ENVIRONMENTAL PHYSICS
with Associate Professor Morewell Gasseller

Talking *points*

KNOWLEDGE
1. According to the World Health Organization, how many deaths are caused each year by air pollution in China?
2. Name three sources of air pollution.

COMPREHENSION
3. What is environmental injustice?
4. Why does Morewell advocate for more air quality sensors to be deployed around New Orleans?

APPLICATION
5. How could the ECOSTEM project be altered to address issues such as light pollution or noise pollution experienced by communities?

ANALYSIS
6. Why is a community-oriented project like ECOSTEM more beneficial to undergraduate students than more traditional university teaching methods such as lectures?
7. How does ECOSTEM benefit undergraduate students at Xavier University and local high school students?
8. What are the motivations behind the ECOSTEM project?

SYNTHESIS
9. If you were an environmental physics teacher, how would you design a practical community-based project to teach your students about traffic being a major source of air pollution? How would your students engage with local communities and how would communities benefit from your project?

EVALUATION
10. How effective do you think ECOSTEM will be in combatting air pollution in New Orleans?
11. Everybody learns in different ways. How do you learn best? To what extent do you think you would benefit from being involved in a community-oriented education project, compared to a standard classroom lesson?

Activities

Investigate air pollution in your local area
You can study air pollution in your neighbourhood by making a simple air pollution monitor from everyday household items.

For this activity you will need:
• Small pieces of card
• A hole-puncher
• String
• Petroleum jelly (e.g., Vaseline)
• A magnifying glass or microscope

1. Making air pollution monitors
Punch a hole in the corner of each piece of card. Loop a piece of string through each hole, so the pieces of card can be hung up. Spread a thin layer of petroleum jelly on one side of each piece of card. Once deployed, particulate matter will stick to the petroleum jelly allowing you to monitor air pollution.

2. Deploy your air pollution monitors
Choose a few locations near to your home or school to deploy your air pollution monitors. You could hang them on fence posts, trees, road signs or even your front door. Be sure to write the location on the back of each monitor, as this will be important later. Leave your monitors at their locations for three to five days, ideally in dry weather. After a few days, collect your monitors and bring them home.

3. Study your results
Collect your monitors and observe them. Can you see any dust, dirt or pollen stuck to the card? Use a magnifying glass or microscope for a closer look. Compare the amount of particulate matter collected by the monitors in different locations. Are there spatial variations of pollution in your neighbourhood? If so, what might be causing these differences?

Create your own community-oriented STEM education programme
What environmental issues exist in your local area? How would you design a community-oriented STEM education project to help solve a local problem whilst also training young students?

Imagine you are pitching your project to a committee to try and get funding for it. Create a PowerPoint presentation to explain your project and how it will work. Explain how the project will benefit the students that are involved, and how the project will benefit the local community.

More *resources*

• Visit IQ Air to view live air pollution levels around the world:
  www.iqair.com/earth
• Find out more about ECOSTEM:
  www.instesre.org/ECoSTEM/index.html
• Morewell is a mentor in the GLOBE Program. Find out how you can get involved: www.globe.gov

• Find out more about David's organisation, the Institute for Earth Science Research and Education (IESRE):
  www.instesre.org
• Learn more about air pollution from the World Health Organization:
  www.who.int/health-topics/air-pollution
• With an Arduino, you can learn how to create hardware and program software: www.arduino.cc/education