Aquatic Biology

Aquatic Biology is a one-credit course that explores the aquaculture industry as it relates to biology. Emphasis is placed on scientific concepts involving the use of microscopes and the conversion of unit measurements. Topics include career opportunities, safety, history, aquatic species, water management, health and sanitation, biotechnology, and aquaculture issues.

Content standards for this course are not intended to serve as the entire curriculum. Teachers are encouraged to expand the curriculum beyond the limits of these content standards to accommodate specific community interests and utilize local resources. This course encourages critical thinking, use of the scientific method, integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems. Safety concepts are integrated into instruction to the maximum extent possible.

Career and technical student organizations are integral, cocurricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Career Opportunities

Students will:

1. Describe various aquatic career opportunities.

Safety

2. Explain safety concepts related to aquatic biology.

History

3. Describe the historical background and technological advancements of aquaculture as it relates to agriculture.

Aquatic Species

4. Classify aquatic species using scientific nomenclature.
   - Describing characteristics of various species of aquatic life
   - Identifying exotic, invasive, and indigenous aquatic species
   - Identifying microscopic and aquatic organisms using dichotomous keys

5. Describe types of aquatic animal production in the United States.
   - Comparing the aquaculture pond to natural aquatic ecosystems, including recreational fish ponds
6. Classify characteristics of ectothermic animals.
   - Describing roles of various aquatic organisms in aquaculture

**Water Management**

7. Describe concepts of diffusion and osmosis related to aquatic organisms.
   Examples: gill function, counter and current gas exchange

8. Interpret water quality data related to natural and artificial aquatic environments.
   Examples: temperature, dissolved oxygen, ammonia, nitrate, nitrite, pH
   - Managing water quality parameters
   Examples: analysis, treatment

**Health and Sanitation**

9. Diagnose major diseases and their causes in aquaculture environments.

10. Describe preventive measures for aquatic predators and pests.

**Biotechnology**

11. Identify contributions of biotechnology to aquaculture.
    Examples: gene probes for diagnosing viral infections in shrimp, polymerase chain reactions (PCR) for detecting bacterial pathogens in seafood shipments

**Aquaculture Issues**

12. Trace biogeochemical cycles through the environment, including water, carbon, oxygen, phosphorus, and nitrogen.
    - Relating natural disasters and climate changes to the dynamic equilibrium of ecosystems

13. Identify agencies responsible for the development of effluent limitations, guidelines, and standards for aquatic production.
    - Identifying effluent treatment methods


15. Recognize problems with sustainability in aquaculture production.