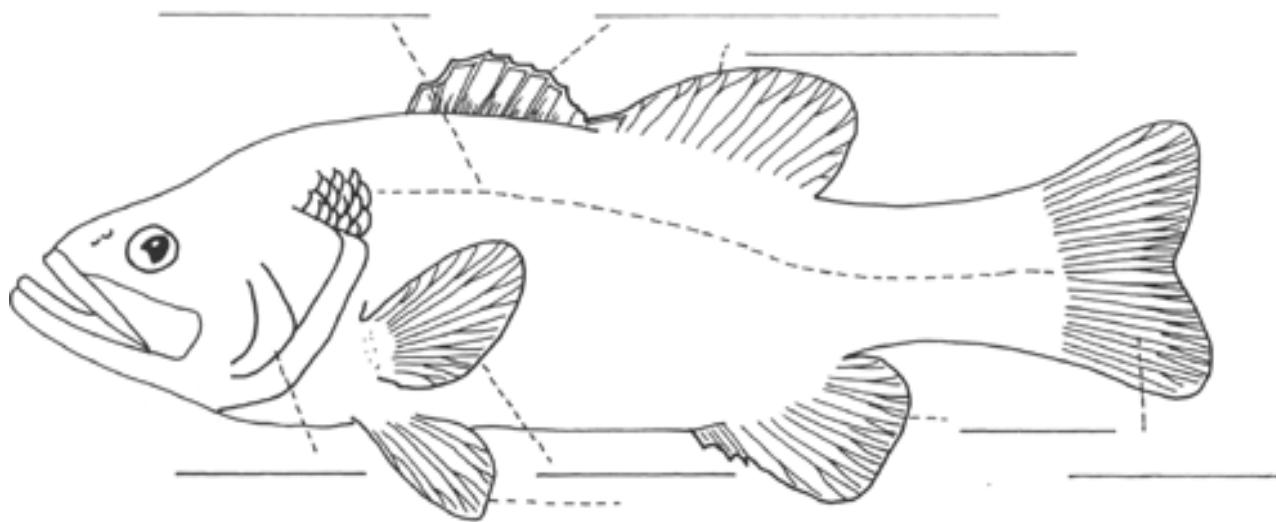
Cutthroat trout are closely related to rainbows but can be recognized by a red cutthroat slash on each side of the lower jaw. Rainbows are found in a variety of colorations, due to where they originate, where they are stocked, the time of the year and if they have crossed with other trout.

Black Bullhead – The black bullhead is our most common bullhead. Compared to a catfish, bullheads are stockier, darker in color, have a more rounded and slightly notched tail and are not as large. We also have yellow and brown bullheads. The black bullhead has 20 to 24 rays in the anal fin, while the yellow bullhead usually has 20 to 27 rays. There are also variations in color as the names suggest, but they are not as noticeable as might be expected. Most of us are satisfied to know them as just bullheads and don't worry if they are black, brown or yellow.



Exercise

1. Identify the parts of the fish. Write the correct terms on the blanks.



2. Pictured are some of the fish found in our state. Identify each fish and write its name on the blank.

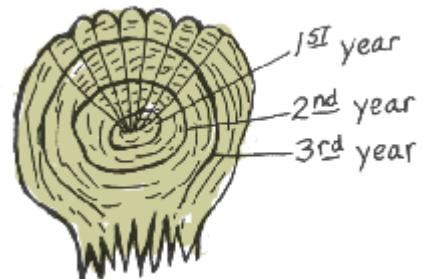








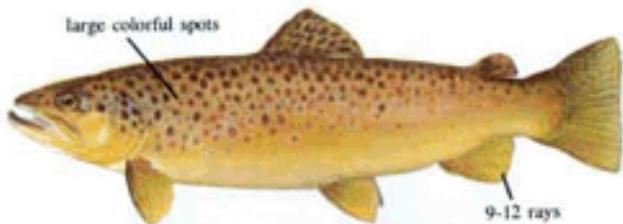
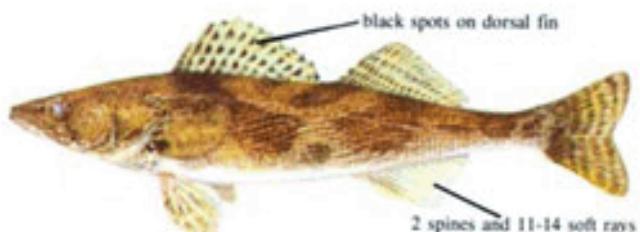
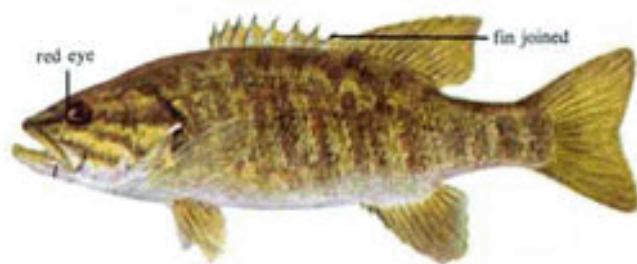
3. Fish scales can be studied to determine age (see illustration). Study the scales from fish that you catch or buy and record their ages below.



SPECIES		AGE	WHERE CAUGHT
1.			
2.			
3.			
4.			

Challenge Activity

The following fish are also found in our state. Using an identification manual or other library reference, try to identify each one.

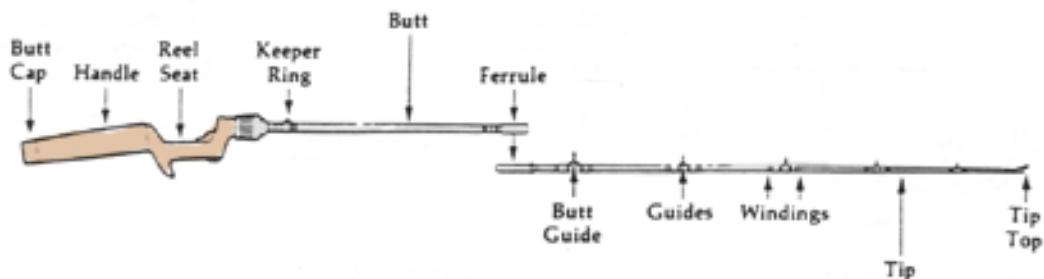


Spin Fishing

Fishing provides enjoyment to people. It can be relaxing, exciting or inspiring. It attracts people of all ages. Fishing is one of the most popular outdoor sports.

