

## **Chapter 12: The science of health and wellbeing**

### **Chapter aims**

The aims of this chapter are:

- To introduce the idea of health being a component part of the environment
- To explore ideas of wellbeing
- To discuss ways of including aspect of wellbeing in the study of primary science.

### **Introduction**

As long ago as 2004, the National Healthy Schools Standard argued that encouraging the health and wellbeing of pupils in schools provided genuine educational benefits. If pupils feel happier and more motivated, this enhances their learning experience and the promotion of social and emotional wellbeing encourages greater inclusion and improves behaviour and attendance. (National Healthy Schools Standard, 2004). Subsequently, organisations such the Children’s Society (2012), UNICEF (2013) and the National Children’s Bureau (2013) have all identified child wellbeing as key social priority. However The Education Act (2011) re-aligned Ofsted’s role so that it would no longer pass critical judgement on health and well-being policy and the only reference in the subsequent National Curriculum for England key stages 1 and 2 (2013) to the term wellbeing is in relation to ‘national’ wellbeing.

However, the fact that child wellbeing has no formal place in the primary national curriculum (2013) should not relegate its importance at the school level. Indeed,

“We recognise and applaud the important and valued role schools have always played in supporting the wider health and wellbeing of every child in their care. We have every expectation that this vital role will continue as teachers recognise the need to deal with individual circumstances which can block a child’s readiness to learn and their ability to succeed.” - Department for Education (2010) The Importance of Teaching White Paper.

Again, it is worth remembering that the 2014 curriculum now stands as an outline framework. The priorities and emphasis on issues such as wellbeing are now the responsibility of schools. The position of ideas pertaining to wellbeing within the taught curriculum is therefore one of design and the science programme of study may provide opportunities for its inclusion.

In contrast to wellbeing, a cursory glance through the National Curriculum for England (2013) demonstrates that ‘health’ is now strongly associated with the science programme of study in years 2, 3 and 6. There are some appropriate references to health in the physical education programme, however, the emphasis is now on the science programme to explore concepts of health, both in terms of environmental and human health. Given that health and wellbeing are often quite difficult to separate, the science programme of study may therefore provide a coherent, intriguing and important opportunity to explore both.

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### **Time for reflection 12.1**

These are statements taken from the National Curriculum for England (2013) for the Science programme of study.

- All living things have certain characteristics that are essential for keeping them alive and healthy.
- Asking questions about what humans need to stay healthy; and suggesting ways to find answers to their questions
- They might research different food groups and how they keep us healthy and design meals based on what they find out.
- Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.
- Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Science has a predominate role in the promotion of health in the national curriculum. Look at the extracts above and consider the opportunities that this provides for integrating science across other areas of the curriculum.

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### **Child health issues**

2012 was a memorable year for sport in the UK. London hosted both the summer Olympics and Paralympics in which Great Britain won rafts of medals, but there were

also notable successes in football, cricket, golf, cycling, even tennis. The UK, from the point of view of elite sport at least, presented a national image of health, fitness and vitality.

Of course that is only part of the picture and subsequent data from a range of sources dealing with children's health and wellbeing in particular suggests a different trend. For example, Public Health England in 2013 suggested that 18.9% of children in Year 6 (aged 10-11) were obese and a further 14.4% were overweight. For children in Reception (aged 4-5), 9.3% were obese and another 13.0% were overweight. As the report concludes these data suggest that over a third of 10-11 year olds and a fifth of 4-5 year olds are either over weight or obese. Indeed, the UK has one of the highest child obesity rates in Europe (Public Health England, 2013).

The publication of these data has resulted in the use of somewhat dramatic terms such as 'the obesity epidemic' and "Generation XXL". While it is important to bear in mind that, as the data suggests, the majority of children are not overweight it is still a worrying trend.

While complex geographic, economic and social parameters appear to influence the distribution of child obesity two primary drivers in otherwise healthy children are the combination of poor diet and lifestyle, with the latter particularly relating to lack of sufficient exercise. Before looking at ways in which the science curriculum can address some of these issues, it is important, now that the decision for curriculum design and emphasis is schools-based, to consider wider aspects of child health in learning contexts.

