

Use of Situational Writing Prompts to Construct Relevant Critical Thinking, Problem Solving Activities

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Aquaculture Biology
The Sound School Regional Vocational Aquaculture Center

The freshman and sophomore aquaculture course content has a focus upon aquaculture science and aquaculture biology. The sophomore course has a focus upon fisheries management and hatchery technology. The biological approach to aquaculture is closely linked to the life cycle and life history of several fish and shellfish commercial species. Interest in aquaculture has grown as the commercial (wild harvest) fishery has declined / collapsed. This, of course, is fueling the demand for fish and shellfish from aquaculture sources. The basic concept for freshmen and sophomore courses is to introduce the environmental and biological constraints around aquaculture production. This approach must include a look of the natural fishery. Why do we fish and how is aquaculture a response to global seafood demand?

The attached situational writing prompt was developed by Phil Bonang, an aquaculture technology teacher here, that demonstrates the use of vocabulary, key concepts, some facts or "things you should know," asking for a written product (response) as a structured critical thinking exercise. It seeks to connect instruction to the practical applications of scientific knowledge, in this case, fishery management science in a fictitious fishing community / country. It is a simulation of the cod fish closures on Georges Bank, an historic fishing area in which Canadian and US fishermen presently fish, as discussed in class. It puts the student into the role (situation) of deciding how to reduce the Total Allowable Catch (TAC) 50%, while considering numerous social / economic impacts associated with the reduction. Neal Perry, an aquaculture biology teacher utilized this critical thinking exercise to satisfy a life science-ecosystem CAPT exercise in his class. That CAPT plan is found at the end of this fact sheet.

The situational CAPT prompt is called the "Fishery Management Problem."

**Aquaculture Biology CAPT Responses (Science & Interdisciplinary)
Fishery Management Problem
Total Allowable Catch Must Be Reduced**

Position:

You are a member of the Flounder Flats Fishery Council which has jurisdiction over the fishing fleet in the historic fishing port of Flounder Flats in the small country of Oceanarium. Traditionally, the community of Flounder Flats has relied upon the fishing fleet for a stable economy through their consistent (yearly) harvest of codfish. But, in recent years, production has declined to the point where the community of Flounder Flats and the natural resource of codfish are in jeopardy.

Objective:

You and the other members of this council must (mandated by court decision) direct a 50% reduction in the T.A.C over the next five years. You may use a combination of the various management techniques that we have discussed over the past month or any other creative technique you wish to exercise to achieve your goal. But, keep in mind, while you need to rebuild the natural codfish stocks, you must do this while preserving as many jobs and fishermen, as possible. The community of Flounder Flats is relying upon you and the Fishery Council to save them and to provide a future for everyone.

Some Facts You Should Know

- (1) Species that needs rebuilding – Cod fish
- (2) Number of boats in fleet – 100
- (3) Annual catch per vessel – 100,000 lbs
- (4) Average price per lb. - \$1.00
- (5) Present annual income per boat - \$100,000 (possible 10% reduction)
- (6) Vessel buyback fund contains - \$1,000,000
- (7) Purchase price of vessels - \$100,000

Fisheries Management Terms

- (1) 1976 Fisheries (Magnuson) Conservation and Management Act – 200 mile exclusive fishing zone established

(2) 1986 The Hague Decision – US/Canadian Boundary U.S. loses Northern Edge of George's Bank

(3) 1993 Conservancy Law Foundation sues National Marine Fisheries Service – forces reduction in fishing effort and rebuilding of fish stocks

M.S.Y	– Maximum Sustainable Yield
O.Y.	– Optimum Yield
C.P.U.E.	– Catch Per Unit Effort
F.	– Fishing mortality
F max	– Maximum fishing mortality
F.M.P.	– Fishery Management Plan
N.M.F.S.	– National Marine Fishery Service
A.S.M.F.C.	– Atlantic States Marine Fisheries Commission
NEFMC	– New England Fishery Management Council
Quotas	– State by state, regional
Trip Limits	– Vessel time at sea
Landing Limits	– Pounds per landing
I.T.Q's	– Individual Transferable Quotas
Gear Regulations	– mesh size, trap limits
Restricted Fishing Zones	- Closed and Open Seasons
T.A.C.	- Total Allowable Catch
Vessel Buyback	– Government purchase of fishing, vessels-removed from industry

Your response should be your own, if you have any questions, please ask.

References

Sound School CAPT Improvement Plan 1999-2000, Eric Yuhas 12/13/99

Science "In an effort to improve students cores on the Interdisciplinary Task section of the CAPT, current research, as reported in scientific journals and the popular press, will be reviewed by whole classes and small groups. Special emphasis will be placed on human impact on the environment

Performance Indicator: CAPT plans for ninth and tenth grade Aquaculture Science classes; Teacher lesson plans; Teacher evaluation process; Student performance on lab write-ups, journal assignments, and class discussion.

CAPT Course Matrix Due 12/14/99 Tim Visel Provide evidence of Interdisciplinary – "All Disciplines" Special Topic issues – student work samples.

All Disciplines: Students will be called upon to work in small groups to solve problems, accomplish common goals, produce joint projects, react to topical issues. Students will be asked to make and support arguments, in writing, in the form of

essays and letters. State of Connecticut CAPT practice materials will be distributed to teachers for regular use with students.

Performance Indicator: CAPT plans for all classes; Teacher lesson plans; Student work samples.

Content for the Second Generation CAPT Science Test Draft 5/25/99

Example for: Page 21

Life Science – Ecosystems (Aqua Biology, Fisheries Management)

Students understand how the number and variety of organisms and populations are dependent on the resources and physical factors of their environment.

Item 3: Explain how human activity can impact the stability of various ecosystems.