

Healthy Human Diet

Background, National Curriculum links and suggested aims

This lesson is intended for use when teaching diet to Years 7-9. It has been written for use in a Biology lesson.

Teacher background knowledge

No special background knowledge required for a Biology teacher. If a Science teacher with a specialism in Chemistry teaches the lesson, there are opportunities to make links with organic Chemistry and Biochemistry.

Cross-curricular links

There are links to Philosophy (including what makes for a good life) and Geography (global food injustices).

Student background knowledge

None required.

Resources and timing

No special resources.

Two lessons, each of 50 minutes, should suffice. There is a homework activity to be undertaken by students between the two lessons.

Activities

1. Start by discussing with the class how what we eat is core to our health, to how we understand ourselves and to a substantial part of our enjoyment in life. Yet today's diets differ greatly from those that we evolved to have. (You may need to be sensitive if there are students who do not accept the theory of evolution.) Explain that humans are omnivores.
2. Get the students in small groups to imagine what the human diet was like some 20,000 years ago. The significance of this figure is that this time is well before the beginnings of agriculture (the growing of crops and the rearing of farm animals for food and other products). Students are likely to realise that there were no processed foods (i.e. foods with ingredients added for flavour, texture or preservation) but may not appreciate that there were no cereals (unless the

ancestors of today's cereals were eaten – which would have been plants with smaller and far fewer seeds), no milk or cheese, let alone tea, coffee or chocolate. Diets of the time usually contained less meat than most people eat today and were also low in salt and sugar. For many people, their diets may have been quite varied with small amounts of many plants being eaten and quite a range of wild-caught animals.

3. Ask the students to consider whether they would have liked such a diet.
4. Move onto the issue of what we mean by a 'good diet'. At first, students may simply equate this with a healthy diet. Later in the lesson, they will consider the question 'Good for whom?'. Help the students realise that while a healthy diet is important, what we eat serves other functions too. For instance, we may eat with others, as in a family meal or a meal with friends – so that food plays a social role. Food is also important in many religions (e.g. food laws in Judaism and special Jewish meals such as those on Shabbat and the Passover Seder; Holy Communion in Christianity; breaking fast in Ramadan in Islam, each day and at Eid at the end of Ramadan).
5. Get students either to discuss in small groups or (if you want the exercise to take longer) to research online what a good diet is for a developing fetus. Nature (a metaphor for evolution!) has ensured that the developing fetus can thrive on almost any diet, even if the mother (within reason) is short of food. Problems can arise if a pregnant woman's diet is high in alcohol (which can lead to fetal alcohol syndrome) or low in folate (vitamin B9) (which can lead to neural tube defects). Both of these can result in very serious, lifelong conditions. While fetal alcohol syndrome has a number of clinical manifestations, the most important is brain damage to the developing baby, with consequent neurological impairment. The most severe neural tube defects include spina bifida (when the spinal cord and spinal column don't completely close) and anencephaly (greatly reduced brain size). The problem of a pregnant woman not getting enough folate in her diet is compounded by the fact that this is needed in the first two to three months of pregnancy, before a woman may even be sure that she is pregnant.
6. Get students either to discuss in small groups or (if you want the exercise to take longer) to research online whether breastfeeding is always better than bottle feeding. By and large, human milk is best for the first year or two. It is hardly surprising that human milk is an ideal diet for a developing baby – it's what we have evolved over tens of millions of years to survive on for the first couple of years after birth. In modern societies, bottle milk can be just about as good from a nutritional perspective (though even that is doubted by some), but breastfeeding has additional benefits. It helps protect against certain common childhood

infections and even lowers the incidence of Sudden Infant Death Syndrome (cot death). It may help reduce the risk of asthma and certain allergies, though this is much less certain. One can't really do controlled experiments so all the studies tend to be correlational ones, which introduces the problem of confounding variables (as it's hardly a random choice for a woman as to whether or for how long she breastfeeds her infant). Finally, many mothers enjoy breastfeeding – though it can be very painful for some – and this enjoyment, along with the physical contact with the mother, can communicate itself to the baby, with subsequent benefits.