While research is limited in relation to child body weight and academic performance there is some evidence linking childhood obesity with an adverse impacts on the child's cognitive development. There is also evidence that suggests that children who are overweight or more likely to have higher rates of absenteeism and increased visits to hospital. Further work also identifies a link to health problems, such as a higher incidence of heart disease in later life.

The literature does however, clearly establish a relationship between physical activity and academic performance.

Getting children to be active, particularly outside, has undoubted advantages and science can provide a good focus. However, before we consider some of the practical applications, there is one other aspect to health that we need to consider.

### **Health and behavioural issues**

There is now a substantial body of research evidence that supports the idea that children's behaviour generally as well as behavioural disorders, such as Attention Deficit Hyperactivity Disorder (ADHD), are improved when children are involved in activities outdoors. There is a 30% improvement the symptoms of ADHD if those activities are in a green space, rather than an urban site or playground. However, any outdoor activity appears to show an improvement when compared to indoor activities is a significant issue effecting up 10% of school children. Indeed,

“Children increase their physical activity levels when outdoors and are attracted to nature... All children with ADHD may benefit from more time in contact with nature...” (Bird, 2007)

There is a significant relationship between natural environments and low levels of ADHD symptoms (Kuo and Taylor, 2004). An earlier study in 2001 evaluated parents perceptions of their child's ADHD symptoms in 'green', 'ambiguous' and 'not green' settings, and found that 85% of parents rated 'green' settings as the conditions in which their child's ADHD symptoms were less severe (Taylor, et al, 2001).

Teaching outdoors, appears to improve children’s behaviour generally and those with behavioural disorders in particular, it provides the opportunity for the children to exercise, or at least be less sedentary and it can provide the basis for ‘hands-on’ active learning in science (See Chapter 11).

## **Health and science at Key Stages 1 and 2**

When considering a multifaceted subject such as health, at times the divide between people and their environment is difficult to distinguish as they are often inter-related or inter-dependant in some way. However, the way we approach studying the world and often the way curricular are organised we can, without care, produce artificial divides.

### **Healthy environments and science**

The 2013 science programme of study is produced at least, in a way that has separate sections on plants and animals. Too often perhaps, this translates to an approach to delivery rather than a guideline of content.

Healthy environments are those where all aspects, both plant and animal, living and non-living operate successfully as an interrelated whole. A healthy environment includes healthy plants, healthy animals and healthy people. It is important to breakdown the compartmentalisation in teaching science, particularly environmental science, and to emphasise that interdependence and the interrelationships between things that this promotes, are the real drivers for environmental health.

In the first instance children should be able to recognise that all living things have requirements for health. In the Year 2 programme of study: 'Living things and their habitats', children will be introduced to basic ecological concepts, exploring habitats and being encouraged to recognise the interdependence of organisms through food chains and food webs. The idea of interdependence is of course an excellent way of introducing the way in which ecosystems adjust and self-regulate, but also how the food web can be easily disrupted and how small human impacts may have profound implications.

Games involving the physical construction of webs when each child takes the role of a plant or animal in that web and then removing, one plant or animal causing the web to collapse are well used, but still enjoyable ways of introducing this idea. Indeed, when it comes to healthy environments many of the activities traditionally used in

environmental education are, once again, potentially of great use here and can be used effectively introduce a range of ecological concepts.

### **Healthy schools**

In the early stages of the programme of study for science, in years 2 and 3, there is a statutory requirement for children to describe simple food chains, but the guidance notes also suggests that children should be introduced to the idea that all living things have certain characteristic requirements that keep them healthy. From exploring what keeps plants healthy, to what keeps humans healthy is an interesting transition and is explored in the national curriculum. Integrating observations made around plant growth and eventually human health are easier to make if the plants grown are edible. Only small spaces are needed either for the construction of a school vegetable garden, or for the introduction of plant containers.

The educational, recreational and outdoor opportunities that school gardens may afford make them invaluable teaching resources. The learning opportunities and benefits that they present are already well documented (Passy and Waite, 2011). For science teaching at least, some form of growing area should be looked at as an essential resource.

