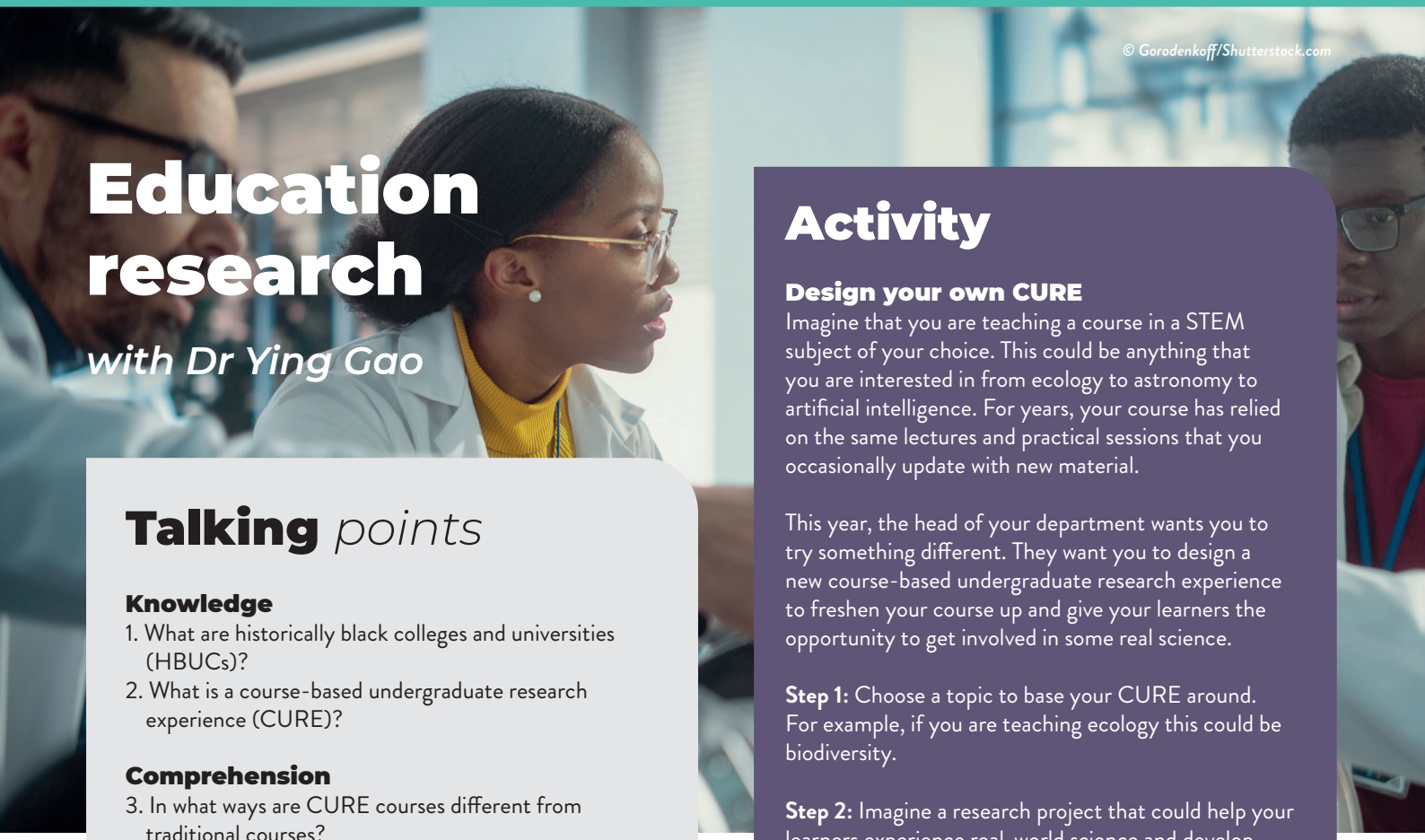

Education research

with Dr Ying Gao

Talking *points*

Knowledge

1. What are historically black colleges and universities (HBUCs)?
2. What is a course-based undergraduate research experience (CURE)?

Comprehension

3. In what ways are CURE courses different from traditional courses?
4. Why are CURE courses particularly valuable at HBCUs?

Application

5. CUREs encourage learners to work collaboratively. In what other ways could collaboration be encouraged in a classroom?
6. CUREs are designed to improve on traditional science courses that focus on knowledge and repetition. What other teaching methods do you think need to be improved?

Analysis

7. In her surveys, Ying asked respondents to rank how much they agree with statements. For example, "This course made me think outside the box – from 1 (completely disagree) to 5 (completely agree)." What are the benefits and limitations of this kind of question?
8. What evidence proves that CUREs have a positive impact on learners?

Synthesis

9. What questions do you think Ying should ask learners in future studies to find out more about their experiences on CURE courses?
10. How could the CURE model be adapted for a high school context?

Evaluation

11. Why is it so important to address inequalities in education?
12. How effective do you think CUREs could be at tackling educational inequalities?

Activity

Design your own CURE

Imagine that you are teaching a course in a STEM subject of your choice. This could be anything that you are interested in from ecology to astronomy to artificial intelligence. For years, your course has relied on the same lectures and practical sessions that you occasionally update with new material.

This year, the head of your department wants you to try something different. They want you to design a new course-based undergraduate research experience to freshen your course up and give your learners the opportunity to get involved in some real science.

Step 1: Choose a topic to base your CURE around. For example, if you are teaching ecology this could be biodiversity.

Step 2: Imagine a research project that could help your learners experience real-world science and develop a scientific mindset. For example, if your topic is biodiversity, you could conduct a biodiversity survey in your local green space.

Step 3: Create a lesson plan that you could use to teach your learners about the topic and prepare them for the research project. For example, if your project is a biodiversity survey, your lesson plan should include some background on what biodiversity is, how we study it, and why it is important, an outline of the research project including a methodology, and some questions for your learners to reflect on and discuss once they have completed the project.

Once you have completed your lesson plan, swap it with one of your classmates. Read their plan and give them some feedback. Would you feel confident taking part in their research project? Would their research project require you to adopt a scientific mindset? How could they introduce more collaboration or inquiry into their research project?

More *resources*

- There are many interesting popular science books about learning and education, such as *Clever Lands* by Lucy Crahan, *How We Learn* by Stanislas Dehaene, and *Those Who Can, Teach* by Andria Zafirakou.
- There are lots of TED Talks on YouTube related to the science of learning, such as How to Learn Better with Ulrich Boser, Stop Studying. Start Learning with Justin Sung, and Learning how to Learn with Barbara Oakley.