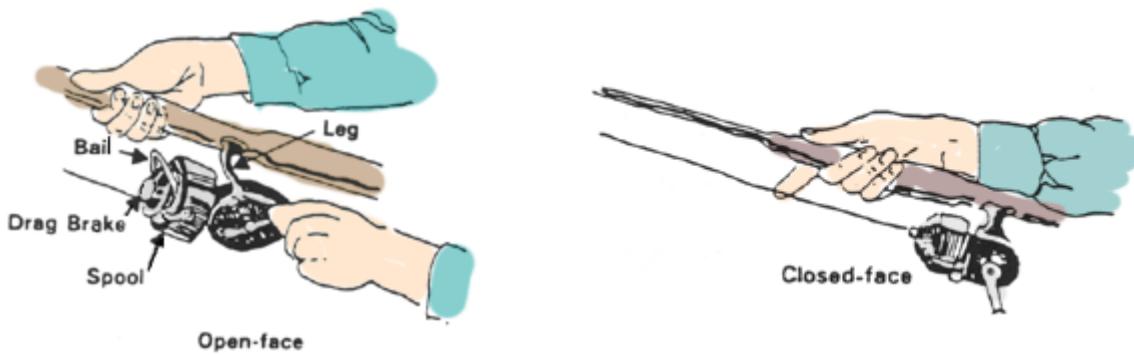
Fishing Equipment

Rod – The rod is usually five to six feet long. The grip, or handle, is offset rather than straight. Most rods are made of fiberglass, but graphite fibers or metals can also be used to make rods.



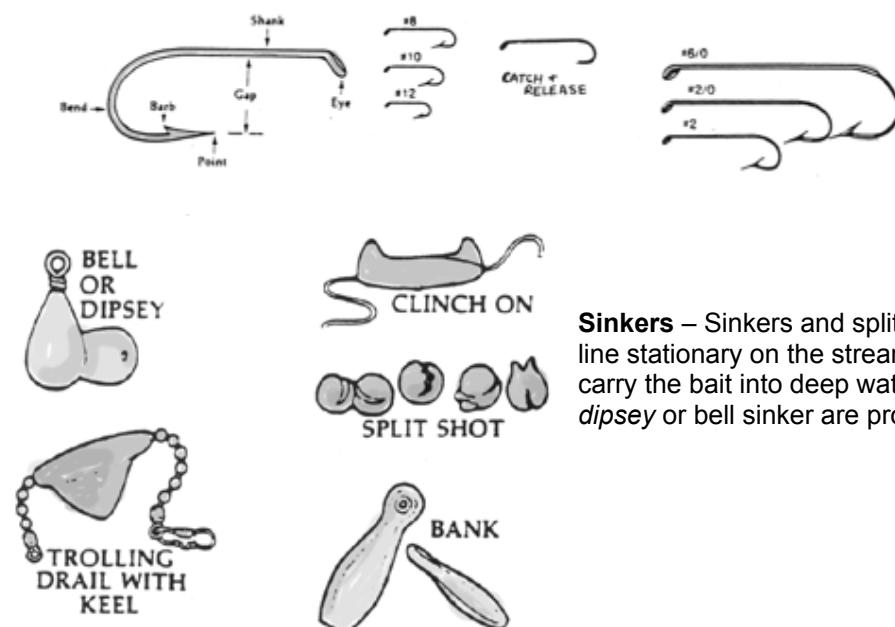
Reels – Reels are designed to hold, release or retrieve line. The spin-cast reel is simple to operate. It has a stationary spool protected by a cover called a *housing*. It is usually mounted on top of the rod. A thumb button lets the line out of the spool. It can also stop the line while casting. To stop the release of the line, fully push the thumb button. Turning the reel handle starts a line pick-up device. Timing of these actions is important to good casting.

The reel's drag lessens the chance of a fish breaking the line. Be sure to check your *drag* before fishing. One good method of adjustment is to have one person hold the rod in a normal position while another person pulls down on the line (no hook on the line). If the rod appears to be under too much stress and no line is being released by the reel, the drag screw should be loosened until line is released. If the line is released with too little effort, the drag should be tightened. It is better to have too little tension on the drag than too much.



Line – Line comes in several strengths. For freshwater fishing, 6, 8 and 10 pound test strengths are usually used. The greater the strength of the line, the thicker and heavier it is. This affects the casting quality. The weight of the bait or lures used, the size of fish, the action of the rod and other factors also enter into the selection of line.

Hooks – Hooks come in many sizes and styles. Hooks must be sharp to be useful. Sharp hooks can be dangerous – handle them with care. A small file or whet stone helps keep hooks sharp. Catch and release hooks do not have a barb.



Sinkers – Sinkers and split shot are used to hold your line stationary on the stream, lake or pond bottom or to carry the bait into deep water. The split shot and the *dipse* or bell sinker are probably the most often used.

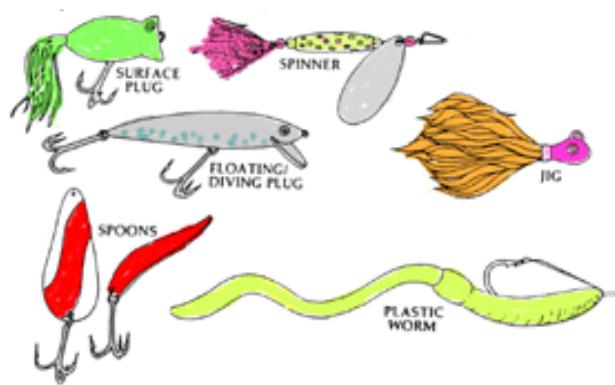
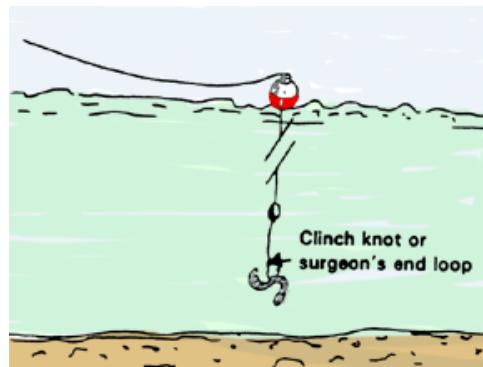
Bobbers – The bobber is a floating object used either to keep live bait off the bottom or to signal when a fish has taken your bait. The hollow plastic sphere is most common.

