Investigative Case: Beijing Blue

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Agenda

Challenges of Sustainability
Contemporary Curriculum
Why Use Cases?
Investigative Case: Beijing Blue
Know/Need to Know
Questions
Resources:
  Google Earth Maps
  Simulations
  Gapminder
  Data
Group Work
Why Use Cases?
The international Commission on Biology Education (CBE) raised the bar for scientists and educators:

“Influencing almost all our activities, from inception to the grave, this (biological) revolution will require profound decisions with respect to the ethical, legal, social, cultural, educational, and development issues that are sure to arise, affecting our personal lives and society in ways that we have never experienced before.”

(Vohra 2000)
Criticism of the way we teach science

“Build into every course inquiry*, the processes of science, a knowledge of what practitioners do, and the excitement of cutting edge research.”

“involving the student in asking questions and finding answers”

*Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering and Technology NSF, 1996. (p. 53)
Entry into the Age of Cyberlearning

Our students engage in new methodologies:
- Self-directed
- Instant information retrieval
- Social construction/collaboration
- Open resources
One strategy to address contemporary biology education is to use investigative cases.

“Crossing the Chasm” of Curricular Reform: BioQUEST Curriculum Consortium Invites CAL-laboration CAL-laborate Volume 4 June 2000
Investigative cases:

• use realistically complex problems
• are interdisciplinary
• introduce data, tools, and background
• invite collaborative exploration
• ask learners to make and support decisions and conclusions
Learners work to develop questions and reasonable investigative approaches, gather data and information, test their hypotheses, and work to persuade others of their findings.
Beijing Blue

China is presently undergoing tremendous economic growth. The threat of decreases in air quality - including higher concentrations of fine particulate matter and ozone - is escalating.

Air quality in Beijing in the summertime is dictated by meteorology and topography. Typically, temperatures are high, humidity is high, wind speeds are low, and the surrounding hills restrict venting of pollution.

Beijing Pollution Watch

http://www.truveo.com/Beijing-Pollution-Watch/id/1757839556
Olympic air pollution

http://www.youtube.com/watch?v=PwaMlffrq1Y
CASE ANALYSIS

What is this case about?
Recognize potential issues and major topics in the case.
What Do I Know?  What Do I Need to Know?

Groups should make a list what they already know that is related to the case in the “What Do I Know” column.

List questions you would like to learn more about in order to understand the case in the “What Do I Need to Know” column.

(go to last page before 4th green sheet in the notebook)
Questions
Maps
Beijing’s air quality is simulated using the Models-3 Community Multiscale Air Quality (CMAQ) modeling system developed by the US EPA. (Byun and Ching, 1999)
CARBON DIOXIDE (ENERGY)

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http://www.gapminder.org/videos/gapcasts/gapcast-10-energy/
Use these data to prepare a graphic resource for your students to examine effects of sensor placement, trends, etc.
Group Work
Why use cases?

• To initiate open investigations
• To utilize new technologies and resources in problem solving
• To develop local and global perspectives
• To emphasize the value of interdisciplinary and collaborative approaches
• To structure student assessment through student products
• To support diverse objectives within a shared work space
• To engage students in cyberlearning