

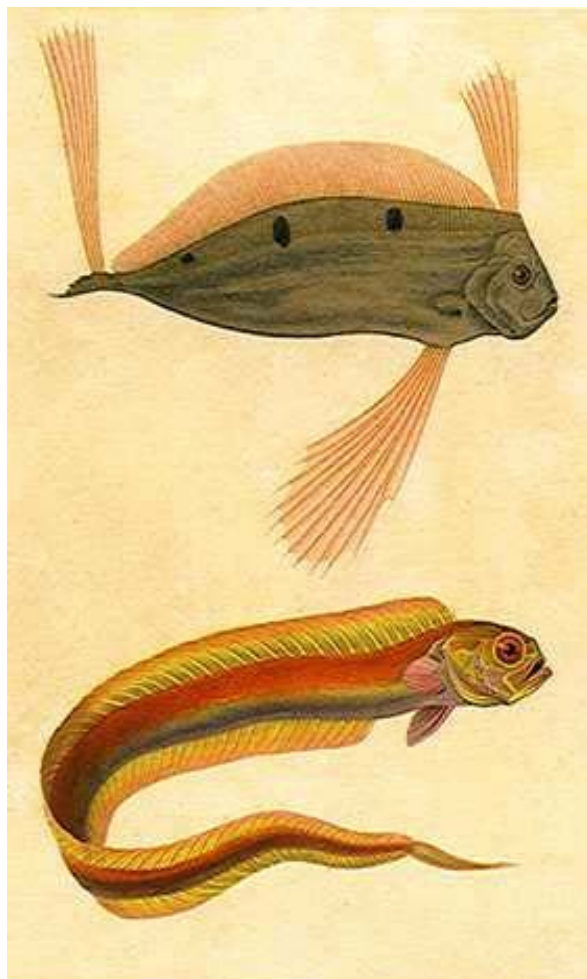
Fins & Scales

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Project Book

Name:

Club Name:



Age: _____ Years in 4H: _____

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Revised December 2006 by Vera Collins Lake County 4-H Secretary Available on line at <http://lake.ifas.ufl.edu/4-H/Projects.htm>

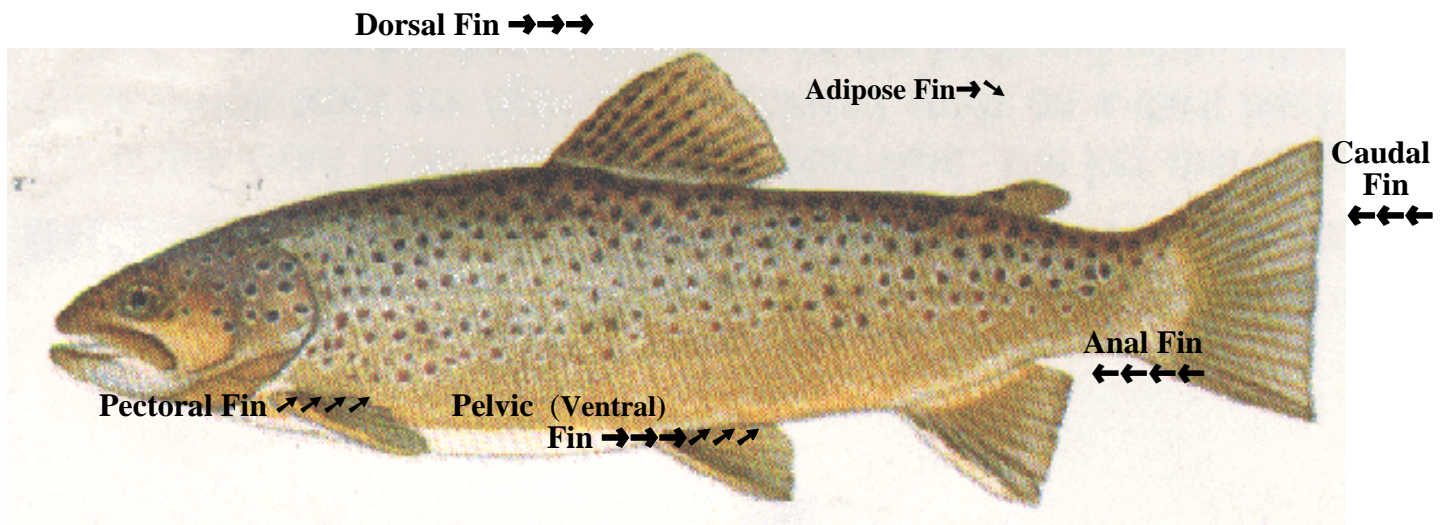
We gratefully acknowledge the assistance of Dr William Seaman, Jr., Florida Sea Grant College, and Dr Carter R Gilbert, University of Florida, for their technical advice in developing this publication.

