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# FISHERIES AND MARINE SCIENCE

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2023-2025

## Purpose

Fisheries and Marine Sciences has the responsibility to prepare students to enter careers in aquaculture and fisheries industries. The purpose of the marine science and technology career development event is to foster student interest, promote instruction in mariculture and career safety, and provide recognition for those who demonstrate skills and competencies as a result of marine science and technology education.

## Event Rules

We recommend you review the complete rules, policies and procedures relevant to all Alaska FFA Career and Leadership for Development Events as found in the Guide to CDE and LDE Policies and Procedures.

- Participants must come to the event prepared to work in adverse weather conditions. The event will be conducted regardless of the weather. Participants should have rainwear, swimwear, towels, warm clothes and appropriate footwear.
- Under no circumstance will any participant be allowed to handle any of the items in the identification portion of the practicums. Any infraction of this rule will be sufficient to eliminate a team from the event.
- Participants will be assigned to group leaders who will escort them to various event-staging sites. Each participant is to stay with his or her assigned group leader throughout the event or until told to change leaders by the event superintendent.

## Event Format

### Equipment

Teams will be notified before the state event if they will be required to provide the following:

- Computers

Participants must use tools and equipment furnished at the event, unless otherwise cleared beforehand. Equipment that will be provided:

- A clipboard
- Sharpened No. 2 Pencils
- All other tools and equipment
- Immersion suits & other safety equipment
- Rope for rope tying & net mending materials
- Scales & Tape Measures

### **Team Presentation (400 total points)**

Teams will be required to develop an oral and written presentation that addresses the questions of an annual scenario. Scenario category will be announced at least 3 months prior to the state event to allow students to study topics in those areas in preparation. They will have 30 minutes to research (with a provided computer) and create their presentation, 5 minutes to present to the judges, with 5 minutes of questions following. Students will be provided a scenario that deals with a marine science and technology problem in the following areas:

#### *Oceanography/Biology*

- Distribution & abundance of marine life
- Adaptions of marine life
- Estuarine environment
- Ocean acidification

#### *Aquaculture/Mariculture*

- Fish & shellfish practices
- Environmental responsibility
- Aquatic plants
- Disease outbreak

#### *Fisheries*

- Fisheries production & management
- Long-term sustainable harvest
- Marketing practices
- Education

### **Team Water Activity (200 total points)**

Students will be expected to safely put on immersion suits, jump into a swimming pool, get into a formation and swim one lap. This event is timed, scores will be based on their time to complete a lap.

Safely putting on suit & entering water (100 points)

Team formation and Lap swim Time (Points assigned by time\*, up to 100 points)

\*Team formation & Lap Time points will be assigned by 5 points.

Ex: 1<sup>st</sup> place = 100 points, 2<sup>nd</sup> place = 95 points, and so on. Ties will get the same point amount.

## **Individual Activities**

### *Written Exam – 60 minutes (100 points)*

The written exam will consist of fifty objective questions to test participant's understanding of basic biological and scientific principles of producing and marketing an aquaculture product. Question format can include multiple choice, matching, and/or true-false.

### *Identification – 60 minutes (100 points)*

Students will identify fifty items. These may be physically present or pictures from the following areas:

- Equipment
- Aquatic species
- Zooplankton species
- Aquatic Plants

## **Annual Practicums**

Three of the following will be selected for annual practicums.

### *Salmon Egg Counting – 20 min (50 points)*

- Utilizing a graduated cylinder to volumetrically count fish eggs. Hatcheries take regular inventory of eggs and their survival, making the ability to estimate egg numbers a vital procedure.

### *Fisheries Business Problem – 20 min (50 points)*

- Students utilize knowledge of business practice and economics to determine total income, cost, wages, and total profit or loss, permitting, and more. General topic may be announced ahead of the event.

### *Knot Tying - 20 min (50 points)*

- Cords are provided and students must correctly tie knots that are regularly used around boats and fisheries.

### *Mayday Call - 20 min (50 points)*

- Calling out the five essential information statements that must be included in a mayday call. This practicum can be written or simulated.

*Net Mending - 20 min (50 points)*

- Properly trimming and repairing a hole in a fishing net.

