

# [Constructivist theory of development](https://assignbuster.com/constructivist-theory-of-development/)

To believe a child is an empty vessel would mean believing that children are unable to think or respond to the world around them. The term ’empty vessel’ suggests that babies’ minds contain nothing and that helping them to develop means simply filling the space with facts. Theorists and scientists have spent many years researching and developing ideas that suggest that even an unborn child is capable of developing sensitivity towards its environment and therefore that human development begins long before the outside world has impressed its influence on a child (Muir & Slater 2000, pg. 68). However, this essay will explore the theories of how children learn and develop from birth, with emphasis placed on the constructivist learning theory in relation to the development of children from infancy and towards adulthood.

Mukherji & Odea, (2000, pg. 80) describe how soon after birth babies begin ‘ trying to make sense of the world around them’. They are able to identify sounds, in particular voices, and then subsequently begin to interpret images and the responses of adults. Their ability to ‘ read’ facial expressions develops (Louw, 2002, pg. 208) and they use this knowledge to modify their behaviour. This development begins the pattern of constructivist learning that theorists have researched and discussed for many years.

The constructivist learning theory essentially means being actively involved in acquiring new knowledge and skills, interacting with one’s social and cultural environment and building on or adapting existing knowledge and experiences (Boghossian, 2006). The theory was documented by Piaget who studied his own children in order to increase his understanding of the developmental phases that children move through when learning. Piaget (cited in Slavin, 1994, pg. 31) identified four specific age-related stages in a child’s development and described how children foster new ideas by using ‘ patterns of behaviour’ or ‘ schemes’ and relating these ‘ schemes’ to the environment around them. Some psychologists questioned Piaget’s theories regarding the four stages and discovered the language used by Piaget during his studies to be too complex to provide an accurate representation of a child’s abilities at any given time (Slavin, 1994, pg. 44). One theorist who challenged Piaget’s theories was Lev Vygotsky, (Oakley, 2004, pg. 42) who suggested that rather than waiting for children to master one level of development before moving onto the next, learning takes place when children are challenged and presented with problems just beyond their current level of understanding. Vygotsky also placed far more emphasis on the role of adults (Gopnik, et al. 2001, pg. 18), an idea further developed by Bruner, who proposed that adults were ‘ tools’ that can assist learning by ‘ scaffolding’ the development of language (Bruner, 1983, pp 64-66). Along with many others, by combining elements from all three theorist’s views of child development, the outcome is the constructivist theory of learning, a theory where prior knowledge is the basis and language, challenge and social interaction, the tools.

Sharp, et al. (2009, pg. 51) place much emphasis on prior knowledge being the fundamental basis in the teaching of science. Learning and understanding in science is no longer considered the rote learning of facts and technical vocabulary, but instead means embracing inquisitiveness and the development of enquiry skills that aid the learner in making sense of the world around them (Loxley, et al. 2010, pg. 45).

Scientific knowledge and understanding stems from intrinsic curiosity (Sharp, et al. 2009, pg. 2). The infant, who continuously touches the objects surrounding him, is investigating the textures of materials and developing his own responses to them. When he then repeatedly returns to the soft toy he demonstrates that his enquiry has formulated knowledge of texture and subsequent actions are based on his initial investigations. The parent who then moves the toy further from the infant and smiles when he finally reaches and nuzzles his prize has provided challenge and social interaction as a means of developing the infant’s skills further. Rather than an empty vessel that the parent has begun to fill, the infant has demonstrated that he is a constructivist learner who is interacting with his environment and building on his experience.

This example demonstrates that both the constructivist learning theory and the development of scientific enquiry apply to even the youngest children and so should be nurtured and developed when teaching science to primary and secondary pupils. Scientific enquiry allows existing ideas to be challenged and knowledge and understanding to be achieved (Loxley, et al. 2010).

However, the constructivist theory in the classroom cannot be implemented unless prior knowledge is ascertained. Although the national curriculum (DfEE, 1999) details the legal requirements for the teaching of science, attainment targets are divided into key stages allowing for differentiation based on children’s level of understanding at any particular point in time. Teachers need to identify pupils’ current levels before they can begin to plan for future learning (OfSTED, cited in Kyriacou, 2007) and work towards these attainment targets.

The elicitation of prior knowledge can be achieved in many ways. With language playing such an important role in the development of knowledge (Bruner, op. cit), discussion and careful questioning can be effective ways of allowing children to clarify their own ideas while giving the teacher an opportunity to identify misconceptions in their understanding (Littledyke, 1998, pg. 22). Stimulus for the discussion can range from a ‘ big question’ as described by Longuski (2006), the presentation of a ‘ Concept cartoon’ [Appendix A] or through debating a ‘ PMI’ statement [Appendix B]. Card sorting activities allow children to share their ideas and recording responses by using ‘ KWL’ grids [Appendix C] or by asking pupils to draw diagrams or pictures provides concrete evidence of current levels of understanding.

Loxley, et al. (2010, pg. 10) explain that children will engage in learning when it is presented in contexts which are familiar. I investigated this theory during a recent science lesson [Appendix D], where I used a story to present a scientific concept. The strategy proved to be particularly effective in eliciting pupils’ ideas and misconceptions and captured the interest of all children involved. Pupils connected with the lesson due to the presentation of a stimulus in the form of visual and auditory media (Naylor & Keogh, 2007). The lesson was filled with discussion with all abilities participating in sharing ideas. The adults’ role in the lesson was to encourage discussion, clarify responses, assist lower ability pupils in recording their ideas and to offer questions that would promote critical thinking. Children’s responses showed that they were using their personal experiences to form ideas about the scientific ‘ problems’ presented by the cartoon [Appendix E]. Curiosity surrounding other aspects of light exploration was stimulated by the lesson, with several children asking questions that they would like to investigate in the future [Appendix F].