FISH

A fish, as most people think, is a scaly animal that has fins and lives in the water. Bony fish have skeletons made of hard bone whereas fish such as sharks and rays have skeletons made of soft cartilage. For this activity we are concerned with bony fishes. Bony fish include: bass, trout, tarpon, catfish, herring, flounder, and swordfish. There are about 23,000 different kinds of bony fish.

FINS

The drawing below is not of any particular fish, but is rather a composite of fishes. Bony fishes have different kinds of fins for different purposes.

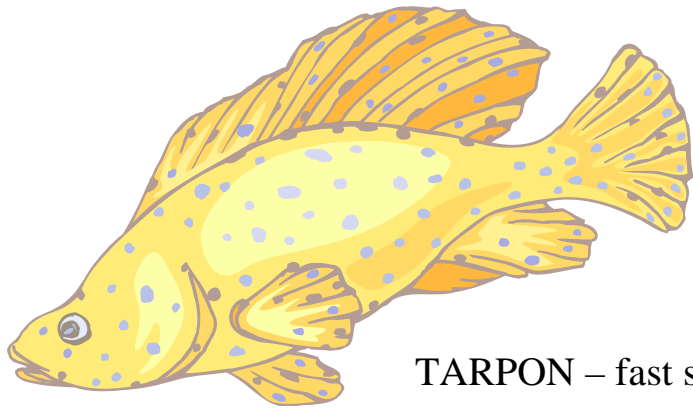


Dorsal fin – This is a single (not paired) fin located on the fish’s back. Some fish may have only one dorsal fin while others may have two or even three. In many bony fishes the dorsal fin has stout spines in the front to help give the fin support. The dorsal fin helps the fish in swimming as well as in protecting itself. It can protect the fish against larger animals by becoming erect and making it difficult for other animals to eat the fish. The triggerfish and filefish are good examples of fish that have well developed dorsal spines which help protect them from predators. The dorsal fin also acts as a stabilizer, much like the feathers on an arrow, so the fish can remain upright.

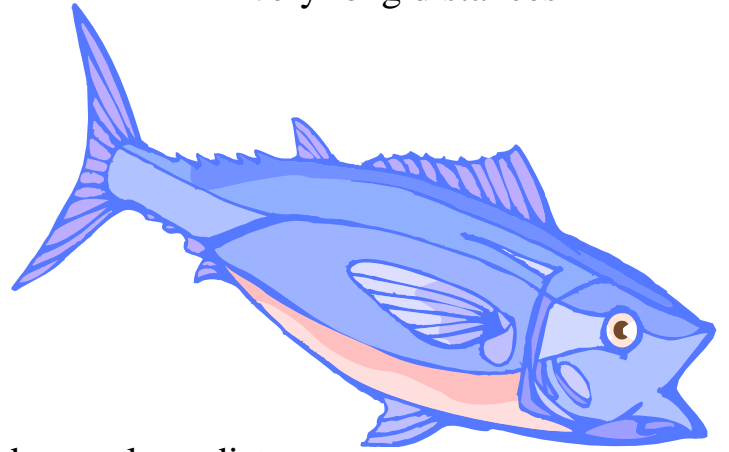
Adipose fin – This fin is found on such fish as the catfish and trout. It does not serve much of a purpose. It is probably just part of an ancient fin that was once found on the fish’s ancestors.