*Piper's Loading Computation - 20 min (50 points)*

- Calculating the number of juvenile fish that can be carried in a hatchery rearing tank. Piper's equation factors are water temperature, size of fish (length), and the amount of water flowing.

*Disease Treatment – 20 min (50 points)*

- Students are presented with images or a live specimen of a fish or invertebrate that is infected with a disease. They must identify the disease, pathogen type, and a possible treatment option.

*Measuring & Weighing – 20 min (50 points)*

- Accurately measuring estimating the weight of 3 specimens of fish or other invertebrates.

## Scoring

Event participants are evaluated as follows:

Activity	Individual Points	Total Team Points
Written Exam	100	400
Identification	100	400
Annual Practicums (3 of the following)- 50 pts each a. Salmon Egg Count b. Fisheries Business c. Knot Tying d. Mayday Call* e. Net Mending f. Piper's Loading Comp g. Disease Treatment h. Measuring & Weighing	150	600
Team Presentation		400
Team Activity		200
<b>Total Possible Points</b>	<b>350</b>	<b>2000</b>

\*5 extra points may be earned on the Mayday Call

## Awards

Awards will be presented at the awards ceremony to individuals and teams based on ranking.

### Tiebreakers

#### *Team*

- Highest team activity score
- Highest combined practicum score
- Highest combined ID score

#### *Individual*

- Highest Exam score
- Highest practicum score
- Highest ID score

## References

This list of references is not all-inclusive. Teachers are encouraged to make use of the best instructional materials available. The following list contains references that may be helpful during preparation for the event.

- Past CDE materials available on Google Drive.
- [Commercial Salmon by Fishery, Alaska Department of Fish and Game](#)
- [What kind of fishing boat is that? \(alaska.gov\)](#)
- [Parasites and Diseases in Alaska - by Disease, Alaska Department of Fish and Game](#)
- [Net Mending.pdf \(netsandmore.com\)](#)
- [List of Boating Knots to Know According To Their Uses \(101knots.com\)](#)
- [Aquaculture | USDA](#)
- [Aquaculture | Powered by Box](#) FFA Aquaculture-Teaching resources
- [KBNERR-Phytoplankton-Guide-2021.pdf \(alaska.edu\)](#)
- [Relative Weight Measuring](#)

# Identification List

## Equipment

1. Salinity Refractometer
2. Van Dorn Water Sampler
3. Marlin Spike
4. Net Mending Needle
5. Plankton Net
6. Stemple Pipette
7. Lantern Net
8. Tumbler/Washer
9. Longline Snap
10. Longline
11. Ganglion
12. Plankton Counting Wheel
13. Plankton Counting Chamber
14. Dip Net
15. Vernier Caliper
16. Graduated cylinder
17. Hatching jar
18. Oyster Trays
19. Circle Hook
20. Sechii disk
21. Personal Flotation Vest
22. Safety Immersion Suit
23. Flare Gun
24. Survival Craft
25. Fire Extinguisher
26. Shucking Knife
27. Measuring Board
28. Harpoon
29. Stow Net
30. Seine Net
31. Lift Net
32. Round trap
33. Rectangular trap
34. "D" Trap
35. Caribbean Traps
36. Trawler
37. Gillnetter
38. Purse Seiner
39. Jig Fisher
40. Troller

## Juvenile Aquatic Species

41. Pink Salmon
42. Chum Salmon
43. Coho Salmon
44. Chinook Salmon
45. Sockeye Salmon
46. Walleye Pollock
47. Pacific Herring

## Zooplankton Species

48. Pteropod
49. Harpacticoid copepod
50. Clam umbo veliger
51. Periphylla periphylla
52. Beroe abyssicola
53. Calanus glacialis

## Phytoplankton Species

54. Asteromphalus
55. Cerataulina
56. Corethron
57. Ditylum brightwellii
58. Fragilariopsis
59. Guinardia
60. Lauderia
61. Licmophora
62. Melosira
63. Navicula

## Marine Plant Species

64. Giant Kelp
65. Feather Boa Kelp
66. Seaweed
67. Fire Algae
68. Blue green algae
69. Green Algae
70. Red Algae
71. Sea grass
72. Manatee grass
73. Sea lettuce
74. Eelgrass
75. Kombu
76. Alaria