The idea of growing edible plants in school gardens is now well established and there is a wide range of on-line resources that are freely available. In the UK the Royal Horticultural Society (RHS) runs campaigns to promote school gardening and supports others such as 'Bake Your Lawn'. Here the idea is that children sow 1m<sup>2</sup> of



ground with wheat (the seed can be provided) that they then grow, harvest and mill. With the resulting flour they bake a loaf of bread. There are significant learning opportunities for science (both plant and human) from such an activity that are, of course, further enhanced by the benefits derived from the children being outdoors.

Also school gardens are a good way of developing an integrated environmental approach, looking at the interdependence of organisms, they provide a source of living organisms for the children to study in science sessions, can tie in parents and the wider community through their construction and maintenance and may simply provide a quiet green space for children and staff.

Of course, much of the children's (and the teachers') day may not be based outside the classroom, but health issues can still be discussed indoors. What are the human requirements for a healthy indoor environment? This is an interesting question and even research topic for children. Aspects such as light and space are equally important for plants and people. As a professional teacher you should be in a good position to consider what would constitute a healthy classroom.

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### **Time for reflection 12.2**

#### The Healthy Classroom

We can teach about the science of health in a classroom, but perhaps we need to consider a more holistic approach that includes the indoor environment. What in your mind would constitute a healthy classroom?

Consider each of these headings in relation to your own class, or one you might be using.

Is the class big enough? Are there sufficient spaces for ease of movement and for activities such as ‘circle time’? Are there quiet areas for children to work? Is there sufficient light? Is there sufficient ventilation? Look at the walls, is there too much ‘stuff’ on them? Is the room tidy? Are there any plants in the room?

Does it feel like a healthy environment?

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A wider approach to a healthy school might include looking at the different way people arrive. Whether by walking, cycling (both staff and students) and the science behind how that promotes health. Diet, health and exercise are all important aspects to the science programme of study and the overall approach to these issues from the school reinforces their importance and can provide a range of wider learning opportunities. However, looking more specifically at the nature of human health can also provide a hands-on, participatory approach to science education.

### **Learning about human health science**

A familiarity with the conditions that promote healthy plant growth may be followed by work on human growth and what we require to remain healthy. By year 3 the emphasis moves away from the needs of water and food, towards to more sophisticated ideas of nutrition.

Nutrition and nutrients are difficult concepts. However, during growth, children develop instinctive ideas and beliefs to help them understand the world around them. When trying to teach about health, in relation to nutrition for example, such preconceived ideas and notions need to be considered. Authors argue that a child's ability to learn about such concepts improves if educational materials are specifically designed to take into account children's developing ideas.

One example that they provide relating to nutrition involves the nature of nutrients. The idea is difficult for young children, particularly as children in key stage 1 commonly have a view of matter that is continuous, in other words the subdivision of an apple would result in ever smaller pieces of apple, as opposed to the constituent parts. Here Gripshover and Markham, (2013) use the fact that young children understand mixtures: recognising, for example, that water into which sugar has been dissolved still contains sugar, thereby explaining nutrients to the children by analogy thus: "Nutrients in food are like sugar dissolved in water. You cannot see nutrients just like you cannot see the sugar, but they are there" (Gripshover and Markham, 2013). This approach also allowed the role of blood as a transport mechanism to move nutrients around the body to be explained. Nutrients then can become the basis of identifying similar foods as the basis of the idea of food groups and for healthy eating:

"food contains diverse, invisible nutrients that are extracted during digestion and carried around in the blood. This constitutes quite an achievement and demonstrates that young children can benefit from a curriculum that capitalizes on their developing intuitive theories." (Gripshover and Markham, 2013)

In Year 2 there is a statutory requirement for children to know about different types of food, but only by Year 3 is it suggested that children explore and research different food groups. Again, this is quite a difficult concept as the food groups do contain disparate types of food that would certainly not appear to be related. Eggs and beans in proteins, milk and fish in fats, fruit and bread in fibre may seem difficult to understand why they are in the same groups. Exploring the reasons in simple forms, such as eggs and beans being early stages of growth, may go some way to helping explain.

Certainly the development (and consumption) of healthy menus based on the science of nutritional requirements can be productive and again there are a number of helpful resources on-line to help develop this and these are listed in Further Reading at the end of the chapter.

