

Living Things

Critical teaching ideas - Science Continuum F to 10

Level: Moving towards level 1

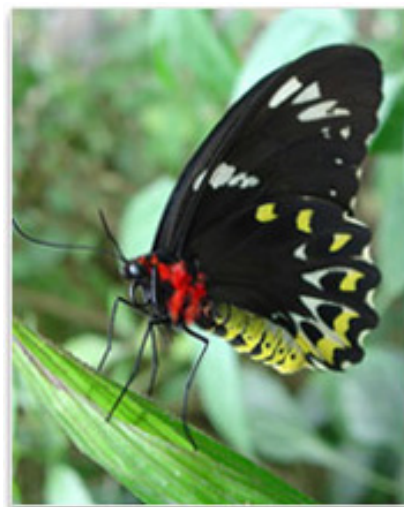
Student everyday experiences

For young students things are 'living' if they move or grow. E.g. sun, wind, clouds, lightning are living because they change and move. Others think plants and certain animals are non-living, (Fleer & Hardy, 1996; Leach et al., 1995).

An everyday example is that students think various lifecycle stages of a butterfly are not alive (the eggs and immobile pupae), whereas a caterpillar and butterfly can move and are therefore considered to be alive. (Carey, 1985; and Stepan, 1985).

Students often do not recognize that trees, vegetables, grass are plants. (Osborne & Freyburg, 1985) This may be related to common language use of word 'plant' defined as small, decorative plants in gardens and nurseries etc.

Most students only list vertebrates, particularly mammals (Bell 1981, 1993; Bell & Barker, 1982) as animals. Primary students use criteria such as number of legs, body covering and habitat to determine 'animal'. Some children think animals only live on land (Mintzes et al, 1991).



It is common for 5-7 year olds to have no conception of humans as animals. Children use 'animals' as examples of the differences between people and animals (Murphy, 1987). This may be related to common language use e.g. 'No Animals on Freeway'. 'Time to feed the animals' when referring to family pets. Children see 'living' in relation to where and how people 'live', e.g. living in my house, a dog lives in a kennel (Kerr et al , 2006) .The focus is on the activity that takes place within a location.

The scientific view

- Living things are distinguished from non-living things in their ability to carry on the following life processes: movement, metabolism, growth, responsiveness to environmental stimuli and reproduction.
- This is a view of science appropriate at this age but has some limitations as this view can lead to the alternative conceptions above. For example movement is not apparent in plants and not every definition of life considers these as essential properties.

Critical teaching ideas

- Most living things need food, water, light, temperatures within certain limits and air (AAAS Maps)

- Living things have a variety of characteristics that are displayed to different degrees: they respire, move, respond to stimuli, reproduce and grow and are adapted within a complex of living things situated in an environment (Skamp, 2004)

To build up a concept of living organisms focus on the similarities shared by unlike classes of living things e.g. ‘a gum tree and a yabby’ (Skamp, 2004) rather than always referring to the differences which can be easily identified. Concentrating on differences alone does not encourage students to make connections across ideas or groups, e.g. to see that ‘plant’ is a major category of classification not just a label for a type of ‘plant’ in a nursery.

As students gain knowledge of biological groups such as reptiles and insects and various types of worms, etc., they lose the inclusive animal concept and eventually the same for plants. Young children aged 5-6 yrs are more likely to think of spiders and worms as animals (the biologists view) than are children aged 9-10 (Bell 1981, 1993; Bell and Barker 1982). There is a need to maintain a focus on the big ideas e.g. groups of classification and allow students to make connections between individual examples and the big ideas.

A challenge for teachers is to determine how to disprove the idea that fire is ‘alive’. Children tend to think fires are living because they consume wood, move, require air, reproduce (sparks cause other fires) and give off waste (smoke). (Kyle et al, 1989) This is a complex idea and needs to be dealt with at higher levels where concepts are unpacked in terms of the language used to define characteristics. (It may also be appropriate to not worry that it needs to be ‘taught away’ at this stage.) It is not necessary to try to change these conceptions at this stage, but to recognize that students may hold and maintain this view at some stage as learners.

Teaching activities

Collect evidence and data for analysis and open up discussion via shared experiences.

Students collect objects from the schoolyard on a scavenger hunt. Classify objects into various groups. Ask the question “Is it alive?” Attempt to determine if objects are living. Discuss ideas e.g. a leaf that has just been picked, an apple etc. Provide the correct answer after students have provided a range of ideas and the reasons for their thinking.



Set up a role play like “Spy Kids” and explore what’s alive. One scenario could be: “We’re all spies and we have to send a report to the Principal on what’s alive.” Students could take digital photos and create a montage.

Challenge some existing ideas.

Is the question ‘Is it alive?’ the same as ‘Is it a living thing?’ (Skamp 2004 p.248) or alternatively ‘How do you know something is dead?’ Discuss these ideas, or students could take on roles such as working as palaeontologists to discover why dinosaurs died. Alternatively students could discuss the question “Is a freshly picked tomato alive?” (Skamp 2004, p. 249) Allow students to explore this question in terms of their own concept of

'living'. Other questions to explore could be whether a computer which is turned on is alive; whether a kangaroo which is hit by a car is alive; and whether a deciduous tree is alive. Try listing key questions that arise in relation to this issue or review these ideas over time with students.

Collect evidence and data for analysis and promote reflection on and clarification of existing ideas.

Students suggest how to compare changes between a growing tomato and one that has been picked. Use digital cameras to record changes over time, and encourage the use of science journals to record observations and ideas.



Students provide oral reports outlining the changes and their views. Or alternatively they could keep thinking books where they draw diagrams, create mind maps on how their thinking changes. (Of the 19 experts who responded to children's letters on this question, 17 took the view that the picked tomato was not alive.

A good case could be argued that the freshly picked tomato is alive because it is able to maintain its biological integrity for a considerable period of time after picking, e.g. it could change colour from green to red if placed in the sun (as a growing tomato would do) and both would eventually show signs of water loss and decay (at different rates) etc. (Skamp 2004 p. 249) Good content for an interpretive discussion requiring students to use reasoning to justify their contributions to discussions.

Extension: Open discussion to explore children's understandings of organic fruit and vegetables. Why do some people choose to buy organic fruit & vegies? Explore the boundaries of students' understanding of 'living' by discussing phenomena such as fire & the sun etc.

Challenge some existing ideas.

Other questions to explore could be whether a computer which is turned on is alive; whether a hibernating bear is alive; and whether a deciduous tree in winter is alive. Consider listing key questions that arise in relation to this issue or review these ideas over time with students.

Research : Skamp (2004)