

Lesson Plan

COURSE TITLE: Aquaculture Science

LESSON LENGTH:

TOPIC: Developing the “Superfish”

OVERVIEW: In this lesson, students will explore different breeding programs and the success of each in broodfish production. Students will use the Punnett Square method to develop a fish from a list of characteristics that will be both desirable and economical. The lesson also introduces several successful strains of catfish and illustrates a minimum guideline for a successful breeding program.

ALABAMA CONTENT STANDARD(S):

- Identify the genotype and phenotype for specific characteristics in aquatic animals resulting from selective breeding (AS11)

LEARNING OBJECTIVES:

Students will be able to:

- Name two factors essential to successful broodfish management
- Describe some characteristics that should be considered when selecting broodfish (Examples: Age, disease resistance, growth rate, etc.)
- Describe the different types of breeding programs: selection, inbreeding, domestication, hybridization, crossbreeding, mass selection and family selection
- Create a fish using the Punnett Square method from a list of characteristics that will be both desirable and economical

MATERIALS AND EQUIPMENT NEEDED:

- Pen/pencil
- Paper
- Handout
- Quiz

TECHNOLOGY RESOURCES NEEDED:

- Computer
- Microsoft PowerPoint
- LCD Projector

CONTENT	INTEGRATED CONTENT CODE	LEARNING ACTIVITIES	RESOURCES	TIME ON TASK
<p>Materials to be covered in this lesson:</p> <ul style="list-style-type: none"> • Successful management of broodfish • Breeding programs • Selection • Guidelines for a breeding program 	<p>R, W, M, S, DM, CT, MS</p>	<ul style="list-style-type: none"> • Present the PowerPoint on selection and breeding programs. • Students will take a quiz on the presentation. • Students will develop a “Superfish” from a list of characteristics and then develop a breeding program based on the guidelines given in the presentation. 	<p>PowerPoint</p> <p>Quiz</p> <p>See handout and checklist</p>	

VARIED ASSESSMENT STRATEGIES: Students will take short quiz on the material from the presentation. Students will be evaluated on the “Superfish” project using a checklist.

PROVISIONS FOR INDIVIDUAL DIFFERENCES:

INTEGRATED CONTENT CODES

BASIC SKILLS

R=READING SKILLS

W=WRITING SKILLS

C=COMMUNICATION SKILLS

SS=SOCIAL STUDIES

M=MATH

S=SCIENCE

IR-INTERPERSONAL RELATIONSHIP SKILLS

CL=COMPUTER LITERACY SKILLS

PROCESS SKILLS

DM=DECISION MAKING SKILLS

PS=PROBLEM SOLVING SKILLS

CT=CRITICAL THINKING SKILLS

EMPLOYABILITY

ES=EMPLOYABILITY SKILLS

MS=MANAGEMENT SKILLS

WA=WORK ATTITUDES

TW=TEAMWORK

LEADERSHIP SKILLS

IM=INTEGRATION OF LEADERSHIP

CTSO=CAREER/TECHNICAL STUDENT ORGANIZATION

LD=LEADERSHIP DEVELOPMENT SKILLS

THE MORE INTEGRATION THE BETTER

“Superfish” Project

Split into groups of four and have each group develop a superfish from some given characteristics. Each group will then make the decision to breed with another group to develop an even more desirable fish. Students will use the Punnett Square method to make the crosses and calculate genotypic and phenotypic percentages. They must then develop a breeding program based on the guidelines from the presentation.

Characteristics:

Feed Conversion ratio

Disease resistance

Growth rate

High Dress-out weight

Color

Age at Reproductive maturity

Guidelines:

Choose broodstock from domesticated strains

Select broodfish from stocks that are known to perform well under commercial culture conditions

Do not mistake large fish for fast growing fish

Prevent inbreeding by obtaining broodfish from as many different spawns as possible

If replacement broodstock comes from fingerlings produced on the farm, they should come from at least 50 random matings

Keep accurate records of spawning output, egg hatchability, fry survival, and growth rates of fingerlings and food-sized fish

Checklist:

- _____ 1. Groups used assigned characteristics to develop their “superfish”.
- _____ 2. Groups follow the guidelines for developing their breeding program:
 - _____ *Choose broodstock from domesticated strains*
 - _____ *Select broodfish from stocks that are known to perform well under commercial culture conditions*
 - _____ *Do not mistake large fish for fast growing fish*
 - _____ *Prevent inbreeding by obtaining broodfish from as many different spawns as possible*
 - _____ *If replacement broodstock comes from fingerlings produced on the farm, they should come from at least 50 random matings*
 - _____ *Keep accurate records of spawning output, egg hatchability, fry survival, and growth rates of fingerlings and food-sized fish*
- _____ 3. Reasons for crossing their “superfish” with another groups “superfish” and the benefits they expect.
- _____ 4. Groups include in their breeding program:
 - _____ Reasons for choosing the type of breeding program
 - _____ Traits they are selecting for
 - _____ Goals for the breeding program
 - _____ Show the work for three generations of mating in the breeding program using Punnett Squares and genotypic and phenotypic percentages for the traits in each generation.