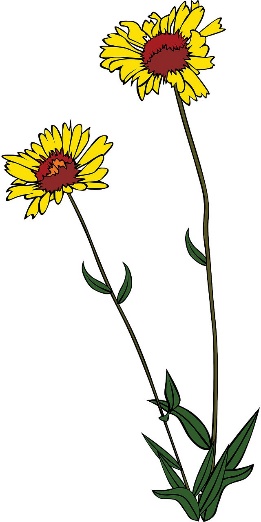
**Standing up**



The long, thin stems of a flower can stand up off the ground. They can support the weight of a flower at the top.

But if a flower doesn’t get enough water it will wilt and droop.

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| Your teacher will demonstrate a model of this using water and long, thin balloons. |

**To talk about in your group**

1. What is inside the stem of a flower that provides support to help it stand up?
2. What is inside a human that provides support to help them stand up?
3. Can you explain why a plant is stuck in one place, while a human can move around?

*Biology> Big idea BCL: The cellular basis of life > Topic BCL2: From cells to organ systems > Key concept BCL2.3: The human skeleton and muscles*

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| --- |
| **Response activity** |
| **Standing up** |

**Overview**

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| Learning focus: | Bones and muscles are tissues that work together with organs in organ systems to support the life processes of cells to keep organisms alive. |
| Observable learning outcome: | Recall that the human body contains a skeleton and muscles for support, protection and movement. |
| Activity type: | Challenge to thinking, discussion |
| Key words: | bones, muscles |

This activity can help develop students’ understanding of the function performed by the human skeleton by challenging them to think about how some of these functions are achieved in organisms without bones. It can be used in follow-up to the diagnostic question:

* Diagnostic question: Without bones

|  |  |
| --- | --- |
| **P** | **PRIOR UNDERSTANDING**  This activity explores ideas that are usually taught at age 5-11, to aid transition from earlier stages of learning. |

**What does the research say?**

By age 11, students should know from science lessons that the bodies of humans and other animals have different parts with specific functions, including bones and muscles (AAAS Project 2061, 2009; Department for Education, 2013). Young children may think of the human body holistically as a single entity, but by age 10 they more commonly understand that it has different functional parts that work together to maintain life (Carey, 1985; Driver et al., 1994).

**Ways to use this activity**

Show the class a plant or cut flowers with long, thin stems. Point out that the long, thin stems are self-supporting, such that they can stand up off the ground and can support the weight of leaves and flowers at or near the top.

For contrast, show a similar plant or cut flower that has been deprived of water and is wilting and drooping, such that the stem is no longer self-supporting.

To draw out the idea that water inside a stem provides it with support, fill a long, thin balloon (e.g. a modelling balloon) with water until it becomes self-supporting. Then let some of the water out, to show that it ‘wilts’ and ‘droops’.

Students should then talk in pairs or small groups about how to answer the questions on the worksheet. It is through the discussions that students can check their understanding and develop their explanations. Listening in to the conversations of each group will often give you insights into how your students are thinking.

After their discussions, each group should be prepared to report the key points of their discussion to another group, or to the class.

*Differentiation*

The quality of the discussions can be improved with a careful selection of groups; or by allocating specific roles to students in the each group. For example, you may choose to select a student with strong prior knowledge as a scribe, and forbid them from contributing any of their own answers. They may question the others and only write down what they have been told. This strategy encourages contributions from more members of each group.

**Equipment**

For demonstration to the class:

* one or two long, thin balloons (e.g. modelling balloons), which can be filled with water
* two similar plants, one that has been well watered and one that is wilting (optional)

**Expected answers**

1. (A column of) water
2. Bones/skeleton (and muscles)
3. A plant has roots to provide a constant supply of water from the ground, but which also mean it is rooted in one place. A plant does not have muscles or bones, so cannot move around (e.g. by walking or running). Humans have muscles to move their bones, enabling them to move around.

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: pixabay.com/Clker-Free-Vector-Images (31448)

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