Virtual Insight into University – Oxford Materials

Materials Science Research Poster Activity

The lifeblood of scientific research is the writing and publication of scientific articles. Undergraduates at all universities are expected to familiarise themselves with current research in the subject they are studying. This will often take the form of literature reviews and discussions/presentations of findings with staff and peers in seminars and tutorials.

The results of research may also be presented as a poster which will be displayed at scientific conferences. Undergraduates are also challenged to produce the results of their work in the form of a scientific poster.

This exercise combines these elements, emulating an approach taken during the undergraduate course at Oxford Materials. A key feature of this at Oxford is that undergraduates compete to produce the best poster. Their efforts are judged by the Director of Studies and Senior Lecturers and a substantial prize is awarded.

For this activity, you will carry out the task individually. You can choose to answer all the research questions posed in this prompt, focus on one particular area, or expand your research to include further questions related to the topic. You can use any resources to carry out your research (e.g. books, scientific papers, videos…) but you should make sure to include a list of all references used as part of your work.

Your task will be researching the topic/question below:

Are organic or inorganic based solar cells better at producing electricity?

And/or

What are the different uses of organic and inorganic based solar panels?

You should consider issues such as:

- *Do organic and inorganic based solar cells work differently? If so, how?*
- *What is the basic principle of generating electricity from light?*
- *What different purposes do we need electricity for? Do we need different types of solar cell for different jobs or is it one size fits all?*
- *Have there been changes throughout the last 70 years in terms of what is used to make solar panels?*
- *Which type is more expensive? think in terms of entire lifetime, from sourcing the materials, making the solar panel and possible recycling. Are there supply chain issues?*

- *Sustainability – are the materials used toxic/environmentally damaging?*
- *How will decreasing the cost of solar cells affect our day to day life and that of people from other places in the world?*

You may not cover all of these, and you may think about other issues of your own – think about what the key priorities might be. Feel free to consider emerging technologies – might this be something that might open up in a few years' time?

There are some websites to get you started at the end of this document.

Task: Research Poster

Produce a scientific poster based on the topic/question you have researched. The target audience for your poster should be other students in Y11/12, so you can assume some background science knowledge.

a. This should be done as a single slide in PowerPoint

b. Your poster should be **A3** in size – to change the size of your slide, go to 'Design' and click 'Slide Size' and then 'Custom Slide Size'. In the pop-up box, click on the 'Slides sized for' drop down menu and select 'A3 paper'. You can choose either portrait or landscape.

c. Make sure you include any references you use in your research and credit any images or figures used – these references should be included on the poster itself.

d. You should NOT include your name on your poster

Your poster should be an **academic style poster** – you may wish to research this style of poster before starting. A few tips for creating a good academic style poster are below:

- Don't include too much text on your poster – it should be easy to read and digest in just a couple of minutes
- Use a font large enough to be read by someone standing at least 30cm away
- Be sure to include images/diagrams and make sure these are large enough to be seen clearly and labelled if appropriate
- Think about the story your poster is telling and the flow between sections – it might help to organise your poster into sections using text boxes with headings
- Include your references and image credits – these can be in a small font at the bottom of the poster or below images for example
- You will be given marks for your design as well as your scientific content, so make sure your poster is eye catching! Think about things like colour, fonts, images, and the overall layout. It should look attractive, but still be easy to read and follow.

More details about how your poster will be scored are in the 'Judging' section below.

Submission

You should submit your poster as a **PDF file** via the Talent LMS Portal. The deadline for submission is **Friday 9th August**.

Judging

The posters will be judged by a panel made up of students and staff from the University of Oxford Department of Materials.

The person (or people) producing the best poster in the opinion of the department will receive a modest prize.

Your poster will be marked out of 10, with up to 7 points available for scientific content, and a further 3 available for the appearance of the poster.

Feedback

We will reveal the results of the judging, as well as offer some general feedback about the submitted posters, at a live feedback session being held on **Friday 16th August, 2-3pm**. Everyone who submits a poster for this activity will be invited to this session.

Questions

If you have any questions, please ask them via the 'ask a question' page on the Talent LMS Portal.

Resources

A couple of websites that might help you get started:

(The review articles are heavy reading and as such the abstracts, introductions and conclusions are recommended as starting points)

https://www.bbc.co.uk/news/science-environment-65602519

https://energyeducation.ca/encyclopedia/Main_Page

https://thesolarlabs.com/ros/future-of-solar-energy-predictions-for-2023/#:~:text=Some%20of%20the%20most%20promising,to%20optimize%20the%20performance%20of

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9414585/

https://www.nrel.gov/solar/market-research-analysis/solar-manufacturing-cost.html

https://easysolar.guide/organic-solar-cells-vs-inorganic-solar-cells/

https://pubs.rsc.org/en/content/articlelanding/2020/ee/c9ee03046h

https://www.nrel.gov/pv/cell-efficiency.html

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6261913/#:~:text=The%20working%20principle%20of%20DSSC,2)%3A