## Adult Aquatic Species

77. Pink Salmon
78. Chum Salmon
79. Coho Salmon
80. King Salmon
81. Chinook Salmon
82. Sockeye Salmon
83. Walleye Pollock
84. Black Rockfish
85. Yelloweye Rockfish
86. Pacific Halibut
87. Sablefish
88. Cod
89. Lingcod
90. Atka Mackerel
91. Yellowfin Sole
92. Flathead Sole
93. Rock Sole
94. Greenland Turbot
95. Alaska Plaice
96. Arrowtooth Flounder
97. Pacific Herring
98. Blue King Crab
99. Golden King Crab
100. Red King Crab
101. Dungeness Crab
102. Tanner Crab
103. Pink Shrimp
104. Coonstripe Shrimp
105. Spot Shrimp
106. Sidestripe Shrimp
107. Geoduck Clam
108. Razor Clam
109. Littleneck Clam
110. Sea Cucumbers
111. Red Urchin
112. Green Urchin
113. Pinto Abalone
114. Octopus
115. Squid

## Diseases

116. Aeromonas
117. Argulus (fish louse)
118. Capriniana
119. Chilodonella
120. Cold Water Disease
121. Dropsy
122. Egg Fungus
123. Episyllis
124. Gill Flukes
125. Ichthyophthirius
126. Lernaea (Anchor worm)
127. Monogeneans
128. Nematodes (Roundworms)
129. Psuedomonas
130. Septicemia
131. Shell Disease
132. Swim Bladder Disease
133. Trichodina
134. Vibrosis
135. Whirling Disease



# Team Presentation

400 Points

Name \_\_\_\_\_

Chapter \_\_\_\_\_

Indicator	Very strong evidence of skill (5-4 points)	Moderate evidence of skill (3-2 points)	Weak evidence of skill (1-0 points)	Weight	Total Points
<b>Written Statement/Poster</b>					
Writing Convention	Information is thoroughly & clearly reported. Grammar and spelling are high quality, less than 2 errors. Concise information presented.	Ideas are stated with some supporting detail, although without clear construction. Grammar and spelling are adequate. Less than 5 errors.	The message is difficult to understand. The main idea is not supported with details. Lack of grammar and correct spelling throughout.	x	
Analysis	Addresses the problem at hand & conveys viable solutions. Subject knowledge is excellent.	Addresses the problem at hand, but solutions may not be as clear or viable. Subject knowledge is average.	No specific focus on the problem. Factual errors are evident	x	
Design	Design expresses high levels of creative ability and advance design technique.	Design expresses some creative ability & minimal advanced design.	Design lacks creative ability and demonstrated limer design technique.	x	
<b>Presentation</b>					
Communication	Speaks articulately, without hesitation. Confidence, poise, & eye contact; excellent use of grammar. Oral communication enhances entire presentation.	Speaks articulately, but sometimes hesitates. Some problems with eye contact and grammar are average. Occasionally has need for long pauses and moderate hesitation.	Speaks articulately, but with frequent hesitancy. Long, awkward pauses while speaking. Reads from notes and rarely looks at judges. Has problems with grammar.	x	
Participation	All members participated equally.	The majority of the group took an active role.	All members did not participate equally, obvious weak individuals.	x	
Questions & Answers	Knowledge is evident and provides clear, concise well-thought out answers to questions.	Provides answers that are somewhat unclear and at times do not answer the questions.	Seems caught off-guard by questions and either does not answer the questions or provides a rambling answer.	x	
				<b>Total Points</b>	

# Mayday Call Rubric

50 Points

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Name \_\_\_\_\_

Chapter \_\_\_\_\_

The following are the 5 essential information statements that must be included in a mayday call. Students will receive 10 points/statement. If the 6<sup>th</sup> statement is included, students can receive an extra 5 points.

1. Mayday Mayday Mayday \_\_\_\_\_

2. Name of the boat given at least three times \_\_\_\_\_

3. Location. \_\_\_\_\_

Ex: 10 Nautical miles due west of Cape Constantine, Bristol Bay

4. Condition of the vessel. \_\_\_\_\_

Ex: Taking on water, sinking quickly, etc.

5. Description of vessel. \_\_\_\_\_

Ex: 58-foot limit seiner, white hull, green decks, etc.

