



Activity 12: Managing Salmon by Coded Wire Tags

Audience:

Adults and grades 5-12

Time:

30 - 45 minutes.

State Essential Learning Requirements

Science: 2.2, 3.2

Math: 5.3



Directions: Using Coded Wire Tags to Count Fish

- Describe with the overheads how fish biologists insert a coded wire tag in fish.
- Pass the coded wire tag plug around with a magnifier for students to take a close look.
- Demonstrate where in the head of the fish, using the plastic model, the coded wire tag is placed.
- Display the poster pictures and brief description of coded wire tags for students to study.
- Ask students to create their own poster with illustrations and descriptions on how coded wire tags are used to manage fish.

Extensions:

- What research questions would you answer using coded wire tags? Explain.

Directions: Break the Code

- Follow the instructions provided in the "Break the Code" Teacher Information sheet.
- Provide students with the "How to Read a Coded Wire Tag" information sheet and student activity sheets to practice decoding.
- Provide students with the table "Query: 1990-97 CWT Releases" to find out about their fish.
- Answers to activity sheet decoding are provided.

Overview:

Students will learn techniques in fish management to count fish by coded wire tags. Students will decode a simulated coded wire tag and find information about the fish from tables provided.

Objective:

- To describe how scientists count fish using coded wire tags.
- To read codes from coded wire tags, to learn about fish.

Critical Questions Addressed:

2. Endangered Salmon
3. Salmon Recovery

Background:

Available in Activity Packet 12 - Information Tent

Materials:

Available in Activity packet 12

- Coded wire tag disk
- Plastic fish head model with wire tag inserted.
- Overheads on wire tags.
- Poster description and pictures of coded wire tag process.
- Hatchery Diagram



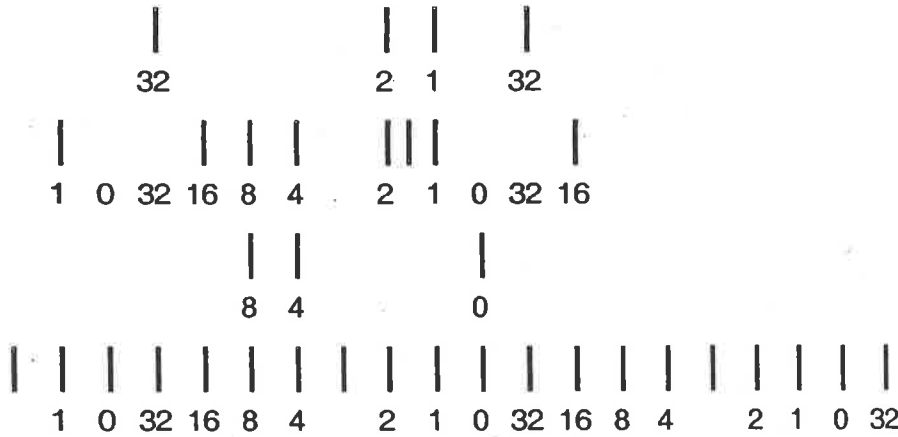
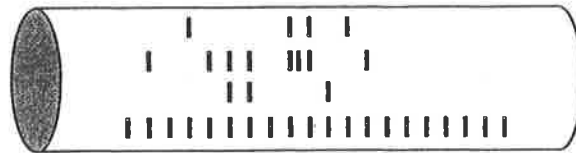
How to Read a Coded Wire Tag

How to read a coded wire tag

A coded wire tag has a number of indentations or notches that are placed in four separate rows, similar to a bar code. These notches are given values that are determined by what is called the "master row." The first step when looking at a tag is to find the "master row." The values and placements of the notches on the master row is the same on all coded wire tags used in Washington. The values and the locations of the notches on this row determine what the values are on the other three rows.

When a hatchery orders a spool of coded wire tagging, they receive a length of tagging with: *their code for the agency, the row with the master code, and then two unique codes* (the data 1 row and data 2 row) that are different from any other spool of tagging. A particular batch of fish tagged with this wire is the only batch of fish with this "final code." This "final code" gives access to all the information needed about a particular batch of fish.

To read the code you find the master row then determine what the values are for the data 1 row and the data 2 row by matching them with the values in the master row. You add up the values for each individual row (not including the master row since it is only used to determine the values of the notches for the other rows) and then each number is put in a sequence so that you can create the final code. *Note that you never count the same number twice when adding up the rows, only once.* The reason for this is that the wire material is a tiny wire that comes ready to cut like a spool of thread. The number pattern repeats so that it may be cut in various places and technicians will be able to read the code no matter where it is cut because the numbers are assigned by the master row. For this particular pattern, the number pattern/order is 32,16,8,4,2,1,0...and then the pattern starts all over again. The additions of the numbers total to 63.



