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ANIMATION SCRIPT

UNDERSTANDING THE ATMOSPHERE: WHAT CAN ATMOSPHERIC CHEMISTRY TEACH US ABOUT AIR POLLUTION?

DR TRAN NGUYEN

TO MAKE THE MOST OUT OF THIS SCRIPT, YOU COULD:

- Stick it in your book as a record of watching Tran's animation
- Pause the animation and make notes as you go
- Add your own illustrations to the sheet
- Create your own animation to accompany it
- Add notes from classroom discussions
- Make notes of areas you will investigate further
- Make notes of key words and definitions
- Add questions you would like answered – you can message Tran through the comments box at the bottom of her article:
  www.futurumcareers.com/understanding-the-atmosphere

SCRIPT:

Air pollution is a major problem in cities. Emissions from vehicles and industries increase the number of toxic particles and greenhouse gases in the air. These have negative impacts on human health and the environment, by causing smog, acid rain and climate change.

Atmospheric chemists, such as Dr Tran Nguyen at the University of California Davis in the US, play a critical role in understanding how these chemicals react in the atmosphere. Tran is investigating how chemicals react in air and atmospheric water droplets, and how these reactions are altered by human activities.

In the atmosphere, water droplets range in size from nanoscopic wet aerosols to raindrops. The size of the water droplets impacts the concentration of chemicals they contain and the speed at which chemical reactions take place.

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As scientists create new chemicals for society to use, atmospheric chemists investigate how these new chemicals interact in the atmosphere and discover new chemical reactions. In her lab, Tran studies how these newly discovered reactions happen and how quickly they occur. She uses this information to see how these reactions affect air quality and the climate.
Tran and her team study air pollution reactions in an atmospheric chamber, a specialised enclosure in which they can control atmospheric conditions, such as humidity, temperature and light intensity, to study how chemicals react and respond to different atmospheric conditions.

Powerful instruments surround the atmospheric chamber to monitor each reaction. These instruments measure how fast the reactions take place and what chemical products are produced. This gives the team an idea of the impact each reaction might have on the atmosphere outside the lab.

Tran is studying how shining artificial sunlight on a concentrated solution of atmospheric chemicals can generate radicals. Radicals are highly unstable chemical species that react with many other molecules in the atmosphere. Depending on environmental conditions, radicals can either increase or decrease air pollution by reacting in different ways with atmospheric chemicals.

It is therefore not always clear what effect new chemical reactions will have on the atmosphere, so Tran is continuing her research to find out how atmospheric radical reactions might impact air pollution. She hopes her results will help scientists create more accurate atmospheric models. These are used to predict what the atmosphere will be like in the future, indicating how Earth's climate and harmful air pollution events will change in response to human activities.
What could you achieve as an atmospheric chemist?