Caudal fin – Also called the tail fin, it helps in propelling the fish through the water. It has been shown, though, that this fin is not absolutely necessary in swimming. Experiments where the caudal fin was removed, proved that the fish continued to swim quite successfully. This is not to say, though, that the caudal fin does not play an important role in the fish’s ability in swimming. Without a caudal fin, a fish such as the tuna would not be able to swim at great speeds over long distances. The stout blunt tail of a grouper helps it in moving swiftly from one hole in a reef to another. Notice the various caudal fins on these fish, and how they help the fish.

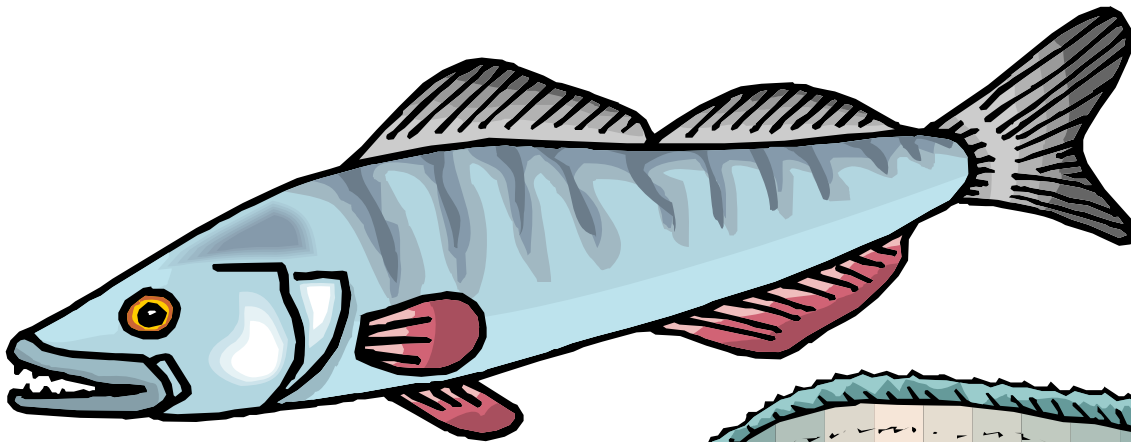
GROUPER -fast, short bursts of speed



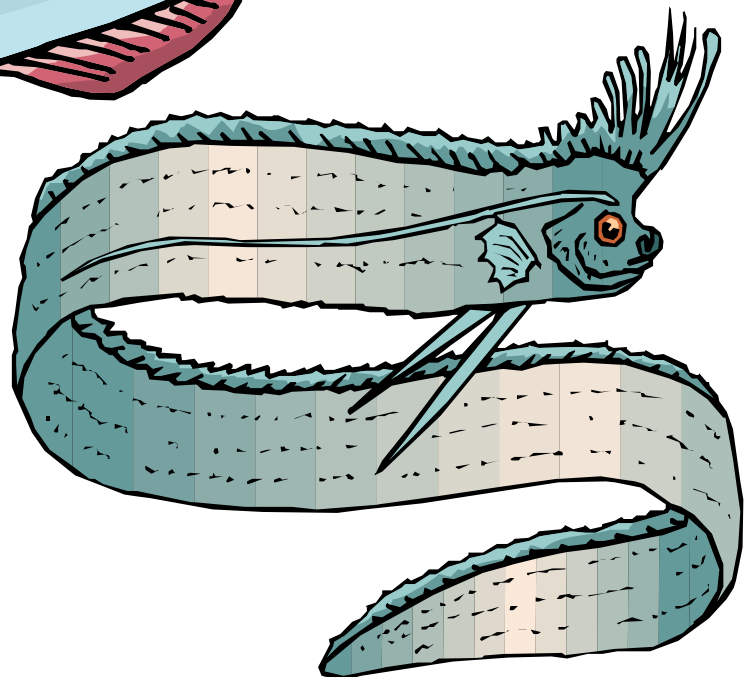
TUNA – very fast speeds over very long distances