Natural Baits – Natural bait is the most common bait. Earthworms, minnows, crayfish, frogs, grubs, insects and insect larvae are often used. The key is to secure the bait firmly to the hook.



Artificial Lures – There are many artificial lures on the market. Check with your hardware or sporting goods stores.

A variety of techniques may be used when fishing with artificial lures. These include moving the rod tip up and down, varying the reeling speed, and pausing as you reel. Make short casts and watch how the lure reacts. Select a method that makes it work most naturally. Sometimes a small variation in the way the lure moves makes a big difference in catching fish.



Spin Casting Methods

Grasp the rod handle firmly but don't try to strangle it. Place two fingers forward on the reel. Good casting, for distance and accuracy, is a matter of skill and timing.

Assume a natural, comfortable position with the rod tip at about 10 o'clock. Try shifting your body so all your weight is on the right leg (for right-hand casting) and the right shoulder is well forward toward the target. The casting arc is from 1 o'clock to 10 o'clock. When casting, remember to let the rod do the work. You control the power that has been built into the rod.

Bring the rod smartly from 10 o'clock. Do not let the rod come to rest at 1 o'clock. This means that the tip will still be going back from the momentum of the lure when you start the handle back toward 10 o'clock. When the lure starts forward, you will feel the rod working. If you allow the rod to rest at 1 o'clock, all the compression will have been lost and the cast will have no power. Don't let the rod and lure come to rest on the back cast. Keep them moving until the lure is in flight.

Practice this Pendulum Movement

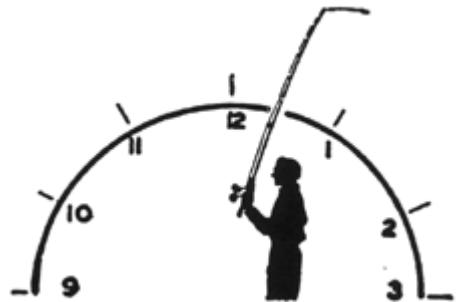
Spin-casting techniques, in brief:

10 o'clock – Be comfortable and relaxed. Put the lure in position, move the pick-up bail out of the way and be ready to case. CONCENTRATE on the target.



Step 1 – Start the cast with the rod tip at 10 o'clock and with the lure drawn to within 6 inches or so of the tip.

1 o'clock – Note that while your hand has started the handle of the rod back toward 10 o'clock, the rod tip and lure are still going back. Don't rest at 1 o'clock.



Step 2 – Raise the rod swiftly and smoothly to the 1 o'clock position, then immediately...

10 o'clock – Let go of the line. Your first cast may go almost straight up. You may be releasing the line too soon, a natural error.

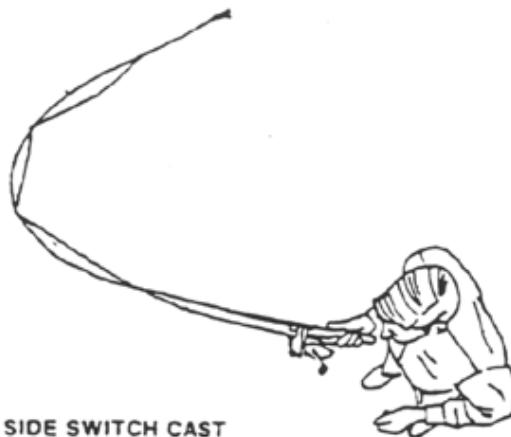


Step 3 - ...move the rod back down to the 10 o'clock position and release the index finger hold on the line. To stop the flight of the lure, touch the line against the spool lightly with your index finger.

Line control while the lure is in flight is simple. Just lay the tip of your right index finger on the line or on the edge of the spool. The amount of pressure used determines the braking effect. The lure may be stopped dead in flight this way, or by winding in on the handle. This will be useful when you fish in cramped areas or where vegetation and rocks are present.

Side Switch Cast

To cast a lure low over the water, simply switch the rod tip slightly downward and to the right, or lift it a few inches. Release the forefinger from the line as the rod begins to straighten. Don't swing your rod completely to the right or left because you may hook another fisherman.



Exercise

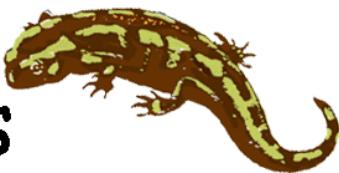
1. Practice casting. Tie on a casting weight, one without hook and preferably weighing $\frac{1}{4}$ to 5/8 ounces. Grasp the rod handle firmly. Aim at the target which can be made from a tire, ropes or other object. Keep score on the Casting Score Sheet below.

TARGET WITHOUT BULLSEYE	TARGET WITH BULLSEYE
<p>10</p>	<p>10 20</p>
STATION 1	STATION 2
1 st cast _____	1 st cast _____
2 nd cast _____	2 nd cast _____
3 rd cast _____	3 rd cast _____
Subtotal _____	Subtotal _____



North Dakota 4-H Nature Trails

Amphibians and Reptiles



Objectives

You will learn about the characteristics of amphibians and reptiles.

Introduction

North Dakota has several types of amphibians and reptiles. These animals are important parts of the food chain. For example, snapping turtles eat small birds and other animals. They help control animal populations. Reptiles and amphibians also serve as food for other animals.

Amphibians

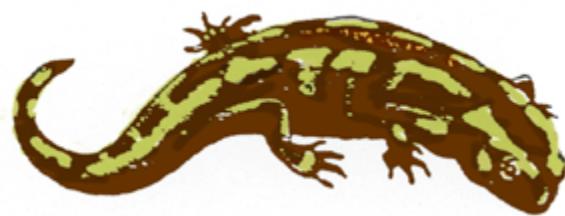
Amphibians are found on every continent except Antarctica. They have soft bodies. Their skin is usually moist.

Amphibians undergo a change from egg to larva to adult. This change is called *metamorphosis*. Metamorphosis is the gradual change in body form. Each stage looks different from the other. Frogs and toads are amphibians. Their larvae are called *tadpoles*. Tadpoles have fishlike features. They have gills and a long finlike tail. Gradually the tail is absorbed. Legs develop and lungs enable the amphibian to live on land.

