FA172

UF UNIVERSITY of FLORIDA
IFAS Extension

Teach Aquaculture Curriculum: What Makes a Good Fish Food?[1]

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This is Activity 22 in a series of 24 in the Aquaculture Curriculum.The introduction to this series is available at http://edis.ifas.ufl.edu/FA172.

Abstract:

Today, many people are health conscious. We are more aware of what is in our food now than we were over the past decade. Have you ever wondered what is in the food your companion animals (pets) eat? How about the fish in your fish tank: what is the best food for them to eat? In the class activity, students will examine the water stability of different fish foods and what makes a fish food economical. During this activity your students will learn the answers.

Students will have an opportunity to learn about the composition of fish foods. They will be challenged to explain why the common ingredients in fish food are important and what benefits and problems are associated with feeding fish. By examining several real world examples of animal food from local sources (dog or cat food vs. fish food) students will use their abilities to compare and contrast. Finally, they will use a list of ingredients and formulate a nutritionally complete fish food. Students will formulate an economical diet. This exercise will test students' abilities to think creatively and understand fish food design. The exercise emphasizes the need to be both effective and economical.

Objectives: Student will be able to:

1.Summarize the importance of common ingredients in fish food.

2.Design a fish food.

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3.Measure water stability.

4.Relate water stability to fish nutrition, fish production, and the environment.

5.Compare and contrast key ingredients of two feeds.

Describe key ingredients to meet nutrient needs of aquatic animals and terrestrial animals.

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6. Describe key ingredients to meet nutrient needs of aquatic animals and terrestrial animals.

Grade Level:

9–12

Subject Area:

Aquaculture, Nutrition

Time:

45 minutes + introduction/discussion time

Student Performance Standards (Sunshine State Standards):

03.01 Employ scientific measurement skills (SC.912.E.7.8; SC.912.L.14.4; MA.912.S.3.1, 2; MA.912.S.4.2; MA.912.S.5.1, 2, 3, 4, 5).

06.01 Explain the economic importance of animals and the products obtained from animals (LA.910.1.6.1, 2, 3, 4, 5; SC.912.L.17.11, 12, 13, 15, 16, 17, 18, 19; SC.912.L.17.18; SC.912.N.4.2, MA.912.D.4.1).

11.07 Determine why aquatic crops may be more productive than terrestrial crops (LA.910.1.6.1, 2, 3, 4, 5; SC.7.L.10.2, 3; SC.7.L.11.2, SC.912.L.14.7).

11.10 List and describe the major factors in the growth of aquatic fauna and flora (LA.910.1.6.1, 2, 3, 4, 5; SC.7.L.17.1, 2, 3).

15.05 Determine feeding methods and feed aquaculture species (LA.910.1.6.1, 2, 3, 4, 5; MA.912.A.1.4).

Interest Approach:

Begin the class with any current story in the news that involves commercial fishing, declining fish populations or general fish nutrition. There are always some! Review the storyline with your students and discuss the importance of fish for feeding people. Make sure you discuss the fact that wild fish populations are declining and won't be able to feed the world population in the near future. Aquaculture production must supply the need for fish in the future. However, for aquaculture to be sustainable, we must feed fish protein and lipids (or fats) from sources other than fish and fish oil whenever we can. At this point introduce the foods that companion animals and aquacultured fish eat: corn, soybeans, wheat, and other products we don't think of as "fish food." This will serve as an excellent segue into the diet-making and fish feed composition activities.

Student Materials:

1. Pencil

2. Paper

3. Calculator

Teacher Materials:

At end of document in Table 1.

Student Instructions:

1. Following the *Feeds and Nutrition PowerPoint* presentation http://irrec.ifas.ufl.edu/teachaquaculture/curriculum/6nutrition.php, examine an ingredient label from a commercially made fish food.