TARPON – fast speeds over long distances

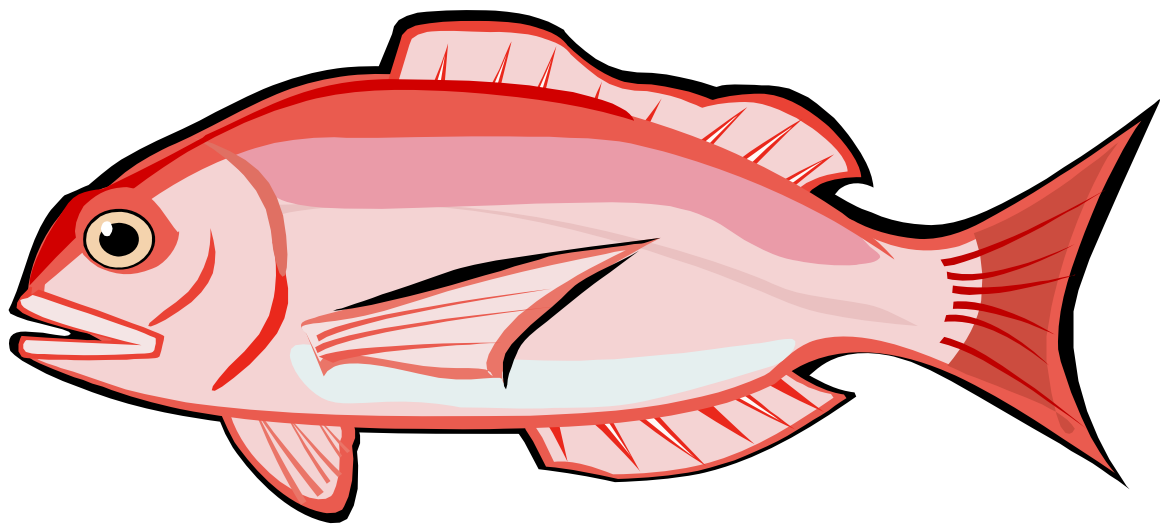


EEL – for swimming between rocks & crevices



Anal Fin – Like the dorsal and caudal fins, the anal fin is unpaired. This fin may not be present in some fish while on others it may be very long. The role of the anal fin is to help stabilize the fish while it is swimming. In some fish such as the triggerfish, the anal fin is used in sculling. This is necessary because the triggerfish has a rather rigid body and the wave like motion of the anal fin helps in propelling the fish through the water. In some live bearing fish (fish whose young are born alive) the anal fin of the male is modified into a gonopodium. The gonopodium is a long extension of the anal fin and is used in transferring sperm from the male into the female fish.

Pelvic (Ventral) fin – This fin is paired. There are always two pelvic fins, a right one and a left one. On some fish the pelvic fins may be way up front and very close to the fish's throat while on other fish they may be further back and very close to the anal fin. The pelvic fins are used in stabilization and for stopping. They are also used in sculling. In some fish, such as the cling fishes, the pelvics resemble a suction cup and help hold the fish onto rocks.



Pectoral fin – Like the pelvics, these fins are also paired. The pectoral fins are usually located on the side of the body near the fish's head. These fins are used in most fish for turning and sculling. If you watch a fish in an aquarium, notice that the pectoral fins scull back and forth in order to keep the fish in one position. As a fish “breathes”, water passes out the back of its gills. This tends to act as a jet propulsion moving the fish forward. The sculling action of the pectoral fins helps to counteract this jet propelling action and will keep the fish in one place. In flying fish the pectoral fins are enlarged for soaring in the air.

