

English for Science

Unit 3: Scientific Reading and Debate

Materials

- Teacher's Resource Kit EFS3.1 - Warmer - Reading Race for Scientific Alphabet
- Teacher's Resource Kit EFS3.2 - Jigsaw Reading - Information Gap
- Student's File EFS 3.3 - Extended Reading Activity
- Optional EFS 3.4 - Discussion - Genetic Engineering

Procedure

- 1 Write up the session agenda on the board.
- 2 Reading Race for Scientific Alphabet. Explain that the students are going to be involved in a race. Ask the students to work in pairs for this activity. Hand out one text between two students. If you have an odd number in the class, have one group of three.

Tell the students to quickly skim through the text to see what it is about. It's about studying science.

Tell the students that they need to find one scientific term in the text beginning with each letter of the alphabet. As they find the words, they should make a note of them. When they have found 26 they should either run up to you or shout out so that you know they have finished. If they have 26 scientific words, then they are the winners (prizes!). If there is a mistake somewhere, send them back to their desks and tell them they haven't finished.

The words are in the table below.

atomic	biology	chemistry	dissecting
experiment	fructose	gauge	hydrocarbon
inorganic	joules	Kelvin	litmus
mechanics	nucleus	organic	physics
quantum mechanics	radioactivity	science	triglycerides
uranium	velocities	whetstone bridge	x-rays
Young's modulus	zoology		

Don't let this go on too long. If it has taken more than ten minutes, you should make it into a race of who can find the greatest number of words in five more minutes.

- 3 The next section is a jigsaw reading. This is based on an article from the SCMP. Students should work in pairs for this too. They will get one Text A and one Text B. These are similar but have different sections missing. Refer to the resource kit for copies. Give A texts to half the class and B texts to the other half. The intention is that they both complete their texts by asking questions of each other.

You may have to police this fairly strictly to make sure they do not just put the two texts on the table and look for the information. This in itself is fine as an activity, but it is not the intention here.

The complete text appears below.

Text for Jigsaw Reading.

A thriving subterranean world of microscopic creatures has been discovered by British scientists drilling more than 4,000 metres below the surface of the Atlantic Ocean.

The find, which has set a record for the deepest living organisms, has increased the possibility that similar microbes could be alive deep inside planets.

Core samples, taken during drilling 750 metres under the seabed, 3,500 metres below the ocean surface, have revealed life forms cut off from the rest of the natural world for millions of years. Scientists said the bacteria show it is possible for life to survive under extreme conditions where pressures are 400 times greater than at sea level and where temperatures can reach 170 degrees Celsius. Other scientists have previously found huge wormlike animals, called pogonophora, on the seabed near underwater volcanoes.

John Parkes, Professor of Geo-microbiology at Bristol University, said the discovery of microbes living at such enormous depths has overturned conventional ideas about life on Earth. He said: "This is a big conceptual leap because the idea of life being confined to the surface of our planet has been shown to be incorrect."

One of the most surprising aspects of the discovery is that the deeper the scientists drilled, the more bacteria they found.

The scientists are confident the bacteria are not dangerous because they have never evolved to infect humans or other animals. Preliminary research shows they have a distinct genetic identity and, although clearly related to surface bacteria, they possess unique properties such as resistance to high temperatures and pressures.

- 4 Allow students to complete the task and then give feedback. You could ask students to read parts of the passage aloud, or you could read it as a check dictation.

- 5 The next activity is an extensive reading activity. The article, taken from the SCMP, is about 1200 words long and contains some difficult vocabulary items both in meaning and pronunciation. These items should be dealt with after the reading activity. This is an effort to get students to read through something rather than stop all the time and hang off a dictionary. So for want of a better term, it is a fluency reading activity.
- 6 The worksheet is fairly self-explanatory, but you might want to look through the text beforehand and pre-teach any vocabulary items you think your students will have problems with. One of the tasks they are asked to do is to note any vocabulary items they have problems with. This will be used as a focus activity at the end of the reading activity. This can be done in small groups, pairs or individually. As it is quite challenging, it might be better to work with a partner.

