

# MECHANICAL ENGINEERING WITH DR S. KOKOU DADZIE

## TALKING POINTS

### KNOWLEDGE:

1. What are particle-laden flows?
2. Where do particle-laden flows appear in nature?
3. Can you name some industrial processes where particle-laden flows are used?

### COMPREHENSION:

4. Why are particle-laden flows more difficult to model than a single-phase mixture?

### APPLICATION:

5. How might Kokou's findings be used to combat some of the challenges relating to climate change?

### SYNTHESIS:

6. Kokou mentions he wants to reinvent physics and take fluid mechanics to 'another level'. What do you think he means by this and what would happen if he was successful in this endeavour? How would it change our understanding of scientific principles in general?

### EVALUATION:

7. Kokou says, "It takes time, lots of reading and practice to come up with the ideas that work." His team must test models and if they do not work, they must start again. What personal qualities does this process require? To what extent do you have these qualities?
8. Do you believe that making coal production and usage 'cleaner' in countries that are heavily dependent on fossil fuels is a good thing? How does that compare to, say, helping those countries move away from using coal at all? To what extent do you think this is feasible?

## ACTIVITIES YOU CAN DO AT HOME OR IN THE CLASSROOM

- Write a 60-second speech explaining to your class why Kokou's research is significant – remember to select key information and quotations from the article to support your ideas.
- Do some research into the key milestones in the history of mechanical engineering, focusing on either the 18th, 19th or 20th century. What were the greatest inventions? Why do you think they were the greatest inventions? Who invented them? Which mathematical and scientific principles were used to invent them?

## MORE RESOURCES

### INTRODUCTION TO MULTI-PHASE AND PARTICLE-LADEN FLOWS

This video by Gianandrea Vittorio Messa provides a brief explanation of multi-phase and particle-laden flows. It is challenging but definitely worth watching:

[www.youtube.com/watch?v=lcpOpPWfdxs&ab\\_channel=PolimiOpenKnowledge](https://www.youtube.com/watch?v=lcpOpPWfdxs&ab_channel=PolimiOpenKnowledge)

### FLUID EXPERIMENTS

These fluid experiments with Google are fascinating. They relate to the physics of fluids and demonstrate how scientists are working on fluid simulations:

[experiments.withgoogle.com/search?q=fluid](https://experiments.withgoogle.com/search?q=fluid)