COMPOUND INTEREST

CHEMUNICATE
GRAPHICAL CHEMISTRY COMMUNICATION
WHY COMMUNICATE CHEMISTRY VISUALLY?

IMAGES VS. TEXT: REACH AND ENGAGEMENT

REACH
- Images: 6604
- Text: 3151

ENGAGEMENT
- Images: 7.0%
- Text: 2.5%
DOS AND DON’TS

• Use images and diagrams to supplement text as much as possible.

• Resist the temptation to use as many typefaces as possible.

• Any text should ideally be large enough to be read easily without enlarging the image.
• Use sensible dimensions. No-one likes scrolling forever to read an infographic.

• Space out elements of the graphic – ensure it isn’t too cramped.

• Use colour to draw attention, but don’t turn it into a colour vomit.
WHY COMMUNICATE CHEMISTRY VISUALLY?

\[ \text{VBH}^+\left(\text{BH}_3\text{NH}_2\text{BH}_2\text{NH}_2\text{BH}_3\right)^- \quad + \quad \text{M}^+\left[\text{Al}\{\text{OC}\left(\text{CF}_3\right)\}_4\right]^- \]

\[ \text{M}\left(\text{BH}_3\text{NH}_2\text{BH}_2\text{NH}_2\text{BH}_3\right) \]
WHY COMMUNICATE CHEMISTRY VISUALLY?

DOI: 10.1039/C4CP06124A
In uncooked crustaceans, the compound astaxanthin is bound to the protein crustacyanin. The negatively charged enolate ion this creates is blue in colour.

The crustacyanin protein denatures when cooked, which releases the astaxanthin from its bound state, leading to a red-orange colouration.
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OCEAN ACIDIFICATION AND CHEMICAL SIGNALLING

Marine organisms use molecules called peptides, built up from amino acids, as chemical cues. The purpose of these can include detecting predators, homing, and reproduction.

This study examined how ocean acidity affected a chemical cue which mediated egg ventilation in shore crabs.

Absorption of carbon dioxide leads to an increase in ocean acidity. Acidity is tied to hydrogen ion ($H^+$) concentration, a decrease of one pH unit means the acidity is ten times higher.

Ocean acidity causes changes in signalling peptide molecules, affecting shore crab ability to detect these cues.

WHAT ARE THE IMPLICATIONS?

A number of species use these kinds of cues for egg ventilation, hatching, and settlement. The changes caused by ocean acidification could affect them all.

Ocean acidification affects marine chemical communication by changing structure and function of peptide signalling molecules.
WHY COMMUNICATE CHEMISTRY VISUALLY?

ORGANIC NITROGEN IN THE ATMOSPHERE

Organic nitrogen compounds enter our atmosphere from a variety of sources, both natural and industrial. What happens to these pollutants in the atmosphere is a question some chemists are trying to answer.

- **Sources**
  - Amines
  - Amides
  - Isocyanates
  - Ammonia & Carbon Dioxide
  - Droplets

- **Amines**
  - Various groups

- **Amides**
  - Reacts with O₃ in hours

- **Isocyanates**
  - Reacts with +OH in days/weeks

- **Ammonia & Carbon Dioxide**
  - Reacts with H₂O in days/years

- **Droplets**
  - Converted to isocyanic acid

**Why does it matter?**

Ammonia reacts with chemicals in air to form particulates which can cause human health issues, contribute to smog, and impact climate. Nitrogen deposition in soils can also affect ecosystems.
WHY COMMUNICATE CHEMISTRY VISUALLY?

A CHEMICALLY-FUELED MOLECULAR MOTOR

Molecular motors are chemicals that can move themselves using chemical reactions. Chemists hope to eventually use them for specific tasks. The latest motor can operate continuously with a chemical fuel.

**KEY**
- Small ring molecule (benzyl amide macrocycle)
- Cyclic molecular ‘track’
- Binding site (fumaramide sites)
- Blocking groups (9-fluorenylmethoxycarbonyl chloride, 'fuel')

1. The small ring binds to one of two sites on the larger cyclic track. Bulky groups trap it in one of the two compartments.

2. Chemical removal of one of the bulky groups allows the small ring to move between the two binding sites.

3. Reattaching bulky groups locks in changes of position; in this way the small ring can be driven around the larger one.

*This is the first autonomous molecular motor that can be made to move in one direction without human intervention. It is, however, very slow - it takes about twelve hours for a complete turn. Currently, light-powered motors are faster.*

**WHY IS IT USEFUL?**
- A step further in controlling molecular motors similarly to how nature controls enzymes.
- Molecular motors could eventually be used to power nanomachines and robotics.

An autonomous chemically fueled small-molecule motor, M R Wilson et al, Nature, 2016, DOI: 10.1038/nature18013

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- PublicDomainPictures.net
- pixabay
- The Noun Project
- Wikimedia Commons
- flickr
WHICH RESOURCES ARE YOU AWARE OF?

- Font Squirrel
  - 100% Free For Commercial Use.
- Creative Market
WHICH RESOURCES ARE YOU AWARE OF?
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KEY TAKE-AWAYS

• Consider the use of simple infographics to help communicate chemistry topics or research.
• Make use of free resources online to help produce visual communications – you don’t have to be an expert designer to make engaging images!
• Avoid over-complication – keep communication as jargon-free as possible, and don’t over-crowd the design. Images and text should be able to be seen relatively easily on social media sites.
WHY DOES ASPARAGUS MAKE YOUR WEE SMELL?
AND 57 OTHER CURIOUS FOOD AND DRINK
AND... ANDY BRUNNING

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