If they have feet, they are often webbed. The toes have no claws and are soft. Amphibians can breathe through the gills, lungs or through their skin. Some amphibians stay in the larval form throughout their lives. The mudpuppy is an example. It never develops the lungs of adult amphibians. Instead, it has three pairs of gills.

Amphibians lay eggs in water or in a damp place. Sometimes the eggs are in clumps or in long strings.

Amphibians with Tails

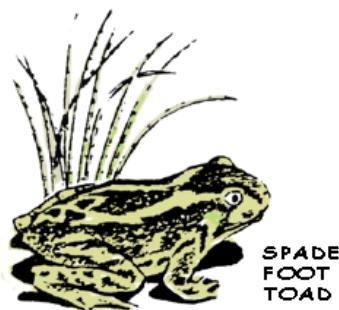


above ground. They live on insects, earthworms and other animals. Our state has three salamanders; the eastern tiger, the gray tiger and the blotched tiger salamander.

Salamanders

Salamanders have no vocal chords. Their legs can barely lift them off the ground. Salamanders have no claws. They have very little defense against predators. Some can change color. That helps them hide. Others are covered with a bad-tasting mucus.

These animals are often overlooked. They spend most of their lives underground. Spring mating brings them



Amphibians Without Tails

Toads

Toads have short compact bodies. They have no tails. Their front legs are shorter than the back legs. The back legs are muscular. Toads move by leaping. The front legs cushion the animal as it leaps. Toads have a warty, rough skin. It is **not** true that you can get warts from handling toads.

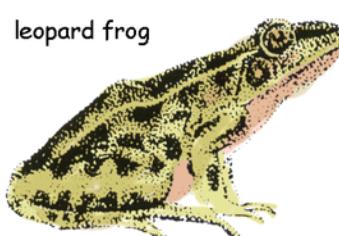
Toads have a crest or ridge on their heads. Frogs don't have this crest. Usually toads' fingers are less webbed than frogs.

The **spadefoot toad** is found in southwestern North Dakota. It has a large black horny spur on its hind legs. This spur is used to dig through the dirt. Other toads have the spur but it is not as large.

Other toads found in North Dakota are the **Great Plains toad**, **Dakota toad** and the **Rocky Mountain toad**.

Frogs

Frogs live close to water. Tree frogs live in wooded areas with ponds. Chorus frogs are found throughout the state. They make a sound like running a finger over a comb. These two frogs have suction cups on the ends of their fingers and toes. Chorus frogs are tiny. They are slightly bigger than dime.



The most common frog in our state is the **leopard frog**. It is also the most common in the United States. It has distinctive dark spots on its body.

Both frogs and toads have no teeth. Instead, they have tiny bumps inside the mouth. These are not true teeth. Their job is to hold prey.



Exercise

Amphibians' breeding season starts in the spring. Once the temperature stays above 50 degrees, amphibians will come out of hibernation.

1. Find a pond or roadside ditch. Choose a less-traveled road. Catch amphibians with a dip net or your hands. Be very careful not to squeeze too hard. Study each one. Keep a record of the different amphibians you study. Use the chart below.

- 2 Listen for frog and toad sounds. Use a tape recorder to record the different sounds they make. Do this in the spring.
- 3 Collect frog eggs from a pond or stream. Keep the eggs in a large container of pond water. The temperature should be about 64 to 77 degrees Fahrenheit. Describe what happens.

Reptiles

Reptiles are covered with scales. Some have very rough scales, and others have very smooth scales, but no reptiles are slimy.

All reptiles are *exothermic*. This means their body temperature changes with the surrounding air temperature. They differ from mammals and birds, which are *endothermic* and can control their own body temperature. This is why reptiles become inactive in the winter when the temperature is cold.



Most reptiles lay eggs. Their eggs are different from a bird's egg in that the shell is soft and will not break if dropped. Most reptiles do not watch over their eggs or their young after they are hatched. The eggs are laid in moist soil or in rotting logs. In the case of turtles, the female will dig out a hole on the shoreline of a lake or river and deposit the eggs, cover them up and then leave them to be incubated by the sun.

Some reptiles, such as the garter snake, bear their young alive.

Reptiles are primarily predators, actively catching and killing their food. They will eat dead animals when they are available. Snakes feed on small mammals such as mice, gophers and rats (warm-blooded prey), or on frogs, fish and other snakes (cold-blooded prey). Water turtles feed on crayfish, fish and dead animals that are found in the water. Land turtles feed on insects, berries, mushrooms and even cow manure.

Snakes

Snakes are the most misunderstood and feared animals in the world and they do not deserve this reputation. Most snakes swallow their prey head first since in this position the legs of the prey lie closer to the body, making them easier to swallow. Snakes are useful to man because they often eat rodents and other pests. The snake's tongue is a kind of feeler. Snakes do not hear like most animals. Instead their entire body picks up vibrations from the ground.

Snakes must shed their skin as they grow. Scales cover their body. These scales are replaced by a new set. Scales cover the eyes of the snake. As it is shedding this eye scale their eyesight becomes murky. Snakes are very vulnerable at this time because they cannot see well. Even friendly snakes may strike at this time. Be very careful when you handle them. To get the old skin off, the snake will rub up against a hard object. The skin is then rubbed off the body. The skin is turned inside out as it is rubbed off.

Snakes do not have legs, of course. They move by using their body muscles. The roughness of the ground's surface provides something for them to push against. An undulating movement is used by most snakes to move forward.



Most snakes are nonpoisonous, but they will bite if cornered. You'll most likely find the **Plains garter snake**. It's got a surprise for you if you should catch one. They smear their enemies with a foul smelling liquid. The red-sided garter snake is also found in North Dakota.

Plains garter snake



The **hog-nosed snake** has a distinctive nose. This snake has the ability to scare you if cornered. It will puff up like a cobra and hiss at its enemy. It will also bite repeatedly. They can also pretend they are dead. That often helps them escape from an enemy.

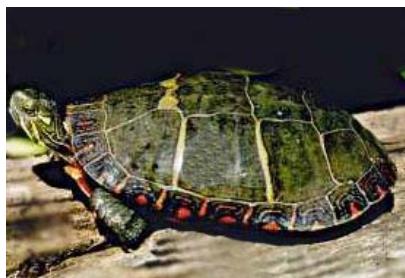
Hog Nosed Snake

We have only one poisonous snake in our state. It is the **prairie rattlesnake**. The rattlesnake is a *pit viper*. That means it has a sensory pit on its head near its eye. The pit senses when warm-blooded prey (lunch) is near. Fangs inject poison which kills the prey. The poison actually starts to digest the prey.