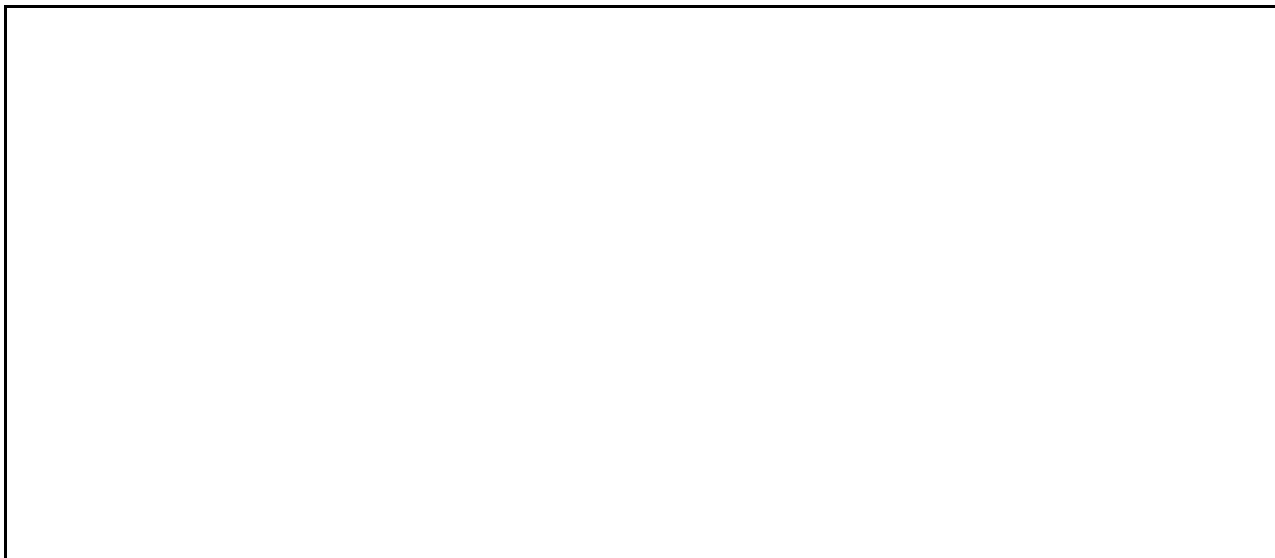
Activities



Go fishing and catch a fish.

In what kind of habitat does this fish live? In other words, where you caught your fish are there rocks, weeds, grass, mud, or sand on the bottom? Was it caught in deep water or shallow water? Was it caught in a bay, under a pier, near a sunken tree or someplace else?

Draw a picture of your fish with its fins spread out. Use the space below.



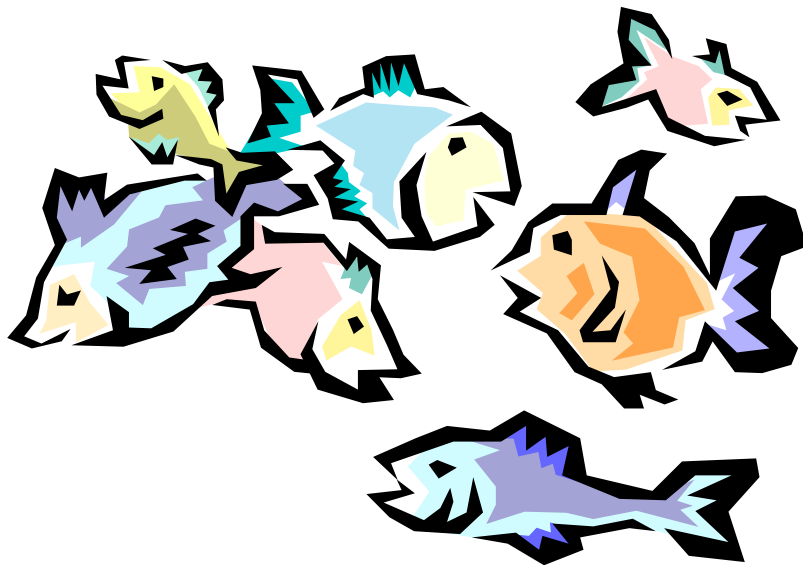
Label the fins on your drawing by writing the name of each fin beside the fin.

How would the fin/fins on the fish's back (dorsal fin) help this fish? _____

According to the type of tail fin (caudal fin) that this fish has, would it be a fast, moderate or a slow swimmer?

Would it swim in short bursts or would it be a long duration swimmer?

If there are pectoral fins on your fish, how would they help it?

