

DISCOVER MATERIALS Resource Title – Notes for teachers

Why is Materials Science so Awesome?

Suggested age range:

14-16, 16-18

Resource description

Dr Eleonora D'Elia (Imperial College London) introduces Materials Science and why it is such a varied (and accessible) subject. https://youtu.be/9BDS6X_DeNI

In the above video Dr Eleonora D'Elia (a teaching fellow at Imperial College London) gives an introduction on what materials science is all about and how it is all around us.

She starts by highlighting what materials scientists do in different industries, then gives a few examples of smart materials. Lastly, she explains how a student can apply for a Materials degree in different universities in the UK and what Materials graduates do after completing their degrees.

- Introduction 0:00
- About Dr Eleonora D'Elia and how she got into materials science 0:48 (<3min)
- What is materials science? 3:22 (<2min)
- All about chocolate 4:51 (<2min)
- Dinosaurs' hearts 6:37 (1min)
- Smart fabrics 7:31 (1min)
- Smart materials in nature – butterflies and seashells 8:47 (<5min)
- Superlight materials – aerogels 13:10 (<2min)
- Self-healing materials 14:49 (<3min)
- Shape-changing materials 17:23 (<3min)
- Sensing materials 19:57 (<3min)
- How materials science saves lives 22:47 (<1min)
- Materials for aerospace applications 23:03 (<2min)
- Biomaterials and bioglass 24:31 (2min)
- How a student can apply for a Materials degree 26:40 (1min)
- Job opportunities as a materials scientist 27:55 (1min)
- Conclusion and Q&A 28:52 (<4min)

Using the resource in class

This resource can be used as a workshop to introduce the field of materials science. This can be followed by a classroom demonstration of other smart materials, such as the corn starch-water experiment (<https://www.youtube.com/watch?v=mYTerCbDUzE>). This experiment shows how non-

Newtonian fluid works. The cornstarch solution's viscosity increases with applied force, so it behaves as a liquid without any force (e.g. at rest) and as a solid with applied force (e.g. when punched/stirred).

Where to find examples for class

SHALL WE PUT IN THE SORT OF THINGS THAT TEACHER / FAMILIES SHOULD LOOK FOR IF THEY WANT TO GET HOLD OF SOME OF THE SMART MATERIALS?

Curriculum links:

[ADD LINKS TO CURRICULUM](#)

Further Information

Smart materials are materials that can respond to external stimuli such as temperature, stress, moisture, light, or electric field.

For an overview of some smart materials (e.g. shape memory alloys, aerogels and the concept of structural colour) [Smart Materials – Examples.pdf](#)

Further Questions?

Please email: info@discovermaterials.uk or leave comments in the comments box below on how you use the resource, what else you would like to see and how you think it could be improved.

To look at the [Notes for Families](#) for ideas of how this topic can be explored at home.