STA NSW

SCIENCE TEACHERS ASSOCIATION OF NEW SOUTH WALES

Stage 6 Conference

23 & 24 June 2022

Virtual Event
via the STA Conference Hub

@stansw #STAStage6

ACKNOWLEDEGMENT OF COUNTRY

Science Teachers Association of NSW would like to acknowledge the Traditional Custodians of the various lands on which we work today and the Aboriginal and Torres Strait Islander people participating in this event

We pay our respects to Elders past, present and emerging, and recognise and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of NSW.

HOUSE KEEPING

Welcome to the STAGE 6 Virtual Event experience
We encourage you to engage on the platform, update your profile, connect with colleagues, chat to the exhibitors and join the roundtable discussions.

Presentation files and recordings can be accessed on-demand after the session via the virtual platform.

Your feedback is important to us, please complete the session survey, and daily event survey. Links will be shared via the Virtual Attendee Hub.

Visit our virtual event partners during the breaks, send them a message via the chat, or schedule a meeting catch up throughout the day or after the conference. Points (and prizes) will be awarded for platform activity across the days, so start networking!

Tag and Follow us on socials @stansw Twitter and Facebook #STAStage6

Round Tables : Join our subject forums for informal (Video and Chat) discussions and a chance to network - open throughout the conference days

Participants can share activities / ideas and links via STANSW Padlet platform https://padlet.com/STANSW/OnlineTools

This session is a Zoom Collaborative Meeting OR Zoom Webinar

Disclaimer for session participants

- **Please ensure your microphone is muted throughout the session**
- **Please use the Q&A function for questions to presenters**
- **Please submit your questions throughout the session and include the presenters name. Session moderators will read out questions during the allocated question time toward the end of the session.**
- **Please be courteous and respectful**
- **Please do not record the session. Recordings will be available on demand 30mins after the session**

NESA ACCREDITATION

The STANSW Stage 6 Virtual Conference contributes to 5 hours of NESA accredited PD per day

Completing each day of STANSW Stage 6 Conference 2022: A Deep Dive into Stage 6 Pedagogy will contribute 5 hours of NSW Education Standards Authority (NESA) Accredited PD in the priority area of Delivery and Assessment of NSW Curriculum/EYLF addressing standard descriptors 3.3.2 from the Australian Professional Standards for Teachers towards maintaining Proficient Teacher Accreditation in NSW.

Event Partners

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SPONSOR ACKNOWLEDGEMENT

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Stage 6 Conference

How can we utilise digital 3D modelling tools to support the development of chemistry students?

Jody Moller, Shane Wilkinson, Tom Elton, Stephen George-Williams and Reyne Pullen

University of Sydney

@stansw #STAStage6

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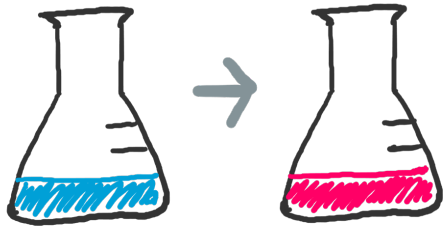
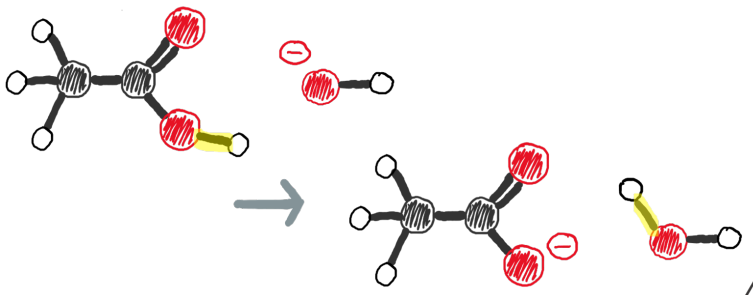
Why is 3D Visualisation Important?



Macro

How do you make 2D -> 3D connections in your classroom currently?



