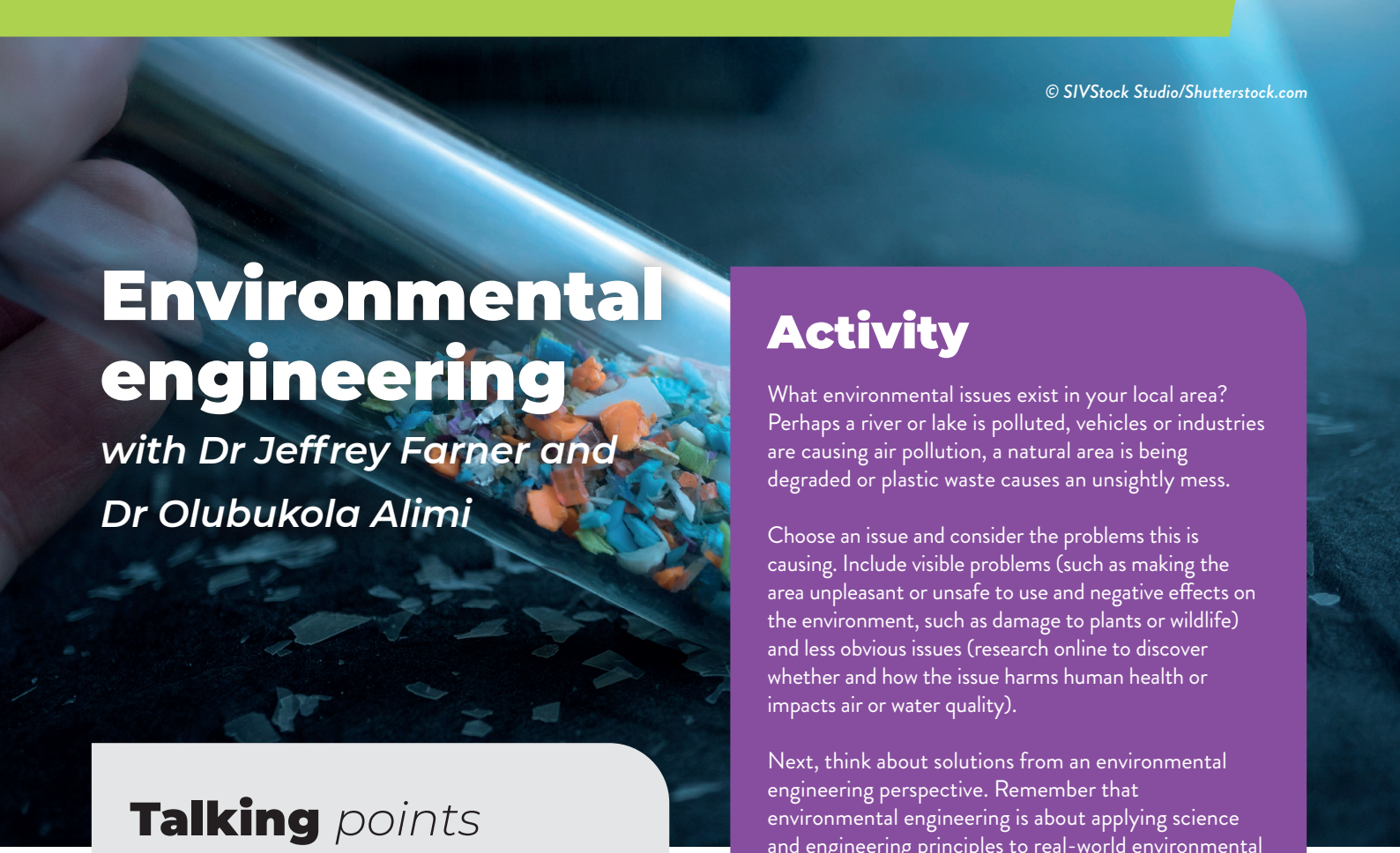

Environmental engineering

with Dr Jeffrey Farner and Dr Olubukola Alimi

Talking *points*

Knowledge

1. What is a colloid?

Comprehension

2. How does the ratio of surface area to volume change as an item is broken into smaller pieces?
3. How and why do the properties of plastic change as it degrades into microplastics and nanoplastics? What effects does this have?

Application

4. Why might aquatic ecosystems be more vulnerable to microplastic and nanoplastic pollution than land-based ecosystems?
5. Fog is an example of a colloid. How does it fit this definition?

Analysis

6. How could Jeff and Bukola investigate whether the fact that nanoplastics carry contaminants is more problematic than the fact that nanoplastics themselves are contaminants?

Evaluation

7. Microplastics and nanoplastics are already found in water, soil, plants and animals, including humans. How do you think society would respond if it was discovered that nanoplastics cause health conditions? Think about political, industrial and cultural responses.
8. To what extent do you think a plastic-free modern society is possible or desirable?
9. Which aspect of environmental engineering would you most like to work in, and why?

Activity

What environmental issues exist in your local area? Perhaps a river or lake is polluted, vehicles or industries are causing air pollution, a natural area is being degraded or plastic waste causes an unsightly mess.

Choose an issue and consider the problems this is causing. Include visible problems (such as making the area unpleasant or unsafe to use and negative effects on the environment, such as damage to plants or wildlife) and less obvious issues (research online to discover whether and how the issue harms human health or impacts air or water quality).

Next, think about solutions from an environmental engineering perspective. Remember that environmental engineering is about applying science and engineering principles to real-world environmental issues. Research online to find out how similar environmental issues are usually addressed. Remember to consider the feasibility of your solutions – as Jeff mentions, if the solution is too expensive or impractical then it will not be possible.

Armed with this information, write a letter to your local government representative that explains the environmental issue and proposes realistic solutions. Explain the science behind the issue and solutions in accessible terms. Use persuasive language to convince your government representative that action should be taken and that it would be worthwhile.

Send your letter to your government representative – your efforts could contribute to solving the problem!

More *resources*

- Learn more about how Jeff is studying environmental colloids: www.sites.google.com/ualberta.ca/farnerlab/home
- This article explains why we still do not fully understand the health risks of microplastics: www.sciencenews.org/article/microplastics-human-bodies-health-risks
- In this activity, you can create your own colloid from cornstarch and water: www.scientificamerican.com/article/bring-science-home-colloids
- This video introduces the problem of microplastics in the ocean: www.youtube.com/watch?v=ZHCgA-n5wRw