If you are bitten by a poisonous snake, DO NOT PANIC. Few people die of snakebite. Don't panic and send the poison racing through your body. DON'T CUT THE WOUND. Get to a hospital quickly. Anti-venom will be given by a doctor.

Turtles

Turtles are the armored tank division of the animal army. These reptiles have a top and bottom shell. The two shells are connected by a bridge. For defense, the turtle pulls all its soft parts inside its shell.



Painted Turtle

Snapping turtles are found throughout the state. They will hiss and strike at enemies. Be careful if one is near you. If they get you in their jaws, you will have to cut their jaws to release their hold. You will find snapping turtles on land.

The **painted turtle** is more friendly. It gets its name because of its colorful shell.

Exercise

Amphibians and Reptile Word Find

Locate the following words in the puzzle below. Circle each.

AMPHIBIANS
FROGS
HOGNOSE
LIZARD
TURTLES

METAMORPHOSIS
PIT VIPER
POISON
REPTILES

SALAMANDER
SNAKES
SPADEFoot
TOADS

A M P H I B I A N S K L M U M L C R A B		
B Z I P C X H O G N O S E T T I S B C N		
R N T O A D S Y I Z D S N O O Z T R A S		
E O U F B T A R T B E N K A P A U C E T		
P T I R Z W S A L A M A N D E R S L X N		
T S P O I S O N T U Z K M S X D T M Q R		
I P E G Q U R S U N D E P D E R I S V O		
L K R S B Z H E L L O S X T U G D K Z F		
E L S N O S P A D E F O O T E M Z J T D		
S M E T A M O R P H O S I S V W M D U L		



North Dakota 4-H

Nature Trails

Water Conservation



Objectives

You will learn about 1) the world water supply, 2) the water cycle, 3) rainfall and snow records and 4) water needs in your home.

Introduction

The earth has been called the *water planet*. Between two-thirds and three-fourths of the earth's surface is water. Water is found in several forms. The polar ice caps are a solid form of water. Polar ice is fresh water, but not very useable to man. Many lakes are not fresh water, but salty. We cannot use these as source of drinking water. We rely heavily on groundwater, which is held under the earth's surface.

World Water Supply

The following table shows the breakdown of the earth's water supply.

SOURCE	PERCENT
Oceans	97.61
Polar Ice	2.00
Groundwater	0.62
Freshwater Lakes	0.009
Saline Lakes	0.008
Soil and Subsoil Moisture	0.005
Atmosphere	0.001
Rivers	0.0001

Exercise

Calculate the percent of fresh water that is available to man:

Percent	
Groundwater	_____
Freshwater lakes	_____
Rivers	_____
Subtotal	_____
Ice caps	_____
TOTAL	_____

The Water Cycle

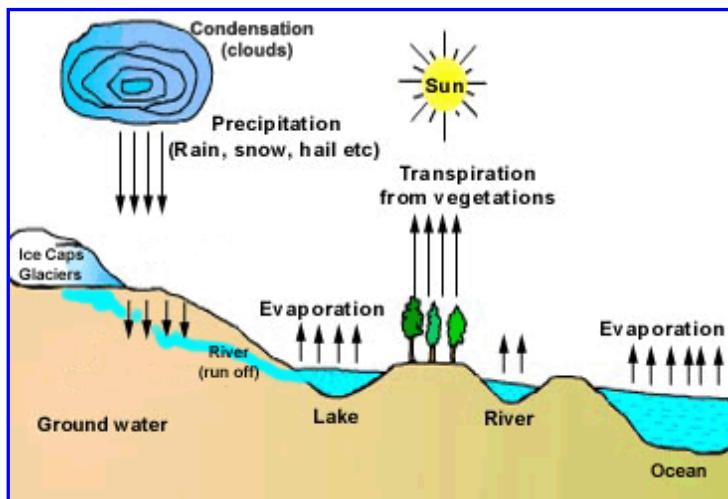
The water cycle is sometimes called the

Hydrologic Cycle. The drawing shows the water cycle. The water cycle is continuous. The different forms that water can take are:

Solid – ice, snow, hail

Liquid – rain, lakes, rivers, etc.

Gas – water vapor



Ice caps and oceans are also part of the water cycle. The water cycle redistributes the earth's water. Water collects in lakes, rivers and oceans. The lakes and rivers are heated by sunshine. The water evaporates and is changed into the gas form, or water vapor. Water vapor is also given off by plants. The vapor forms clouds. As the vapor forms into droplets of 1/25 of an inch or larger, the earth's gravity pulls it back to earth. This is what we call rain. Sometimes crystals are formed which produces sleet, hail and snow.

Definitions

Condensation – process of a water vapor (steam) turning into a liquid.

Evaporation – process of a liquid turning into a vapor.

Evapotranspiration – the loss of water vapor from a plant.

Precipitation – rain, hail, snow, etc.

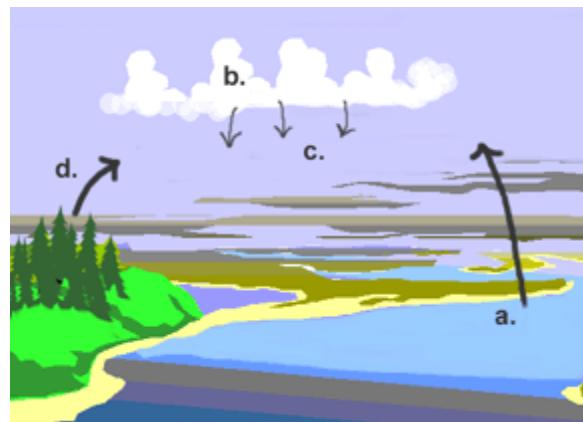
Run-off – the excess water from snow or rain that does not soak into the ground.

Transpiration – the loss of water vapor from a plant.

Water cycle – process that changes water from solid to liquid to gas involving evaporation, transpiration, condensation and precipitation.

Exercise

Label the following diagram using the words **evaporation**, **condensation**, **precipitation** and **transpiration**.



a. _____

b. _____

c. _____

d. _____

Exercise

Let's see if we can use water to make a cloud. You will need:

- a kitchen stove
- a saucepan
- ice cubes
- aluminum foil

Set the dial on the stove for high heat. Place ten or more ice cubes in a saucepan. Begin to heat the ice cubes. What change do you see? You should see the change from a solid (ice) to a liquid (water).