Exercise is the other component of health that can be explored. In the same way that there are different food types, the effect of different exercise types can be explored. Effects of exercise may be studied in relation to pulse rate, with children recording their heart rates, plotting recovery times. Measuring body temperature after exercise not only introduces an important aspect of science, namely, that ‘no change’ can be really intriguing but can also lead to discussions on how the human body regulates its temperature. This in turn can progress to looking at how other animals regulate theirs.

Physical exercise may very well be within the physical education programme of study, but it can also provide a range of integrated science-based activities.

Naturally not all science has to involve activity. The characteristics of relaxation are one aspect of health that children can also learn about. What happens to your heart rate when you are calm? Can you reduce your heart rate by making yourself calm? These are intriguing questions that children may benefit from researching.

One final aspect of children's health that is sometimes overlooked concerns sleep. It is recognised that sleep has an important role in the development of the brain (Kelly et al 2013) and it is therefore important for children to get enough sleep as their bodies grow and mature

There is also a significant amount of evidence now to suggest sleep also plays an important role in children's day-to-day ability to function. Lack of sleep makes it much harder to concentrate and thereby reducing cognitive ability (Bubb et al 2011).

Increasingly evidence suggests that an appropriate degree of sleep is just as important for children's development as the previous discussions on healthy eating and exercise.

### **Why wellbeing?**

In 2011 a survey asked more than 3000 children (between 6 – 12 years of age) across Europe the question "How do you imagine the future?" While new technologies were certainly described (flying cars, a particular favourite) the overwhelming response was a future that was at 'peace' and where new technologies would improve our social wellbeing. When the question was extended to "What do you hope for the

future?” a world at peace was still the primary response, followed by responses alluding to a healthy environment (Young Internet, 2011)

These then are the over-riding future priorities for children, peace, wellbeing and a clean environment. Further concerns are illustrated by a survey on child worry. It suggests that concerns over conflict, isolation, relationships with family and friends and social and environmental issues appear to be amongst those areas that most concern children (Young Internet, 2011) . If peace, relationships, wellbeing and a healthy environment are seen as the most important criteria for the future science would appear to be well positioned. Making science relevant from what children see directly effects them.

Health and wellbeing are of course linked in many ways, but whereas health generally concerns physical health, wellbeing tends to refer to the less well-defined areas of psychological wellbeing and relates to more elusive concepts such as happiness and contentment. A clear explanation of what is meant by wellbeing is contained in the Children’s Society’s Good Childhood Report (2013). In the report they point out that there are two approaches, namely those that are subjective self-evaluations of wellbeing (known as ‘hedonic’) dealing with issues such as how happy or content people feel and those that address personal development and actualisation. These ideas owe much to human psychologists such as Mazlow and Brunner and are generally known as ‘eudaimonic’ and refer to psychological wellbeing.

One further and vital aspect of child wellbeing is that of child protection. In 2010 Department for Education (DfE) made a key change in replacing the phrase of 'Every

Child Matters' with 'help children achieve more'. At the time of writing there is a suggestion that policy to child protection and the role of teachers may change. However, the ideas of the Every Child Matters agenda remain apposite at present and despite the change in title, for teachers of course, every child does matter and will continue to do so.

In the context of our care for children of course, measures and surveys of illusive concepts such as wellbeing can always be criticised but it was hard to ignore the 2007 UNICEF's Report Card 7 that put the UK at the bottom of the child well-being league table. By the more recent UNICEF Report 11 (2013) the UK's position had improved but the outcomes of even this latter survey makes difficult reading for anyone in the UK with responsibility for the wellbeing of children. Its findings underline the need to consider aspects of the wellbeing children in schools and here certain aspects of science teaching, particularly in some of the teaching sessions and environments may provide opportunities for this.

### **Hedonic wellbeing and science**

How do you know if you are feeling happy? How do you know if someone else is feeling happy? These are questions that we may use to begin to think about the physical characteristics of feeling happy. Likewise, the opposite questions relating to the physical characteristics of sadness or any emotion is an interesting starting point. Children may be asked to draw the faces of friends pretending to look happy or sad. What emotional characteristics can they recognise through such observation? Data can be collected from simple questions such as 'what things make you happy?' and

these can be collated and displayed graphically. Some care needs to be taken when dealing with emotional responses, so it is good to 'act out' the expressions and to use suggested 'what makes you happy' categories. However, the topic of happiness is important and one that we can analyse by working scientifically.

