*Biology> Big idea BHD: Health and disease > Topic BHD1: What are health and disease?*

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| **Key concept (age 11-14)** |
| **BHD1.1: Good and ill health** |

**What’s the big idea?**

A big idea in biology is that organisms must stay in good health to survive and thrive; the health of an individual organism results from interactions between the organism’s body, behaviour, environment and other organisms.

**How does this key concept develop understanding of the big idea?**

This key concept helps to develop the big idea by exploring what is meant by good and ill physical and mental health.

The conceptual progression starts by checking students’ understanding that people have physical and mental health, and of factors associated with good and ill physical and mental health. It then supports the development of understanding of symptoms of ill health, and how health as a concept can be defined.

**Using the progression toolkit to support student learning**

Use diagnostic questions to identify quickly where your students are in their conceptual progression. Then decide how to best focus and sequence your teaching. Use further diagnostic questions and response activities to move student understanding forwards.

**Progression toolkit: Good and ill health**

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| **Learning focus** | The physical health and the mental health of an organism can range from good to ill, and are affected by numerous factors. | | | | |
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| **As students’ conceptual understanding progresses they can:** | **C o n c e p t u a l p r o g r e s s I o n** | | | | |
| Recall that people have both physical health and mental health, which can range from good to ill.  **P** | Identify factors associated with good and ill physical health in humans, other animals, and plants.  **P** | Identify factors associated with good and ill mental health in humans.  **P** | Recognise that changes in normal body appearance, function and behaviour can be symptoms of ill health. | Evaluate definitions of health. |
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| **Diagnostic questions** | Health check | Healthy body | Healthy mind | Symptoms | Defining health |
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| **Response**  **activities** |  | Improving physical health | Improving mental health | Is it a symptom? | What is health? |

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| Key: | | | |
| **P** | Prior understanding from earlier stages of learning | **B** | Bridge to later stages of learning |

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| **Health check** | **Healthy body** | **Healthy mind** | **Symptoms** | **Defining health** |
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| Confidence grid | Drawing | Drawing | Focussed cloze | Confidence grid |
| **Improving physical health** | **Improving mental health** | **Is it a symptom?** | **What is health?** |  |
|  |  |  |  |  |
| Discussion | Discussion | Talking heads, discussion | Critiquing a representation, discussion |  |

**What’s the science story?**

Diet, exercise and behaviour have impacts on the functions of the human body. Humans and other animals need a balanced diet of different types of food and plenty of exercise to stay in good health. The physical health and the mental health of an organism can range from good to ill. The physical and mental health of an individual organism result from interactions between the organism’s body, behaviour, environment and other organisms. Changes in the normal appearance, functions and behaviour of an organism can be signs or symptoms of ill health.

**What does the research say?**

*Learning about health*

Over recent decades, a rapidly growing body of research has considered the promotion, measurement and effects of *health literacy* within populations. Put simply, health literacy at the individual level enables a person to access, understand, appraise and use information to make informed decisions about their health. Extensive empirical research shows that increased health literacy can lead to changes in behaviour and decision-making that improve health outcomes (e.g. Pelikan, Ganahl and Roethlin, 2018), and there have been high-level calls for global action to increase health literacy in children and adults (World Health Organization, 2016; IUHPE Global Working Group on Health Literacy, 2018).

The school curriculum has an important role to play in developing health literacy (IUHPE, 2010; Paakkari and Paakkari, 2012; Kilgour et al., 2015; Bruselius-Jensen, Bonde and Christensen, 2017). Research has shown that the development of health literacy in children is important in reducing the incidence of disease (e.g. Hanson and Gluckman, 2011), and that efforts to improve the health literacy of school children can have impacts on their behaviour (e.g. Park et al., 2017).

Health literacy includes both physical health literacy and mental health literacy (Kutcher et al., 2016). Health literacy can be developed in schools through the science curriculum as well as through specific curriculum strands related to social, health, sex and relationships education.

In England, the current National Curriculum programme of study for science requires students to learn about the effects of diet, exercise and drugs on the human body from age 6; aside from requiring basic understanding at age 6 of the importance of personal hygiene, students are not required to learn about pathogens and infectious diseases until age 14; there is no explicit requirement to learn about mental health at any stage (Department for Education, 2013b; 2013a; 2014). Extensive curriculum development work undertaken by the Royal Society of Biology in the UK (McLeod, 2018) and the American Association for the Advancement of Science (AAAS Project 2061, 2009) advocates learning about good and ill physical and mental health, and about the causes of both infectious and non-infectious diseases, in science lessons from age 5.