7. Moving now to diets for children or adults, get the students to name diets of which they have heard. At the very least they are likely to know about vegetarianism and veganism. They may know various 'celebrity' diets (Atkins diet, paleo diet, clean diet, alkaline diet, etc.). It is not, of course, important that they learn about such diets. What they should appreciate is that a balanced diet is key and that the word 'diet' is used to refer both simply to what one eats and to attempts by some people to lose weight (usually over a few weeks or months). The components of a balanced diet (including fibre) are discussed in standard school biology textbooks and in the NHS website listed below under 'Resource links'. Help students to appreciate that any diet that excludes large numbers of food (e.g. a 100% meat diet or a vegan diet) makes it harder to achieve a balanced diet. So, problems with a 100% meat diet, aside from substantially increasing one's chances of eventually developing a cancer, include shortages of fibre (part of the reason why a human carnivore is more likely to develop colorectal and other cancers), vitamin E and folate. A vegan diet, for all that it can have a number of health advantages, can also be difficult to manage. Care may be needed to obtain enough protein, including all the essential amino acids, as well as vitamin B₁₂ (generally taken as a supplement by vegans in wealthy countries).
8. Move now to helping students consider the question 'Good for whom?'. For a homework, get students to research arguments for and against humans keeping domesticated animals as a source of food. You may want to allocate students to a 'pro' or 'anti' position – or allow them to choose which side they will argue for. But there is much to be said for getting each student to research both sides of the argument, only allocating students to 'sides' (if you decide to do this) at the start of the next lesson.
 - a. There are two key issues from the animals' perspective – one is animal welfare, the other is animal rights. Many animals kept for food live lives of poor quality, which means that animal welfare standards are low. A particular instance is broilers – chickens raised for meat production. Broilers have been bred to grow so fast that they typically live only about 35-50 days before they are slaughtered, compared to several years for their wild ancestors.

Unsurprisingly, this huge increase in growth rates has been accompanied by skeletal and locomotory problems; the majority of broilers find walking painful. They live their lives under artificial light regimes (some in complete darkness, some in complete light, some in perpetual gloom) at abnormally high densities and typically in rearing sheds that hold thousands or tens of thousands of birds. Catching the birds (for transport to slaughter) is traumatic and not infrequently leads to further injury. There are plenty of online videos showing the conditions under which farm animals are kept. Students should appreciate that by paying more, people can buy meat from animals that have been kept to higher welfare standards.

- b. The animal rights position is clear-cut. Irrespective of the welfare of the animals concerned, the argument is that we do not have the right to keep animals in captivity for our purposes (food, wool, leather, horse riding, etc). The animal rights argument is equivalent to the principal argument against human slavery – we simply think it unacceptable for a human to be kept as a slave.
 - c. Finally, students can be helped to consider how the food that is eaten in one part of the world can have major implications for people far away. They should realise that one of the main reasons why the tropical rainforests are being cut down is to grow food for farm animals, principally soybean (soya) for cattle in the Amazon and palm oil in Malaysia and Indonesia. They can research the implications of this for indigenous people and for wildlife.
9. There is a range of ways in which students can work in this second lesson. You might want to organise a debate or a role play, or students could design posters (whether hard copy or electronic). You might want to get them to consider how the food served on the school premises could be improved (remember to include any snack machines as well as formal meals). Be wary about encouraging students to consider how the food they eat at home could be improved! For ethical frameworks within which students' arguments can be evaluated, see the Teachers' Guidance Pack.

Resource links

- The NHS has a website about eating well: <https://www.nhs.uk/live-well/eat-well/>.
- For information on the paleo diet, see https://en.wikipedia.org/wiki/Paleolithic_diet.
- Compassion in World Farming has lots of information and video clips about farm animal welfare: <https://www.ciwf.org.uk>.
- Rainforest Concern has information about why the rainforests are being destroyed: <https://www.rainforestconcern.org/forest-facts/why-are-rainforests-being-destroyed>.