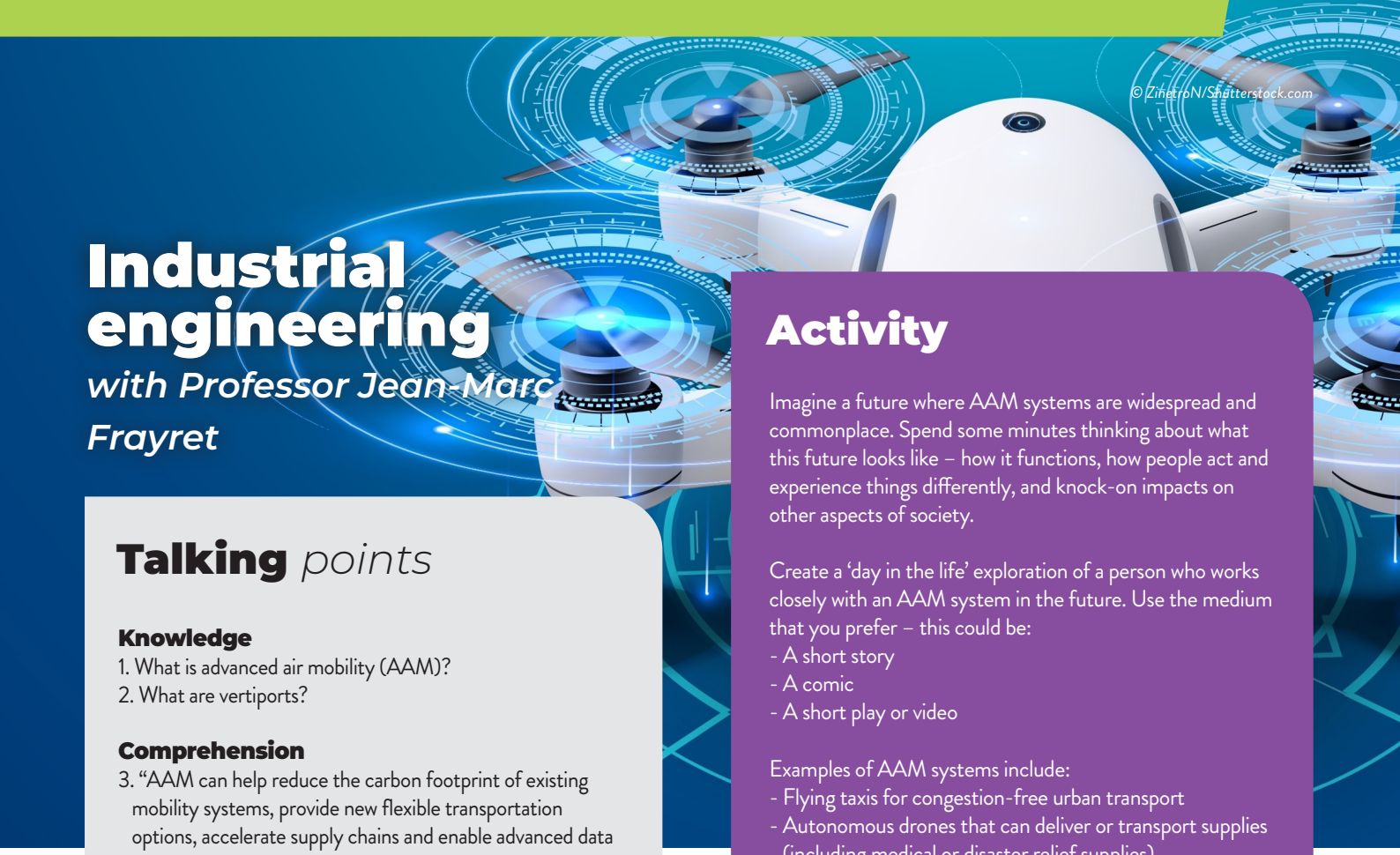

Industrial engineering

with Professor Jean-Marc Frayret

Talking *points*

Knowledge

1. What is advanced air mobility (AAM)?
2. What are vertiports?

Comprehension

3. "AAM can help reduce the carbon footprint of existing mobility systems, provide new flexible transportation options, accelerate supply chains and enable advanced data collection," says Jean-Marc. Using the information in his article, explain how AAM can contribute to each of these four effects.
4. Why is Canada a good choice for the development of AAM systems? Give at least three reasons.

Application

5. What challenges can you foresee for the development of autonomous aircraft? How could these challenges be overcome?
6. What types of AAM vehicles might serve Canada's remote northern communities in the future? How would they support these communities?

Analysis

7. "We have a running vertiport simulation model that enables us to study the flow of passengers through the travel process," says Jean-Marc. What variables do you think are included in this simulation? How do you think their variability might affect the simulation's outputs?

Evaluation

8. "Citizens must perceive AAM as beneficial, fair, safe, and not disruptive or elitist," says Jean-Marc. How do you think industrial engineers can contribute to making sure these conditions are fulfilled? How can other professions or sectors of society contribute?
9. The Jevons Paradox states that increases in something's efficiency often leads to an increase in its consumption. To what extent do you think this might happen with AAM systems compared to today's aircraft, and why? What might this mean for society and the environment?

Activity

Imagine a future where AAM systems are widespread and commonplace. Spend some minutes thinking about what this future looks like – how it functions, how people act and experience things differently, and knock-on impacts on other aspects of society.

Create a 'day in the life' exploration of a person who works closely with an AAM system in the future. Use the medium that you prefer – this could be:
- A short story
- A comic
- A short play or video

Examples of AAM systems include:
- Flying taxis for congestion-free urban transport
- Autonomous drones that can deliver or transport supplies (including medical or disaster relief supplies)
- Hybrid/electric planes that can take off vertically

Within this exploration, include the following elements:
- How the AAM system works and integrates with other systems
- How the AAM system has impacted people and society
- What the protagonist's professional role looks like
- A challenge – something goes wrong that the protagonist must rectify

You can use Jean-Marc's article and online research to inform your exploration, but feel free to use your own creative licence too.

Once complete, share your exploration with others in the class and listen to/watch/read theirs. What common themes emerge? What were some of the most innovative ideas? To what extent do you and your classmates agree that the future of AAM will be safe and fair for all groups in society?

More *resources*

- NASA's 'Advanced Air Mobility Playbook' playlist features a range of interesting videos that explore different aspects of AAM: **youtube.com/playlist?list=PLiuUQ9asub3SwLVqDgTi0MvckjMTASRkK**
- This article and video from IBM explain how digital twins work and why they are so useful: **ibm.com/think/topics/digital-twin**
- This report from the World Economic Forum provides an overview of AAM and how it could revolutionise society: www.**weforum.org/docs/WEF_Advanced_Air_Mobility_2024.pdf**