The authors of a number of studies have called for a constructive, health-oriented (rather than disease-oriented) approach to health education in schools, wherein health rather than disease is the dominant discourse, with the aim of developing students’ understanding of how to enhance good health as well as how to prevent ill health (Downie, Tannahill and Tannahill, 1996; Adams, 2003; Kilgour et al., 2015).

*Understanding the concept of health*

Definitions of health have long been debated. The World Health Organisation’s definition states that (good) health “is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 2006). It has been suggested that the definition of (good) health be shifted away from the absence of disease, towards an emphasis on an individual’s ability to function and cope with physical, emotional, environmental and social challenges (Huber, Knottnerus and Green, 2011). Ill health (or “illness”) can be defined as deviation(s) from the ‘normal’ appearance, functions and behaviour of an organism, although defining ‘normal’ and what constitutes a deviation from it even for an individual organism is not necessarily straightforward (Boruchovitch and Mednick, 2002).

Searching the education research literature for keywords such as ‘health’, ‘wellbeing’, ‘illness’ and ‘disease’ produces an enormous array of papers on managing students’ and teachers’ health issues in the classroom, and the effects of specific examples of ill health on learning. Research into students’ understanding of the causes of non-infectious and infectious diseases is summarised in topics BHD2 *Human lifestyles and health* and BHD3 *Infectious disease*, respectively. It can be challenging to locate, from amongst all of this, research into students’ understanding of health and disease as concepts, and into effective teaching approaches to developing understanding of the concept of health. Some papers that provide useful insights are summarised here.

Research suggests that young children’s primary source of health information is their family, followed by public health campaigns, and then teachers and friends at school (Brindal et al., 2012); children at age 11 are likely to have many preconceptions about health and disease from everyday life.

Children’s understanding of health, and of behaviours associated with good and ill health, changes with their age and developmental stage (Berk, 2000). The ways in which people define health shifts with age; while children and younger people tend to define health in terms of vitality and physical strength, older people relate health to physical functions and ability to cope with everyday life.

Research suggests that children up to age 11 primarily equate healthiness with eating a healthy diet and being physically active (Hesketh et al., 2005; Protudjer et al., 2010). When children aged 5-9 in Australia (Brindal et al., 2012), 9-11 in the US (Reeve and Bell, 2009) and 14-15 in Turkey (Çetin et al., 2013) were asked to draw and write about healthy and unhealthy things, most of the students’ answers related to food and drink (over 60% in the US study) and physical activity. Emotional or mental health was not commonly depicted or described by the children up to age 11 (although depictions of healthy activities usually included people who were smiling), but featured more commonly in answers from the children aged 14-15. Ideas about social health and wellbeing were rarely seen. A separate study found that some adolescent children also referred to fresh air in relation to healthiness (O’Higgins, Sixsmith and Gabhainn, 2010).

When the children in Reeve and Bell’s US study were asked to define health, their answers mostly referred to disease (causes and cures), followed by weight gain and loss, and ideas about balanced diet. A study in Shanghai (Wang et al., 2014) found that when children aged 15-20 were asked to define health, their definitions commonly included the idea that only when people are healthy can they do everything they want and need to do. A study of teachers from a large number of schools in Italy found that they most commonly defined health as the absence of disease, followed by ideas about psycho-physical efficiency, balance, and absence of stress (Miglioretti et al., 2013).

The prevalence of messages about healthfulness, fitness and idealised bodies in everyday life, society and the mass media – even if well intentioned – can mean that an individual’s own health and own body become a source of anxiety. The misunderstanding that health only relates to physical health, and in particular physical *fitness*, is common, as is the incorrect assumption that the same standard of health (often equated to an idealised, slim body) is achievable by everybody through effort and self-discipline, ignoring the effects of variation between individuals (Varea, 2018).

**Guidance notes**

As noted above, curriculum development work undertaken by the Royal Society of Biology (RSB) and the American Association for the Advancement of Science (AAAS) advocates learning about good and ill physical and mental health, and about the causes of both communicable and non-communicable diseases, from the beginning of compulsory science education. The *Best Evidence Science Teaching* resources produced to support the development of the ‘health and disease’ big idea adopt the approach advocated by the RSB and the AAAS, and also draw on guidance from the Mental Health Foundation (2019), with the aim of developing physical and mental health literacy throughout compulsory science education.

This key concept (BHD1.1 *Good and ill health*) and the following one (BHD1.2 *Disease*) probe and develop students’ understanding of health and disease as concepts. Understanding of the effects of specific lifestyle factors on health (including diet, exercise, asthma and recreational drug use) is developed further in topic BHD2 *Human lifestyles and health*. Understanding of pathogens and the spread of infectious diseases is developed further in topic BHD3 *Infectious disease*.

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