The main purpose of this lesson was, however, not only to ascertain prior knowledge but to identify misconceptions that would inform the class teachers planning of the class’ next unit of work.

Misconceptions can originate from a variety of sources. Children can sometimes form incorrect ideas based on their own experiences or interpretation of language, as demonstrated by the common misconception about the term ‘ plant food’. In response to a natural desire to form relationships with known ideas (Allen, 2010, pg. 3), children can also draw inaccurate conclusions to newly encountered concepts (McGraw-Hill, 2011), an example of which is a child who, having observed the sun appearing to move across the horizon, concludes that the sun must actually move around the Earth. Occasionally educational staff can, due to their own misconceptions or lack of subject knowledge, provide information that is not accurate which highlights the need, as outlined by Professional Standard 22, (TDA. 2008) for teachers to be secure in their understanding of the scientific concepts taught to pupils (TDA. 2008, Standard 14) and, through reflection and evaluation, to identify when they need to further their own scientific understanding (TDA. 2008, Professional Standard 7a).

The transcript of the discussion, [Appendix G] coupled with children’s’ written recordings of their ideas [Appendix H, I & J] highlights the common misconceptions [Appendix K] that the group held about their understanding of the Earth, sun and moon unit of work, studied previously, and their impending studies of light. Misconceptions regarding concepts already taught, in this instance the Earth, sun and moon misunderstandings, provide an example of assessment of learning, or summative assessment, and can be used to judge a child’s learning and level of scientific understanding.

The misconceptions surrounding the theory of light act as formative assessment as they can be used when considering implications for future progress and to inform planning for the new topic to be covered, as described by Littledyke (1998, pg. 21). They also enable the teacher to consider ways of challenging pupils’ misunderstandings without simply giving them the correct responses, as this could damage their self esteem or lead to them refusing to accept alternative explanations (The National Strategies, 2009). Instead, Miller, et al. (cited in Ansberry & Morgan, 2007) explain that children should be provided with opportunities to investigate their own theories, for example through practical investigations or even the use of picture books (Ansberry and Morgan, ibid), while considering those of others. This will enable them to use the experiences on which the misunderstandings were based (assimilation) and then to adapt their original ideas in response to their investigations (accommodation) (Allen, 2010, pg. 12). Any strategy adopted must address errors in a child’s understanding, as failure to do so could prevent further progress (The National Strategies, ibid: 3).

Formative assessment (TDA. 2008, Standard 12) isn’t, however, a tool to be used exclusively to elicit pre-conceptions about a topic to be covered. Yeomans and Arnold (2006) describe it is an essential part of planning and preparation that should be carried out continuously to enable teachers to ‘ evaluate the impact of their teaching’ (TDA. 2008, Standard 29), modify their approaches and assess how well children are progressing. It enables teachers to compare children’s levels of understanding with age appropriate objectives and those listed in the National Curriculum for Science.

Analysis of an elicitation activity will also enable the teacher to plan differentiated activities to address individual pupil’s strengths or areas of weakness. Together with consideration for differences in learning styles and factors that may be affecting learning, this analysis will ensure that the needs of individuals are met and that all children ‘ achieve their potential’ (TDA. 2008, Standard 10). However, this type of personalisation of learning is not straightforward and requires commitment to an ‘ ethos, where every learner matters and every learner’s learning needs should, if possible, be accommodated’ (Keeley-Browne, 2007, pg. 133).

Although there are links, there are also differences between differentiated and personalised learning. Differentiation is a more ‘ traditional approach’ to teaching with pupils often grouped by ability and with tasks that match that ability (Kendall-Seater, 2005, pg. 24). Personalised learning is a progressive approach where the child’s experiences are the focus and results are judged by outcome or by the extent of resources supplied (Kendall-Seater, ibid). Both approaches benefit from consideration for children’s previous knowledge and experiences, on which they can build new ideas.

Despite agreeing with this principle, experts have identified difficulties that could occur by implementing the constructivist teaching and learning theories. Keogh & Naylor (1996) have questioned the plausibility of considering the prior knowledge of every pupil, and Skidmore & Gallagher (2005) acknowledged the difficulties that a change in approach might present to teachers. In her research report, Chin (2006) discusses difficulties between balancing the responsibility of teachers as providers of accurate scientific facts with them being facilitators of child-initiated learning. Considering each of these experts’ reservations means viewing constructivist teaching and learning in science as a challenging process where the acquisition of scientific knowledge is the main goal that can be achieved through the amalgamation of an understanding of children’s developmental processes and the commitment from teachers to providing opportunities for personal enquiry with sound subject knowledge.

In summary, teachers need to first recognize that ‘ children are not empty vessels’ but that they have a valuable wealth of scientific knowledge and experience on which to construct and adapt new ideas. Teachers should embrace and nurture curiosity, promote critical thinking and provide creative learning environments that facilitate purposeful exploration and social interaction. Careful consideration has to be given towards the National Curriculum for Science objectives; however, as is often the case with preparation for statutory testing (POST, 2003), it should not be seen as a constraint that restricts creativity or that initiates a return to the meaningless rote learning strategies (Stones, 1984, pg. 64) of the past. Assessment opportunities should be explored, and the results used effectively to inform and enable an inclusive, personalised curriculum that allows children to become active participants with ownership of their own learning.