Johnstone's Triangle

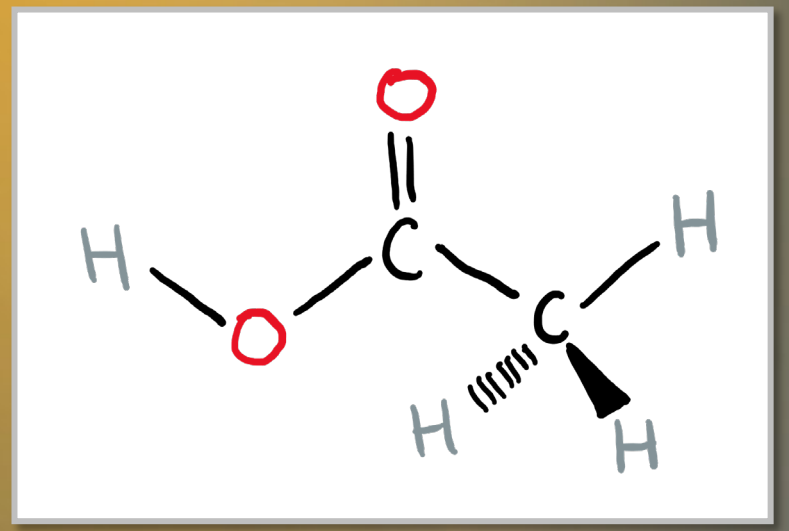
Micro

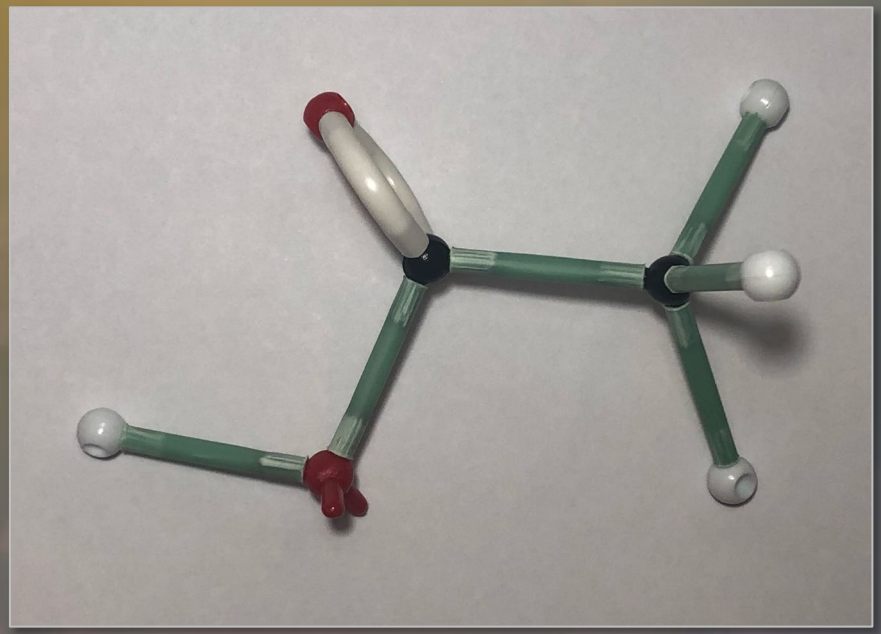
Symbolic

$$CH_3COOH_{(aq)} + NaOH_{(aq)} \longrightarrow CH_3COONa_{(aq)} + H_2O_{(l)}$$

Traditional Modeling Tools

- Drawing 3D representations
- Molecular modeling kits
  - Space-filling models
  - Ball-and-stick models
- Balloons





Digital 3D Modeling Tools

1. Simple beginnings
   – Online virtual molecular modelling kits

2. Stepping outside the box
   – Building interactive 3D organic molecules to use in Microsoft Office

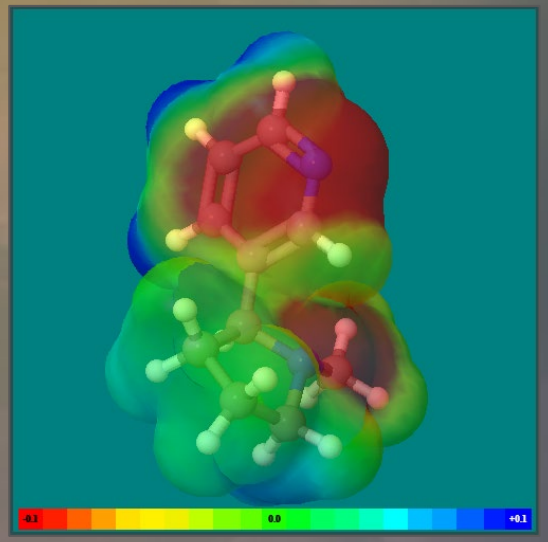
3. Where to next?
   – UNITY and VR coding