Complete the following questions. (Underline the correct answer.)

1. What causes the ice to change into water? (heating, cooling)
2. Keep heating the water until it boils. The water now changes into the third form of water, which is (solid, water vapor).
3. What is another name for water vapor made this way? (steam, condensing)

As the water boils make an aluminum foil tent about 20 inches above the pan of boiling water.

4. What do you see on the foil? (water drops, clouds)
5. Where is the water cooler? (in the pan, above the pan on the foil)
6. Warming water causes (evaporation, condensation).
7. Cooling water causes (evaporation, condensation).

Summary

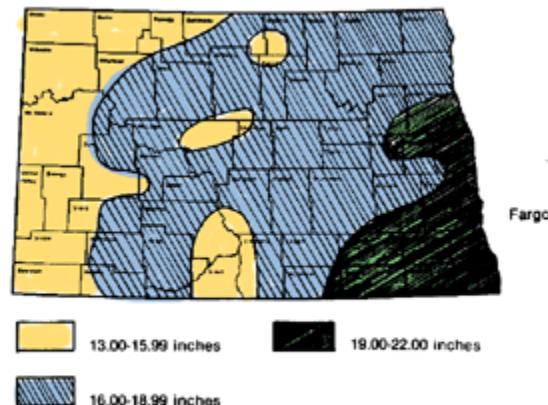


Plants give off water vapor as a waste product. This water vapor also becomes part of the water cycle. Water vapor rises in the air. The rising water vapor cools. This cooling is called condensation.

You can see the results of this cooling in the sky as clouds. Inside the clouds water drops form. The water may become heavy enough to fall to the ground. This is called precipitation. Precipitation can be rain, hail, snow or sleet. Water is constantly changing form.

Annual Rainfall Records

North Dakota has a semi-arid climate. Rainfall varies greatly. Averages are 13 to 20 inches per year from west to east. About 60 – 70 percent of this rain falls from April through September. Water losses due to evaporation and plant transpiration are usually higher than the annual rainfall. That leaves the land very dry. The average rainfall and snowfall for the state is 17 inches.



MAP OF THE ANNUAL PRECIPITATION FOR NORTH DAKOTA

Exercise

1. Which part of the state has the most annual rainfall? _____
2. Keep a record of the rainfall or snowfall in your area. Compare the amounts that you get with the amounts listed in the local paper. Keep your record for one month.

Rainfall Date	Your amount	Newspaper Amount

Water Usage in the Home

Modern living conditions in our homes have made water more available for our use. The following table shows some of the uses of water in our homes.



AMOUNT	USE
3 – 5 gallons	flush toilet
3 gallons	shaving with water running
5 gallons/minute	shower
8 gallons	cooking 3 meals
8 gallons	cleaning the house
10 gallons	washing dishes for 3 meals
20 – 30 gallons	washing clothes
30 – 40 gallons	watering lawn
30 – 40 gallons	taking a bath
30 – 40 gallons	washing a car

Exercise

1. Keep a record of your family's water use for one day. Record your findings below.

USE	HOW MANY TIMES	ESTIMATED AMOUNT USED IN GALLONS
Flushing toilet		
Shaving		
Showering		
Taking a bath		
Cooking 3 meals		
Washing dishes for 3 meals		
Washing clothes		
Watering lawn		
Washing car		
Cleaning house		
Other:		

Exercise

Water is used to manufacture the products we use daily. Many products are from a water environment.

List 8 things you would expect to find in a grocery store that come from an aquatic (water) environment. (include ponds, swamps, oceans, etc.)

Go to a local grocery store. List 10 products that contain water.

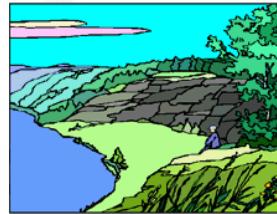
Challenge Activity

Trace the manufacturing of a product and find out how water is involved in the production of the product. Report your findings below.



North Dakota 4-H Nature Trails

Geology of North Dakota



Objectives

You will learn about how the land of North Dakota was formed.

Introduction

North Dakota is a wonderful place to live. Have you ever thought about how it was formed? To answer that question, you need to know something about *geology*. Geology is the study of the earth.

North Dakota Before the Glaciers

Scientists believe the earth is about four and one half billion years old.

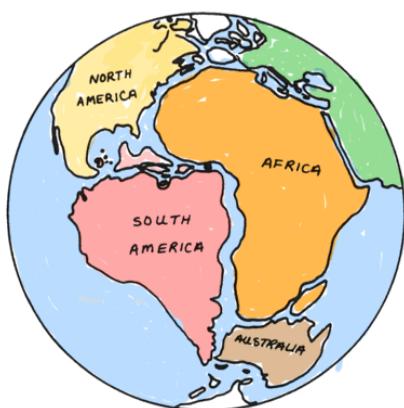
The earth is covered by a thin rigid layer called the *crust*. Under the crust is the *mantle* which is more flexible. The mantle is *plastic*, somewhat like silly putty. You can slowly pull and stress it but if you pull it suddenly, it will snap. Pressure and heat keep the rock in the mantle plastic. Continents and oceans are part of what floats on the plastic mantle. Continents are less dense than the ocean floor. That is why continents rise above the oceans.

The rocks that make up the earth are of three types:

Igneous – rocks formed when hot molten material (magma) cools and hardens (crystallizes).

Sedimentary – rocks formed from the weathering and erosion of pre-existing rocks. The grains are transported by water, wind or ice and deposited to later be formed into new rock.

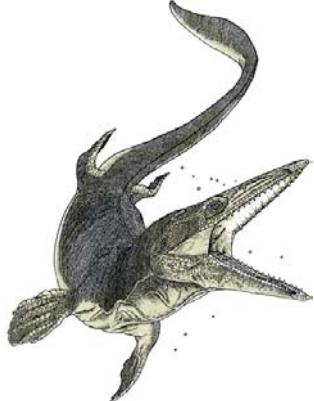
Metamorphic – rock formed when either igneous or sedimentary rocks are buried at great depths within the crust where the pressures and temperatures are very high. The heat and pressure changes the parent materials into new rock. This rock may have a different texture, composition and mineral content.