Data 2 code =
 $32 + 2 + 1 = 35$

Master code
 (no value, just designates values)

Data 1 code =
 $8 + 4 + 0 = 12$

Agency code =
 $1 + 0 + 32 + 16 + 8 + 4 + 2 = 63$

Agency code	Data 1 value	Data 2 value	
Final code:	63	12	35

To create the final code and thus receive all the information on that particular batch of fish you must put the added values for each row in a certain sequence. For this example the final code is 63-12-35, the order is the agency value, the data 1 value and finally the data 2 value. **After you figure out the code, you can determine the information laid out on the following sheets.**



Break the Code

Student Activity Number 1

Student Assignment : BreAk THE CODE worksheet # 1

Name

Date

Teacher

Directions:

Read the "How to read a coded wire tag" paper

Break the code for the following notches

After you find the code, find your fish in the following fish query data

Locate the following information: Species, Brood year, Hatchery, Release site, Release Stage, Weight

Data 2 code



Master code



Data 1 code



Agency code





Break the Code

Student Activity Number 2

Student Assignment : BreAk THE CODE worksheet #2

Name _____

Date _____

Teacher _____

Directions:

Read the "How to read a coded wire tag" paper

Break the code for the following notches

After you find the code, find your fish in the following fish query data

Locate the following information: Species, Brood year, Hatchery, Release site, Release Stage, Weight

Data 2 code



Master code



Data 1 code



Agency code





Break the Code

Student Activity Number 3

Student Assignment : BreAk The CODE worksheet #3

Name _____

Date _____

Teacher _____

Directions:

Read the "How to read a coded wire tag" paper

Break the code for the following notches

After you find the code, find your fish in the following fish query data

Locate the following information: Species, Brood year, Hatchery, Release site, Release Stage, Weight

Data 2 code



Master code



Data 1 code



Agency code





Break the Code

Student Activity Number 4

Student Assignment : BreAk The CODE worksheet #4

Name _____

Date _____

Teacher _____

Directions:

Read the "How to read a coded wire tag" paper

Break the code for the following notches

After you find the code, find your fish in the following fish query data

Locate the following information: Species, Brood year, Hatchery, Release site, Release Stage, Weight

Data 2 code | | |

Master code | | | | | | | |
1 0 32 16 8 4 2 1 0 32 16

Data 1 code | | |

Agency code | | | | | | | | | | | | | | | | | | | | | |



Break the Code

Student Activity Number 5

Student Assignment : BreAk The CODE worksheet #5

Name

Date

Teacher

Directions:

Read the "How to read a coded wire tag" paper

Break the code for the following notches

After you find the code, find your fish in the following fish query data

Locate the following information: Species, Brood year, Hatchery, Release site, Release Stage, Weight

Data 2 code



Master code



Data 1 code



Agency code





Break the Code

Teacher Information

Break The Code!—Teachers

Name: _____

Date: _____

Teacher: _____

Summary:

Students will read the "How to read coded wire tags" paper and will figure out the code in the activity so that they may find the information about the fish that has that particular code. (5 different codes are available for the same activity)

Objective:

Students will learn the concept of reading coded wire tagging and apply it the way the scientists do once they figure out the code. They will learn what kind of information can be found once the "code" is discovered.

Background:

Coded wire tagging is an integral part to tracking a particular group of fish. By tagging a group of young fish we can identify where they go and where they came from once they are caught. We can also track the survival of the group throughout the various life stages. We use this information to understand fish migration habits and the survival patterns from one life stage to the next.

Break the Code! Activity Answer Sheet

Answer for Activity Sheet #1: Final Code: 63-33-09

Data 2 code = 9

1	0	32	16	8	4	2	1	0	32	16	8	4	2	1	0	32	16
1	0	32	16	8	4	2	1	0	32	16	8	4	2	1	0	32	16
1	0	32	16	8	4	2	1	0	32	16	8	4	2	1	0	32	16

Data 1 code = 33

Agency code = 63

Species: Spring Chinook
Brood year: 1988
Hatchery: Hoodsport
Release Site: Finch Creek
Stage Released: Smolt
Weight: 75.60 grams

Answer for Activity Sheet #2: Final Code: 63-14-21

Data 2 code = 21

1	0	32	16	8	4	2	1	0	32	16	8	4	2	1	0	32	16
1	0	32	16	8	4	2	1	0	32	16	8	4	2	1	0	32	16
1	0	32	16	8	4	2	1	0	32	16	8	4	2	1	0	32	16

Data 1 code = 14

Agency code = 63

Species: Summer Steelhead
Brood year: 1989
Hatchery: Lyons Ferry
Release Site: Lyons Ferry
Stage: smolt
Weight: 82.50 grams

Answer for Activity Sheet #3: Final Code: 63-34-03

			Data 2 code=03
	2 1 0		
			Master code
1 0 3216 8 4	2 1 0 3216		
			Data 1 code=34
32	2 0		
1 0 3216 8 4	2 1 0 3216 8 4	2 1 0 32	
			Agency code=63

Species: Coho
 Brood year: 1989
 Hatchery: Bingham Creek
 Release Site: Bingham Creek
 Stage Released: smolt
 Weight: 26.68 grams

Answer for Activity Sheet #5: Final Code: 63-37-22

			Data 2 code = 22
	16 4 2		
			Master code
1 0 3216 8 4	2 1 0 3216		
			Data 1 code = 37
32	4 1		
1 0 3216 8 4	2 1 0 3216 8 4	2 1 0 32	
			Agency code = 63

Species: Fall Coho
 Brood year: 1989
 Hatchery: Grays River
 Release Site: Grays River
 Stage: smolt
 Weight: 32.40 grams

Activity Sheet #4: Final code: 63-13-44

			Data 2 code=44
	32 8 4		
			Master code
1 0 3216 8 4	2 1 0 3216		
			Data 1 code=13
8 4	1		
1 0 3216 8 4	2 1 0 3216 8 4	2 1 0 32	
			Agency code=63

Species: Coho
 Brood year: 1988
 Hatchery: Westport
 Release Site: Westport Boat Basin
 Stage: smolt
 Weight: 44.04 grams