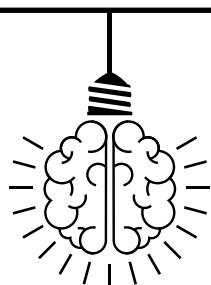




# Learning notes

- explore three of the key stories



Discover ideas, activities and opportunities to learn more about the science and technology covered in this edition of Catalyst magazine.

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acoustic engineering  
and sound control



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awareness



If you have any feedback or ideas for topics for future editions, then please email:

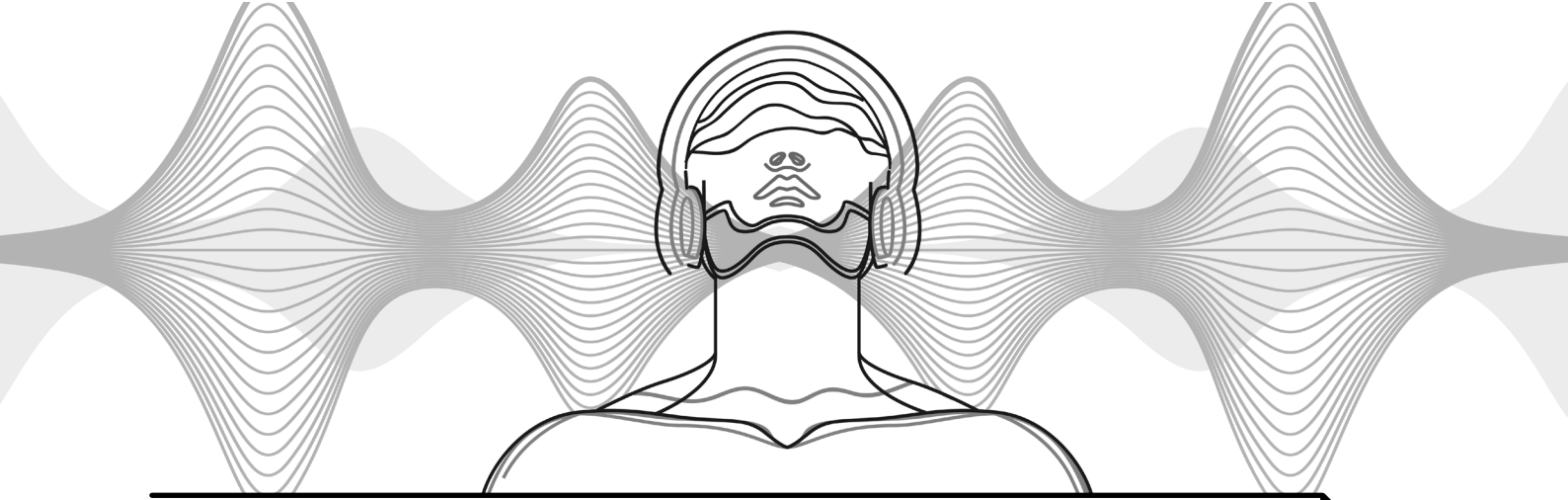
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## Take your learning further

### Making Waves: acoustic engineering and sound control

Main Article: [The science behind 3D sound](#)

We all learn about sound waves from a young age and some people continue to study it through to post graduate level at university or through their jobs, each time building on the knowledge learned previously. If you understand the basics of sound, it really can open up a wealth of different opportunities, especially careers. You might choose to be a club DJ, a sound engineer at concerts and festivals, the next record producer at Abbey Road or a sound technician working on the latest Hollywood blockbuster.

#### Learning Task:

Explore the '[Making Waves](#)' resource, where you will look at acoustic engineering and sound control. Learn what an acoustic engineer does, including how experiments on directing sound around a space can increase enjoyment, for example at a concert, or dampen the sound to improve comfort, such as in an aircraft.

Then try acoustic engineering for yourself. Use free software on a laptop or an app for your phone

and investigate how sound travels. Build cardboard tubes to project the sound onto different surfaces, you just need a few things that can easily be found around your home. Students at university sometimes do similar experiments and report on them for their final year projects. If you enjoy doing your mini project, you may decide that sound engineering is for you and that you might try to study it at university. [stem.org.uk/rxetun](http://stem.org.uk/rxetun)

#### Taking your learning further:

Use the STEM Clubs activities in the Movie Music resource as a basis to further explore sound waves. [stem.org.uk/rxeymv](http://stem.org.uk/rxeymv)

- Create a series of sound panels and test their effectiveness at directing sound around a room.
- Investigate soundwave effects on a non-Newtonian fluid (slime) and assess which sound wave has the greatest impact.
- Explore how tuning works to create a set of pipes tuned to a specific note.



2

## Take your learning further

### Investigating the uses of bioluminescence

Main Article: [The brilliant world of bioluminescence](#)

Danielle's article on bioluminescence shows us that there are multiple applications, with wide-ranging benefits.

#### Learning Task:

Danielle's article shows us that people are hoping to make use of bioluminescence in many ways. Create a knowledge organiser such as a mind map, bullet point list or table of key ideas to show the main applications and their benefits. Add to your knowledge organiser a note of:

- one thing that surprised you
- one thing that you think is an important use of bioluminescence
- one thing that interested you

#### Take your learning further:

Having explored bioluminescence in the article choose one application and find out more, carry out some research. You can add your findings to your knowledge organiser and/or discuss them with your teacher, friends or family. Share your knowledge and explain how your example uses bioluminescence and what the benefits might be. You may also want to find amazing images of bioluminescent organisms online or research where to see them in real life.