The seven continents used to be one *supercontinent*. Gradually, the continents separated and drifted apart. The ocean floors spread out taking the continents with them.

Seas of the North American continent during the Cretaceous period.

Most of the geologic history of North Dakota is buried deep below the surface of the land. The land surface of North Dakota is relatively young and has a history that only goes back to the **Cretaceous** period (about 100 million years ago).



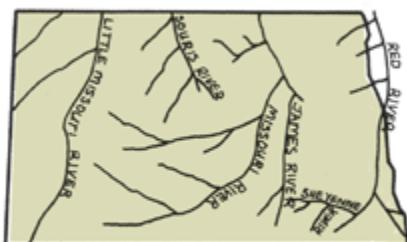
Mosasaur

In the Cretaceous period plates of the crust to the west of North Dakota were forced against each other, much like closing a vice. The rocks between the plates (or in the vice) were squeezed, or faulted and folded. The Rocky Mountains were formed. This was also accompanied by volcanic activity. Ash from volcanoes can be found near Valley City. The ash settled in a sea. Where we are now was once the central part of a large shallow sea that connected the Arctic Ocean to the Gulf of Mexico. Large reptiles such as *mosasaurs* swam in this sea. Their bones are found near Valley City. Bones of large flying reptiles, the *pterosaurs*, have also been found near Pembina. On the western edge of this sea, near Bowman and Marrmath, bones of several types of dinosaurs have been found, especially *Triceratops* and duck-billed dinosaurs.

Following the formation of the Rockies, erosion began. Small particles eroded from the base rock to form soil. The soil was washed down the mountains. These particles are called **sediment**. They spread out at the bottom of the mountains. The Great Plains were created.

The Great Plains were formed from clay, sand and silt from the surrounding mountains. The North Dakota Badlands were formed from sediment eroded from the Rockies. The sediment was transported by large rivers to be deposited on the broad floodplains. At this time the climate of western North Dakota was subtropical and crocodiles were present in the lakes and rivers.

BEFORE



Drainage pattern in North Dakota before the state was glaciated. All major streams drained northward into Canada.

AFTER



Modern drainage pattern in North Dakota. The Missouri River valley developed when north and east flowing streams were diverted along the margin of the glacier.

At this time most of the water in North Dakota flowed north into the Hudson Bay. See the maps of river flow that show the drainage patterns before and after the glaciers.

Then the Glaciers Came

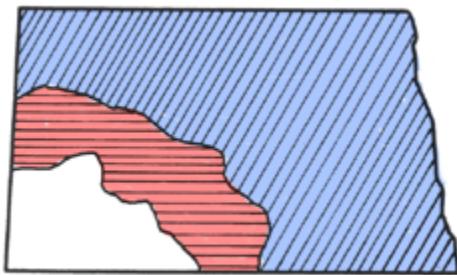
What do you think North Dakota looked like before the glaciers? Actually, it looked like the southwestern part of the state looks today. It had long steep slopes, low buttes and mesas.

Some land features still exist today that were present before the glaciers. They include:

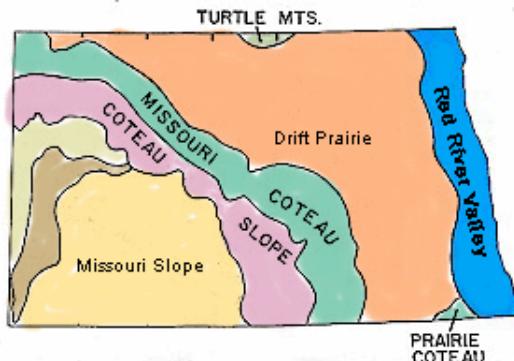
- The Turtle Mountains
- The Missouri Escarpment
- The Red River

When the glaciers advanced over the state, river drainage was blocked and changed. Some of the valleys were completely filled in with glacial sediment when the glaciers advanced over them. Others again became rivers and streams after the ice melted.

This map shows the part of North Dakota that was glaciated (shaded area). The diagonal pattern indicates the area that was glaciated during the most recent glacial period, the Wisconsin. The horizontal pattern indicates the area that has earlier glacial deposits at the surface.



GLACIER MAP



North Dakota Land Shape Today

North Dakota is located in the center of the North American continent. Rugby, located in the north-central part of the state, is the geographic center of North America.

The state is mostly flat or rolling land. Its elevation is highest in the western part of the state. From the west, it slopes downward gradually toward the Red River Valley in the east. Two factors shaped the state;

glaciers northeast of the Missouri River, and wind and water erosion southwest of the Missouri River.

North Dakota is divided into two areas:

1. The Central Lowlands in the east
2. The Great Plains in the west

The Central Lowlands

The Central Lowlands refers to an area of North Dakota where the original plant life was a tall grass prairie before the land was opened for farming. This area is also called the *Drift Prairie*. The Central Lowlands also includes:

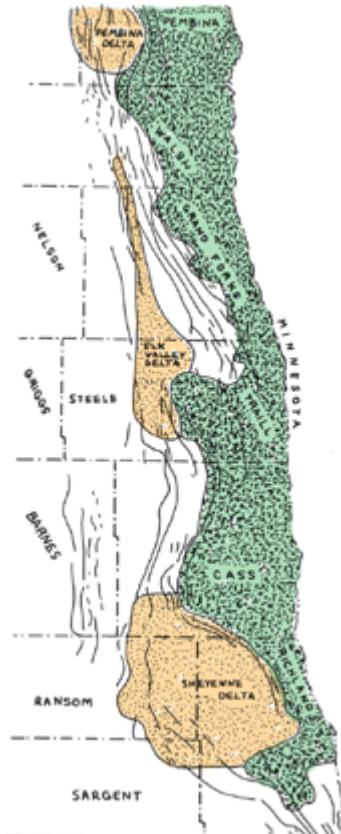
- The Red River Valley
- The Turtle Mountains
- The Prairie Coteau
- The Glaciated Plains
- The Missouri Coteau

The Red River Valley

The Red River Valley is 40 miles wide along the eastern border of the state. Rivers always flow from a point of high elevation to one of low elevation. The lowest point of the Red River is on the northern border of North Dakota where the river enters Canada.

This area is so flat because it used to be an old lake bottom. This old lake bottom is called Lake Agassiz. Lake Agassiz was formed as the glaciers melted. The water dammed up and formed the large lake. The lake covered parts of North Dakota and Minnesota and most of Manitoba.