Online virtual molecular modelling kits

- Molview: https://molview.org/
- CheMagic: https://chemagic.org/molecules/amini.html
- ChemTube3D: https://www.chemtube3d.com/

- Visualisation of 3D shape
  - Shape of single vs double vs triple bonds
  - Length of bond types
  - Bond angles
  - Comparison of isomers
- Visualisation of polarity (electron density)
- Visualisation of more complex organic structures (polymers, proteins)
- Visualisation of reaction mechanisms

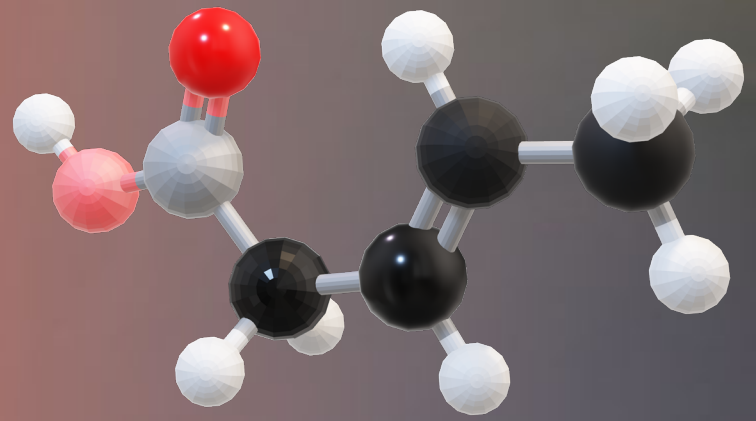
Amylase structure in Molview

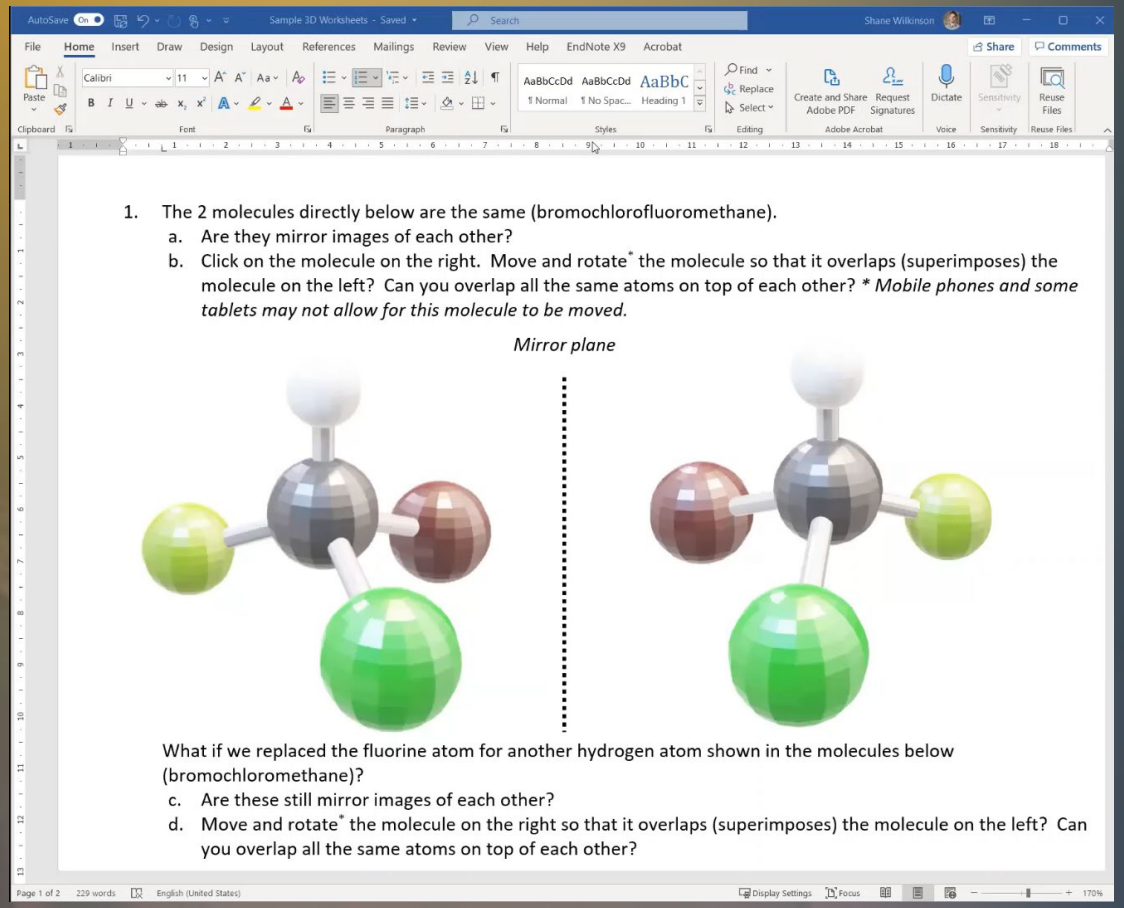


MEP for Nicotine in CheMagic

Building interactive 3D organic molecules to use in Microsoft Office

- Build 3D molecules using Avogadro
  - https://avogadro.cc/
  - Similar to Molview
- Convert to 3D objects using Blender
  - https://www.blender.org/download/
- Both freeware and run offline





1. The 2 molecules directly below are the same (bromochlorofluoromethane).
   a. Are they mirror images of each other?
   b. Click on the molecule on the right. Move and rotate* the molecule so that it overlaps (superimposes) the molecule on the left? Can you overlap all the same atoms on top of each other? ** Mobile phones and some tablets may not allow for this molecule to be moved.*

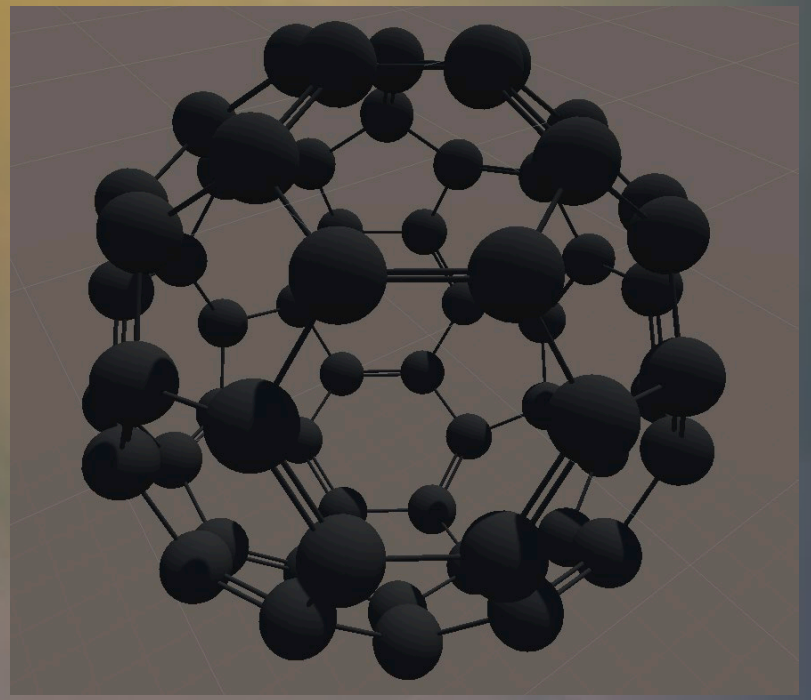
Mirror plane

What if we replaced the fluorine atom for another hydrogen atom shown in the molecules below (bromochloromethane)?

   c. Are these still mirror images of each other?
   d. Move and rotate* the molecule on the right so that it overlaps (superimposes) the molecule on the left? Can you overlap all the same atoms on top of each other?

UNITY and VR

- New technologies are offering exciting new opportunities in visualising 3D molecules!
- Virtual Reality allows for an immersive 3D chemistry experience.
- Unity is a game engine which allows for the easy creation of virtual reality applications.
- The 'CLEVR Molecule Generator' allows for the quick and easy creation of 3D molecules which can be added to virtual 3D spaces!



What would you like to hear more about?

- BREAKOUT ROOM 1: Online virtual molecular modelling kits
  - Jody Moller
- BREAKOUT ROOM 2: Building interactive 3D organic molecules to use in Microsoft Office
  - Shane Wilkinson
- BREAKOUT ROOM 3: Unity and VR
  - Tom Elton

Resources for all Breakout Rooms available on GitHub

Summary

- Free online modelling tools readily available for simple molecular visualization
- Supplement to, not replacement of, of tactile tools
- Increase in coding embedded in the curriculum provides the ability to find solutions to more complex modelling problems

Thank you to our event sponsors!

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