#### Take your learning further still:

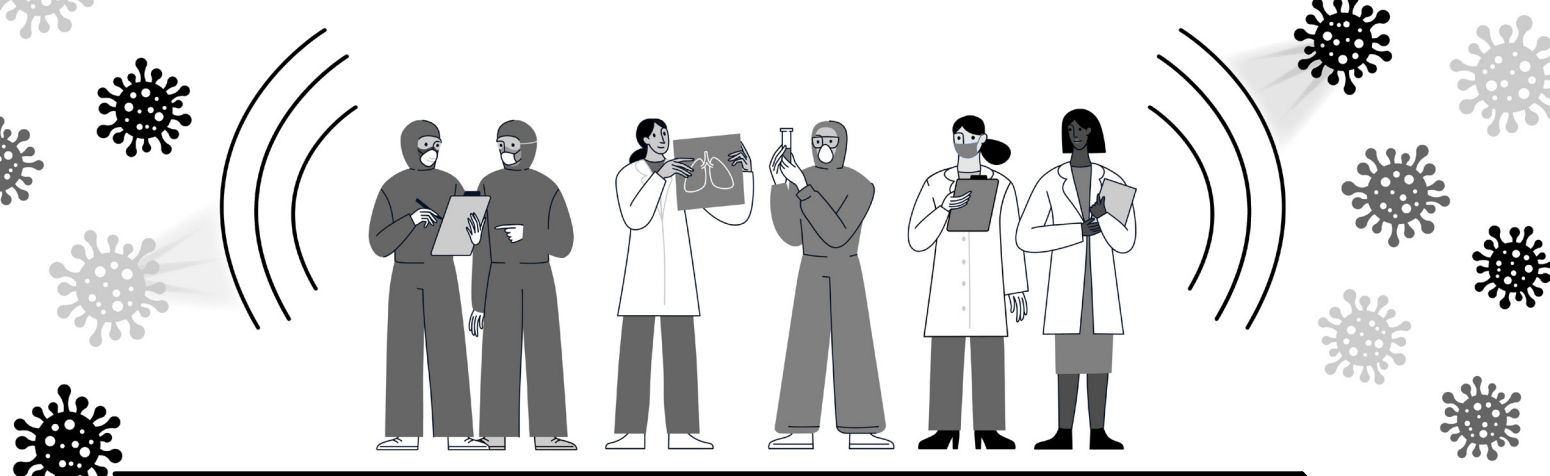
Bonnie Bassler is a research scientist who has investigated bioluminescence to help with one of the most significant medical problems of our age: how to deal with the fact that bacteria are becoming ever more resistant to current antibiotics.

Watch her TED talk [stem.org.uk/rx34nr](http://stem.org.uk/rx34nr) and write a paragraph to explain how she used bioluminescence to help research a possible solution to this problem. Use the following key words in your explanation:

<b>Bioluminescence</b>	<b>Vibrio fischeri</b>
<b>quorum sensing</b>	<b>Bacteria</b>
<b>enzymes</b>	<b>antibiotics</b>



To find out more about the Nobel Prize for Chemistry 2008 Green Fluorescent Proteins see [www.nobelprize.org/prizes/chemistry/2008/illustrated-information/](http://www.nobelprize.org/prizes/chemistry/2008/illustrated-information/)



## Teaching notes

### Using scientific current affairs to stimulate student awareness

Main Articles: '[What are coronaviruses?](#)' '[What are scientists doing to fight coronavirus?](#)'

The two articles, What are coronaviruses? and What are scientists doing to fight coronavirus? can be used separately or to complement each other. They make a strong link between an issue that is of worldwide importance and enormous current interest and several areas of the science curriculum. They could be used to enrich and add context to study of: the immune system, discovery and development of new medicines, cell signalling or ideas about viruses as pathogens.

#### Suggested Activities:

One or both of the pair of articles could be used as a basis for developing reading skills, for example through reciprocal or paired reading strategies. One approach would be to start by activating prior knowledge of what a virus is and how viruses spread. In addition get students thinking about vaccination and respiratory illnesses, such as colds and flu and defining the respiratory system as the structures involved in breathing so that air can enter and leave the body leading to oxygen and carbon dioxide being transported in and out.

You may also choose to select and pre-teach some of the vocabulary from the article.

Predicting what the article will say about coronavirus based on prior knowledge will also help to focus interest and engage with the article. After reading you can ask students to formulate their own questions about the text to check their comprehension or ask about points they would like further clarification on.

#### ✦ Related resources:

e Bug Harmful Microbes students group microbes according to characteristics and the effect they have on the body [stem.org.uk/rxxd4](http://stem.org.uk/rxxd4)

e Bug Immune Defences includes an animation of the immune system in action and student reading on the immune system [stem.org.uk/rxxd5](http://stem.org.uk/rxxd5)

Big Picture Immune System [stem.org.uk/rx34vg](http://stem.org.uk/rx34vg)



**External link:** the suggestions about reading strategies here is based on the Education Endowment Foundation Report Improving Literacy in Secondary Schools available at [educationendowmentfoundation.org.uk/tools/guidance-reports/improving-literacy-in-secondary-schools/](http://educationendowmentfoundation.org.uk/tools/guidance-reports/improving-literacy-in-secondary-schools/) Accessed May 2020

## Bring a STEM Ambassador into your classroom

We have a network of over 30,000 inspiring STEM Ambassadors who volunteer their time to inspire the next generation in STEM.



Find out more about how you could bring a STEM Ambassador into your school or college: [www.stem.org.uk/stem-ambassadors](http://www.stem.org.uk/stem-ambassadors)