2. Explain why the common ingredients in fish food are important to local aquaculture production.

3. List the ingredients of a commercially made fish food and those of cat food, or dog food, and compare the two lists.

Teacher Instructions:

A. LABEL COMPARISON

***Preparations*:**

1. Begin a discussion by having students list common ingredients in their own food and then proceed to list ingredients in animal foods. (Perhaps have them bring in a label from an animal food from home.)

***Activity*:**

1. Provide students with a handout with a written description of a fish diet, or have them examine several feed ingredient labels for common fish foods (obtainable from a pet store).

2. As the students examine the labels, make sure they compare the ingredients in the foods.

3. Have the students explain why the ingredients might be used in a fish diet.

4. Have the students write paragraphs analyzing the labels and describing how each ingredient is to be used in the fish feed. Provide prompting questions that require them to list and analyze ingredients. For instance,

> "Which ingredients are used as protein sources, carbohydrates, fats, vitamins, etc?"

5. Ask the students to suggest several alternatives for the ingredients they identify. This part of the lesson is especially fun, since they can use anything as a substitute ingredient, as long as the item fulfills the nutritional requirement. Also, have students make up a diet using a list of alternative ingredients and then have the class vote if the fish would actually eat the diet. This gets very interesting!

6. Collect the following day and grade on accuracy and effort.

***Post work/Clean-up*:**

1. No clean up for this activity.

B. WATER STABILITY

***Preparations*:**

1. Obtain several samples of fish food, both live (brine shrimp, tiny worms, various larvae, etc.) and commercially made. (If possible obtain a floating fish food and one that is pelleted.)

2. Have students set up four beakers approximately half-full of water.

3. Follow procedure outlined in WATER STABILITY LAB SHEET (Teacher's Edition) http://www.irrec.ifas.ufl.edu/teachaquaculture/curriculum/6nutrition.php.

***Activity*:**

1. During the lab activity make sure that students are recording observations at fixed intervals.

2. Monitor student progress and ask questions about the characteristics of each fish food.

***Post work/Clean-up*:**

1. Wash all containers.

2. Store remaining bulk ingredients in the refrigerator.

Anticipated Results:

Students should be able to:

1. Explain why the common ingredients in fish feed are important.

2. Learn the diet composition of commercial feeds for aquatic animals.

These topics can be used when evaluating fish feed, whether the feed is for pets or for agricultural animals. Many economic decisions in an aquaculture operation are linked directly to fish feeds, costs, and dietary requirements.

Support Materials:

(all available at http://www.irrec.ifas.ufl.edu/teachaquaculture/curriculum/6nutrition.php)

1. Aquaculture Nutrition presentation

2. UF EDIS Publication VM 114 Fish Nutrition (Francis-Floyd 2002) (http://edis.ifas.ufl.edu/FA096) or

3. FEED LABEL COMPARISON handout

4. FISH FOOD WATER STABILITY TEST LAB SHEET STUDENT

5. FISH FOOD WATER STABILITY TEST LAB SHEET TEACHER

Explanation of Concepts:

Math conversions

Animal nutrition

Table 1. Teacher Materials

Material	*Store*	*Estimated Cost*
Pencil	NA	NA
Paper	Walmart; office supply store	$1.99 and up
Calculator	Walmart; office supply store	$4.99 and up
Blackboard/whiteboard	NA	NA
Powerpoint presentations: *Feeds and Nutrition* and *Aquaculture Nutrition*	http://www.irrec.ifas.ufl.edu/teachaquaculture/curriculum/6nutrition.php	NA
Pictures/samples of feed from each animal (pellets, flakes, etc.)	Internet	NA
Examples/pictures of and ingredient labels of larval and adult fish foods (algae, daphnia, feeds)	Internet; pet store	$5 and up
Scale	Walmart, Carolina Biological Supply (http://www.carolina.com/)	$20 and up
Weighing boats	Carolina Biological Supply	$16 and up
Fish meal (or canned sardines), corn meal, wheat flour, soybean meal	NA	NA
Mixing bowl, sponge, soap, and water (clean-up)	Grocery store	NA