6. How many persons on board & survival equipment available. \_\_\_\_\_

Ex: Eight people on board, suits for all, inflatable life raft, flares, etc.

\_\_\_\_\_  
Total Points

## Net Mending Rubric

50 Points

Name \_\_\_\_\_

Chapter \_\_\_\_\_

Criteria	Points Possible	Points Earned
Student Properly trimmed threads around the hole.	6	
Student began knot at the correct location with a high-quality knot.	10	
Proper sequence in completing the repair was followed.	12	
Quality knots used throughout the process. Proper knots and evidence of slippage.	10	
Ending knot location is correct.	6	
High quality repair with proper side lengths if each web. Webs are not too long or too short.	6	
<b>Total Points</b>	50	

# Knot Tying Rubric

50 Points

Name \_\_\_\_\_

Chapter \_\_\_\_\_

Before the event, judges should select three of the following nautical knots to be tied by students.

Bowline

Cleat Hitch

Clove Hitch

Rolling Hitch

Anchor Hitch

Overhand

Sheet Bend

Stevedore

Figure 8

Marlinspike Hitch

Round turn/2 Half Hitches

Handcuff Knot

Square/Reef

Scaffold

Criteria	Points Possible	Points Earned
Knot # 1 identified & tied correctly.	14	
Knot #2 identified & tied correctly.	14	
Knot #3 identified & tied correctly.	14	
Knot labelled with student name and chapter.	8	
<b>Total Points</b>	<b>50</b>	

# Disease Treatment Scorecard

50 Points

Name \_\_\_\_\_

Chapter \_\_\_\_\_

Directions: You will be presented with an image or live specimen of a fish or invertebrate that is infected with a disease. A list of potential diseases can be found at the bottom of the scorecard. Please identify the disease, the pathogen type, and a possible treatment option.

	Points Possible	Points Earned
Disease	25	
Infection Type	5	
Treatment	20	
<b>Total Points</b>	50	

## Diseases

Aeromonas

Argulus (fish louse)

Capriniana

Chilodonella

Cold Water Disease

Dropsy

Egg Fungus

Episylis

Gill Flukes

Ichthyophthirius

Lernaea (Anchor worm)

Monogeneans

Nematodes

(Roundworms)

Psuedomonas

Septicemia

Shell Disease

Swim Bladder Disease

Trichodina

Vibrosis

Whirling Disease

**AQUACULTURE & FISHERY RESOURCES CDE  
IDENTIFICATION SCORECARD – 100 points**

Participant Name \_\_\_\_\_ Chapter Name \_\_\_\_\_

**Directions:**

Identify fish, invertebrate, and plant specimens by writing the correct sample number in the appropriately numbered spaces below.

1 _____	26 _____
2 _____	27 _____
3 _____	28 _____
4 _____	29 _____
5 _____	30 _____
6 _____	31 _____
7 _____	32 _____
8 _____	33 _____
9 _____	34 _____
10 _____	35 _____
11 _____	36 _____
12 _____	37 _____
13 _____	38 _____
14 _____	39 _____
15 _____	40 _____
16 _____	41 _____
17 _____	42 _____
18 _____	43 _____
19 _____	44 _____
20 _____	45 _____
21 _____	46 _____
22 _____	47 _____
23 _____	48 _____
24 _____	49 _____
25 _____	50 _____

**Score** \_\_\_\_\_  
**/100 points**

**Scoring Directions:**

Each fish, invertebrate, and plant specimen is worth 2 points. Deduct total incorrect from 100 points possible and record the score at the bottom of the card.

# Weighing & Measuring Scorecard

50 Points

Name \_\_\_\_\_

Chapter \_\_\_\_\_

Directions: With given aquatic specimens, please determine the approximate length and weight.

## Specimen #1

	Points Possible	Points Earned		Points Possible	Points Earned
Length	8		Weight	8	
Total Points (16 possible)					

## Specimen #2

	Points Possible	Points Earned		Points Possible	Points Earned
Length	8		Weight	8	
Total Points (16 possible)					

## Specimen #3

	Points Possible	Points Earned		Points Possible	Points Earned
Length	8		Weight	8	
Total Points (16 possible)					

Total Score \_\_\_\_\_

/50 points