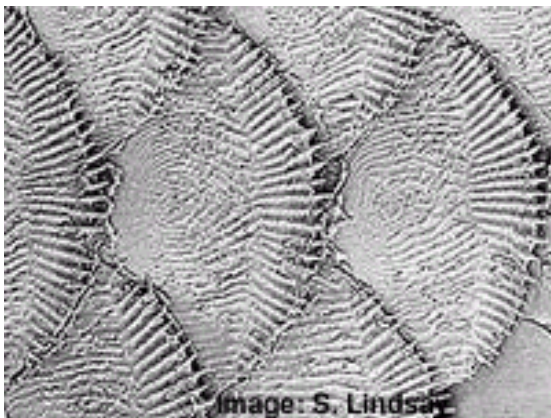


SCALES

Most fish have scales. Some fish such as catfish have no scales and are said to be “naked”. Other fish such as trout and freshwater eels have scales that are very small. The scales are so small on these fish that many people think that they are naked like the catfish. Scales are used for protection, much like our fingernails. Rather than protecting just a little part of the body, though, scales protect a large part of a fish’s body. Scales help protect a fish’s skin from being cut by sharp objects. Scales also have color pigments which give the fish its coloration. The scales along the side, which make up the lateral line, contain sensory receptors which enable the fish to detect wave vibrations in the water. That is how a fish hears.

There are three different kinds of scales that may be found on bony fish. A ctenoid (teen-oid) scale has small sharp spines on one end. A cycloid (syk-loid) scale is a smooth scale. A ganoid (gan-oid) scale is a thick platelike scale found on sturgeons and gars.

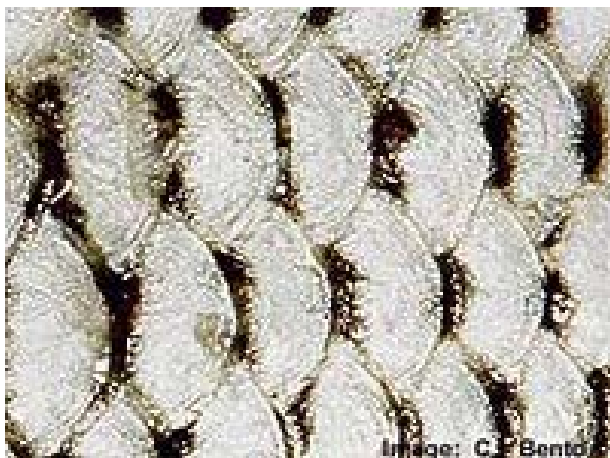
Ctenoid scales of a Paradise Fish



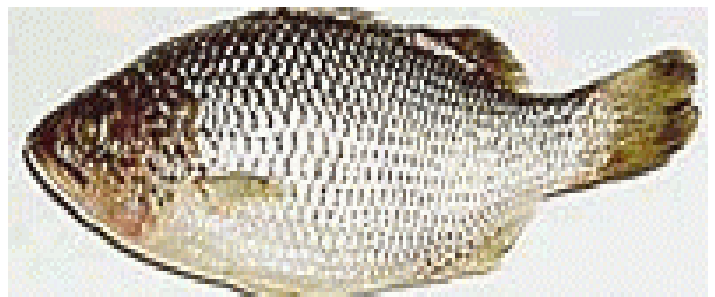
Paradise Fish



Cycloid scales of a Jungle Perch.



A Jungle Perch



Ganoid scales of a Florida Gar

A Florida Gar



Parts of a Scale – When a fish hatches, it has small scales covering its body. The center (focus) of an older fish's scale represents the scale when the fish was newly hatched. As the fish grows the scales get larger. Rather than growing smooth like our fingernails, scales produce small circular growth rings around themselves. These growth rings are called circuli. A fish grows faster in the summer and slower during the winter. Circuli formed during the summer are widely spaced. Circuli formed in the winter, however, are spaced very close together. A dark ring is formed where the circuli are spaced close together. The darker ring of circuli is called the annulus. The age of a fish can be determined by counting the number of annuli on its scales.

Determining Age – To determine the age of a fish, you must pull some scales off of its body. Two or three scales may be pulled from a live fish without hurting it. The best place to take scales, for age determination, is from under the fish's pectoral fin. The pectoral fin has a tendency to protect the scales and keep them from being lost. If a scale is lost, a new one will begin to grow back. If you count the annuli of a replacement scale you will find that it has fewer annuli than an original scale. By taking scales from under the pectoral fin you have a better chance of getting original scales. Also, to insure an accurate count of annuli, take at least three scales. Take one scale from under the left pectoral fin, a second one from under the right pectoral fin and a third from someplace else, such as the fish's back. If all three scales have the same number of annuli, you can be pretty sure that you have original scales.