Like many lakes, Lake Agassiz also had beaches. The beaches are sand and gravel. These beaches can still be found west of the Red River. The old beaches were laid down at different times as the lake raised and lowered.



The map shows the locations of the Lake Agassiz beaches (the lines), the areas of offshore lake sediment (green) and areas of delta deposits where rivers emptied into Lake Agassiz (gold).



The Red River Valley is very flat. It is some of the richest farm land in the country. The rich soil is from the river deposits of topsoil. Topsoil was eroded from other areas and washed down the river. The river deposited this soil along its course.

The river used to be several miles east into Minnesota. The river wore the land down until it reached very hard bedrock. Since it couldn't cut into the hard rock, it began to shift westward. The ground to the west was shale and sand, which are easier for water to cut through than hard bedrock.

Headwaters of the Red River of the North

The Pembina Escarpment

The western edge of the Red River is the Pembina Escarpment. An escarpment is the side of a cliff or ridge. This escarpment had springs in it. The springs wore down the walls of the escarpment. The walls got steeper and steeper. The river cut into it, moving it westward. The escarpment may have gotten sharper when the glaciers moved through the state.



The Pembina Escarpment

The Glaciated Plains

This area is made up of rolling hills except for the Turtle Mountains on the northern border and the Prairie Coteau region. A *coteau* is a flat-topped ridge. The plains were formed from the gradual melting of the glaciers. As glaciers moved over the land they scraped off the soil and rock and carried them along. Sometimes the glaciers took large chunks of bedrock. *Till* is the sediment that the glacier collects as it moves along.

When the glaciers melted, the dirt, rocks and sediment were left covering the land and the ice turned to water. At first the water was dammed up as Lake Agassiz. Then the water moved northward into the Hudson Bay. A **ground moraine** is the name for the gently rolling land that came from melting glaciers.

The glaciers also changed the streams in this area. The sediment deposited by the glacier covered the old streams. Now this area is buried in sediment. Instead of streams, this part of the state has many small lakes called *prairie potholes*.

The Prairie Coteau and the Turtle Mountains

These two areas are higher than the rest of the glacial plains. They were formed by a **dead ice moraine**. The Turtle Mountains and the Prairie Coteau were present before the glaciers. As the glacier moved, it cut pieces of rock and sediment out of the highlands. This rock and sediment was moved to the top of the glacier forming a layer over the glacier. This layer insulated the glacier. The glacier in the plains melted faster because it was not insulated. It took several thousand years longer for this part of the glacier to melt. When the dead ice melted, the land looked bumpier than the smooth plains.

The Missouri Escarpment

This steep cliff divides the Missouri Coteau from the Central Lowlands or Drift Prairie. It is believed to be the result of a *fault*. A fault is a break in the earth's crust. The blocks of rock beside the break slid upward, forming the Missouri Escarpment.

The Missouri Coteau

This coteau (flat-topped ridge) is a strip of land 30 to 50 miles wide. The land is bumpy, being made up of irregular plains and rounded hills. This land was also formed by a dead-ice moraine. Dirt and rocks covered the top of the glacier. The Missouri is the farthest west that any glacier came in our state.

The Great Plains

The Great Plains look much different from the rest of the state. This is the part of the state south and west of the Missouri River. Streams are present here. The glaciers did not dump sediment here to cover them. This land was shaped by wind and water erosion.

When the last glacier stopped, the debris it was pushing at its front left a **terminal moraine**. The debris left by the glacier blocked the rivers in the western part of the state so they could no longer flow north into Hudson Bay. The rivers had to find new paths. They cut a steeper and shorter path. The Missouri River's new path cut through the Badlands.

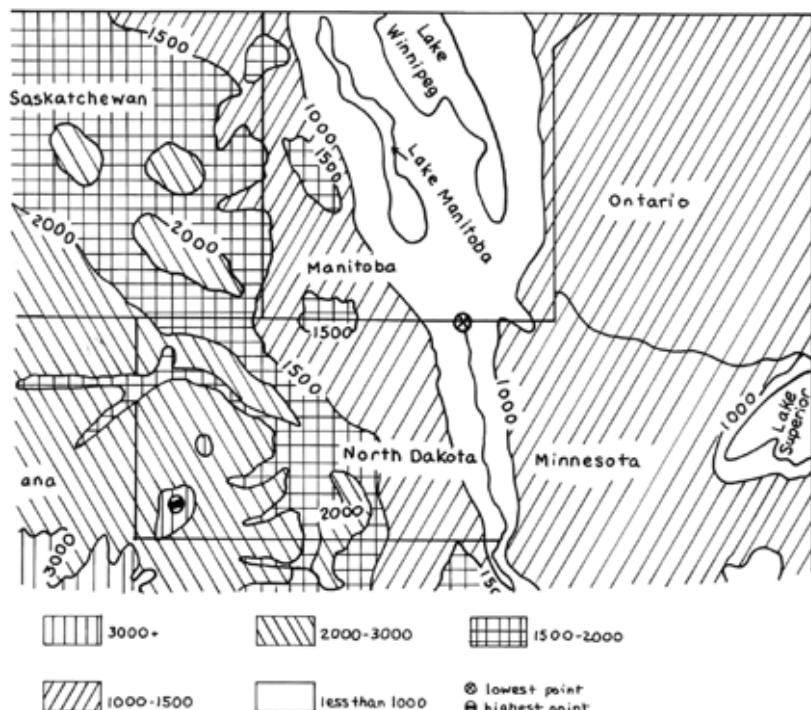
Coal and oil fields are found in this area. They were formed when plant and animal material broke down and was buried under a thick layer of sand.

Exercise

1. Match the following terms with their correct definition:

_____ Escarpment	A. Large, high flat-topped plateau with steep sides
_____ Butte	B. Smaller area than a mesa, but also has a flat top and steep sides
_____ Mesa	C. The side of a steep ridge or cliff

Map of the North Dakota elevations



The highest point in North Dakota is found in the Great Plains. It is White Butte. Can you find it on the map above? Mark it in color.

Challenge yourself to complete one or more of the following:

1. Make a topographic (landform) map of North Dakota. Include rivers and other features. You may draw a present day map or you may choose to show an earlier period.
2. Do a study of your area. What happened with glaciation and land form changes? If you live in an unglaciated area, document the effects of wind and water erosion.
3. Observe geological formations in your county. Write a report of your findings.