You can stop the students after each section and give feedback, or you can wait until the end. If you choose the latter, you should monitor while they are working so that you are not faced with a lot of work to do at the end.

Key EFS 3.3

- 1 The article is about scientific investigation into human DNA and the fact that there is really no such thing as differences in biological make-up of the so called races of humans.
- 2 They no longer believe that races are distinct biological categories.
- 3 It seems reasonable that as we all evolved from the same stock, we should all be similar in our basic make-up. (One possible answer)
- 4 The scientists say that race is a product of social, cultural and political thinking, but often based on the colour of a person's skin.
- 5 Skin colour.
- 6 Superficial, skin deep.
- 7 They would be Negroes, Sino-Asian, Caucasian, American Indians - this would be based on the major skin colourings around the world.
- 8 A small number of scientists still believe that some "races" are superior, better than, others.
- 9 It is quite thought-provoking. (one possible answer)
- 10 Racism is the unfair treatment of people because of the 'race' they belong to. It can take many forms, but is commonly violent and abusive.
- 11 Philippe Rushton says that some races tend more towards violence and crime - this is a very racist remark. And untrue!

- 12 Only very minor examples of racism. Being ignored, being called silly names.
(One possible answer)
- 13 There is no such thing biologically as race.
- 14 Because the Africans that did not migrate have changed genetically over 100,000 years.
- 15 It says that there is no such thing as a biological definition of race.
- 16 That sudden movements over large distances by people from different countries can show big differences in people's appearance.
- 17 Native Americans.
- 18 That changes are very gradual or slow.
- 19 Skin colour.
- 20 They all have very dark skin pigmentation.
- 21 That people who had lighter skin were better able to survive. They had more children, which meant that the light skin gene was passed on.
- 22 10,000 years. That is a long time to wait for a suntan!
- 23 I think it is a very interesting article challenging many commonly held beliefs. I don't believe there is a need to define someone's race. We are, after all, all living on the same planet. However, I think that the challenges this article makes will not be accepted by people for a long time and that the idea of race will continue for the foreseeable future. (One possible answer)

- 7 After you have given feedback on the answers, you may do some vocabulary work with your students.

Get the students to look at the words they have noted down. They could have up to 20. Get them to compare their words with the rest of their group's. They should try to work on getting a consensus of 20 words for the whole group. Get a representative of each group to write up their list on the board. See which are common between the groups. Try to work down to a set of 20 words for the class. This is the list you should get the students to copy down.

This list should form the basis of your vocabulary work. You can also have a quick practice with them. You will probably have prepared a list of 20 words given your familiarity with your students' standards. However, you will also have to be prepared to deal with unexpected items.

- 8 In the next session the students will need to prepare to debate/discuss the problems of ethics in genetic engineering.

- 9 Refer students to **EFS 3.4**. This is an article about genetically engineered food.

Tell them to read through the article and ask them what they think about engineering food. Point out the examples of the unsquashable tomato as something which is obviously not natural.

See if there is a group who supports and one that opposes. If there is, that's great as you have the start of a debate. Open up the argument to include genetically engineered people. Perhaps even bring in the current craze for women who are well past natural childbearing age having children through various medical procedures.

On the plus side you can think about the medical advances that genetics has brought. On the minus side you could paint a picture where people are produced who can work under extreme environmental conditions. A little science fictionish, but

Try to get your students to develop arguments for or against genetic engineering "playing God".

If you do have two distinct groups, then pair them up or open a full class debate. If you do not, then either assign sides or simply have a class discussion on it.

- 10 Students should be encouraged to write a short summary of the discussion with their own opinion as a final remark.
- 11 As a final activity in this science unit, you should get the students to look back at the unit as a whole and review what skills they have practised and how it will help them with their English in general. This Unit is not based on the UE exam and so they may feel that they haven't practised much for the exam. However, they have done a lot of reading, a lot of speaking, some grammar work, a little writing, some vocabulary work, some listening and note taking. That just about covers the UE exam!