Dried scale of a Barramundi
showing the growth rings or annuli.

Why Keep Records?

1. To have an account of all our 4-H accomplishments in one place.
2. Records point up the advantages and disadvantages of projects.
3. They reflect your interest as a 4-h member.
4. Records show self improvement and service to others.
5. To show others what you have done.
6. To train yourself for future work.

Tips for Record Keeping

7. Read the whole record book through now.
8. Tie a pencil on your record book.
9. Keep the book handy for you but out of reach of small children.
10. Keep your records up to date.
11. If you need more pages, make them yourself and fasten them in the book

Project goals: List your goals for taking this project (tell the things you wanted to do or learn in the project this year.)

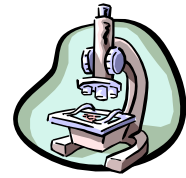
Knowledge and Skills: List the things you learned in this project and why you selected it.

Size and Scope: List things you did in your project.

Date	Activities performed or items produce, purchased, sold, etc.	Value	Expenses	Income	Profits

Opening Inventory \$ _____
 Expenses +\$ _____
 Closing Inventory - \$ _____
 Total Project Cost =\$ _____

Activities



Materials: Forceps, microscope

slides, silicon glue, microscope or 33mm, slide projector.

1. By using strong forceps remove three scales from your fish. One from under the left pectoral fin, a second from under the right pectoral fin and a third from the back area
2. Put one small drop of silicon glue at each of the four corners of a clean microscope slide. Place one, two or all three scales on the slide, if there is room. Allow room for the spreading glue when the second slide is placed on top. If the scales are large, three individual slide preparations will have to be made. Place a second microscope slide on top of the of the first and press firmly. Place a weight, such as a book, on top of the slides and allow at least one hour for the glue to dry.
3. Observe the scales under a microscope or by using a 33mm slide projector. If you use a slide projector, simply insert your slide scale preparation into the slot where the regular 33mm slides drop. This will allow the scale's image to be projected onto the screen.
4. Make a sketch of the three scales, on this sheet, illustrating the general features of the scales: Focus, Annuli, and Circul. If they are ctenoid scales, indicate the Ctenii (small spines).

1)	2)
3)	

Determine the age of each scale by counting the number of annuli. Write the age of each scale and the scale name.

Scale Name	AGE
1	
2	
3	

How could age determination of fishes be useful in fishery biology?

Why did you do this activity?

Who were the people that helped you with this activity?

List any books, references, magazines, etc. that you read on fish, scales, age determination in fishes or any other aspect of fish biology.

Project Summary

LEADERSHIP

List your accomplishments both in this project and as a member of your club, county council, etc.
Ex: participate in TLC as the delegate to District VIII meetings.

Date	Please Describe

COMMUNITY SERVICE

List in detail your individual or club community service accomplishments and the purpose for the service.
Ex: Our 4-H Club saw a need for a food drive & collected 200 items that were delivered to the needy.

Date	Activities and Events

PRESENTATIONS

List in ***detail*** the demonstrations, speeches, exhibits, workshops where you presented. Also list the topic of your presentation & the level at which you participated at.

Ex: County Events Demonstration - "How to prepare your Rabbit for Show" Check County

Date	Activity	Topic	Please check level				
			Individual	Club	Cnty	District	State

CLUB ACTIVITIES

What activities did you participate in with your 4-H Club.

Ex: Workshops, fair, field trips, judging trips

Date	Activities

NEWSPAPER Articles and/or Pictures of your 4-H Project

NEWSPAPER Articles are extra and will not be deducted.

If you or your 4-H club was in the newspaper please attach the article here.

For project pictures, be sure to include captions describing each photograph. If possible show ☺

The Beginning of your project ☺ work being done and ☺ your completed project.

(Minimum of 3 pictures). You may insert pages as needed.