Another area might be environmental preferences. For those who like to be outdoors, what is good about being outside? What are the best points? Fresh air, space, a sense of freedom? What might encourage those who may not like the outside to go out? Again, these ideas can be brought together, perhaps presented, and discussed in terms of what we need for our own health. Of course, this may in turn, lead onto further sessions on what other animals may need.

Looking at human needs in relation to the environment is one way to get children to consider not only their own physical health, but also the wider implications of how certain environments will promote other less well-defined responses such as making us feel good. Less well described perhaps, but no less important an observation, particularly in the context of science.

In fact feelings are an interesting area to explore. In Chapter 11 we talked about the importance of carrying out observations outdoors. We pointed out that scientific observation does not have to be visual, it can be based on any of our senses. For example, how does the smell of cut grass, or chocolate make you feel? How does rain on your face make you feel? There is a simple way to find the latter question out and that is to go out in the rain!



Observations of changing seasons, spending time looking at the world outside, noticing subtle changes in how trees or other plants may look across the seasons. Children could take pictures of a local tree each month, or monthly pictures of the skyscape over the school. These sorts of activities can be used as the basis of science sessions on plants or seasons, but also allow children some deeper emotional engagement with the environment. That in itself may be an important part of their overall sense of wellbeing.

Furthermore, there is another aspect to such approaches perhaps best summarised by Hodgson and Dyer (2003) when they say in relation to the outdoors and wellbeing:

“Teachers today are under intense pressure to produce academic excellence and there is a very real danger that some of the most important elements in the development of well-balanced individuals are having to be neglected. You have the opportunity to redress the balance. We promise you its fun for YOU and the children.” (Hodgson and Dyer (2003)

### **Other forms of wellbeing**

Earlier we mentioned aspects of wellbeing that look more to psychology, that are broadly categorised as eudiamonic. These have a broad range of characteristics but address issues such friendships, confidence and self regard. They tend to be related to mental wellbeing and the UK based organisation ‘Youngminds’ ([www.youngminds.org.uk](http://www.youngminds.org.uk)) produce some excellent resources that address these issues in broader ways.

However, there are ways in which science sessions may be of use in developing ideas of friendship, support and compassion. In Chapter 14 we discuss two relevant points, how remarkably physically similar humans are, something that we sometimes forget in celebrating difference, and the evolutionary advantages of compassion and friendship as aspects of fitness for survival. A really important point here is that we are incredibly social animals. We live in close proximity to each other and aggression (despite what may appear in the news) is actually quite a rare. Ideas of working together, caring for one another and having empathy with other human beings, wherever they may be, has an ecological basis and a part of our biological make up that has made us so successful. This of course may be difficult to demonstrate practically, beyond looking at other social animals, but nevertheless it is an important message and one that is a core principle in human ecology.

### **Further reading**

UNICEF (2007) Report Card 7. Child Poverty in Perspective. An Overview of Child Well-Being in Rich Countries. [On-line] Available from

<http://www.unicef.org.uk/Images/Campaigns/Report%20card%20briefing2b.pdf>

An interesting report, particularly for how low children in the UK score.

Ipsos Mori (2011) Children's Well-being in UK, Sweden and Spain: The Role of Inequality and Materialism. A Qualitative Study [On-line] Available from

<http://www.unicef.org.uk/Latest/Publications/Ipsos-MORI-child-well-being/>

Again an interesting report with some interesting discussions and approaches.

Gutman, L. M., & Feinstein, L. (2008) Children's well being in Primary School: Pupil and School. Wider Benefits of Learning Research Report No.25 [On-line] Available from <http://eprints.ioe.ac.uk/2050/1/Gutman2008Children.pdf>

Some still relevant discussions of well-being in primary settings.

A wide range of resources are also available on-line. Some links are provided below:

<http://www.crickweb.co.uk/ks2science.html>

<http://www.teachingideas.co.uk/themes/keepinghealthy/>

<http://www.educationscotland.gov.uk/learningteachingandassessment/learningacrossthecurriculum/responsibilityofall/healthandwellbeing/>

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UNICEF (2013) Report Card 11

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Young Internet (2011) How Do Young Children Imagine the Future? Available at <http://www.goodbeans.com/files/2012/01/Future-Survey-Press-EN.pdf>