**Cell drawings**

**Onion cells**

Some children were asked to draw what they think onion cells look like.

|  |  |
| --- | --- |
| **A** | **B** |
|  |  |
|  |  |
| **C** | **D** |
|  |  |
|  |  |

**To discuss**

1. Which is the best drawing of onion cells?
2. Why do you think it’s the best?
3. What is wrong with the other three drawings?

**Cell drawings**

**Animal cells**

Some children were asked to draw what they think animal cells look like.

|  |  |
| --- | --- |
| **A** | **B** |
|  |  |
|  |  |
| **C** | **D** |
|  |  |
|  |  |

**To discuss**

1. Which is the best drawing of animal cells?
2. Why do you think it’s the best?
3. What is wrong with the other three drawings?

**Cell drawings**

**Bacteria**

Some children were asked to draw what they think bacteria cells look like.

|  |  |
| --- | --- |
| **A** | **B** |
|  |  |
|  |  |
| **C** | **D** |
|  |  |
|  |  |

**To discuss**

1. Which is the best drawing of bacteria cells?
2. Why do you think it’s the best?
3. What is wrong with the other three drawings?

*Biology > Big idea BCL: The cellular basis of life > Topic BCL1: Cells > Key concept BCL1.2: Cells and cell structures*

|  |
| --- |
| **Response activity** |
| **Cell drawings** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Organisms are made up of one or more cells, which have common structures that carry out life processes. |
| Observable learning outcome: | Apply the idea that organisms are made up of one or more cells. |
| Activity type: | Discussion, critiquing a representation |
| Key words: | cell |

This activity can help develop students’ understanding by addressing misunderstandings about the relationship between cells and organisms, as revealed by the following diagnostic question:

* Diagnostic question: Body cells

**What does the research say?**

Researchers have acknowledged that the cell is, when first introduced, an abstract concept (Dreyfus and Jungwirth, 1989).

Research has identified a number of misunderstandings that students have about cells, including:

* the bodies of humans and other animals *contain* cells, perhaps floating in a ‘soup’ of body fluids, rather than being *made up of* cells (Clément, 2007)
* poor or no appreciation of size and scale (Arnold, 1983)
* animistic and anthropomorphic views, including that cells and cell organelles can have faces, limbs, internal organs or the ability to speak (Dreyfus and Jungwirth, 1988).

Haşiloğlu and Eminoğlu (2017) found that asking students to draw cells revealed a number of misunderstandings that they held about what cells look like, their size, and the relationship between cells and organisms. Their study showed that light microscopy coupled with drawing cells was effective in helping students to overcome a misunderstandings.

**Ways to use this activity**

Students could be asked, individually, to draw what they think cells look like (e.g. onion cells, animal cells, or bacteria cells).

In groups, the students’ own drawings or those provided on the worksheet and in the presentation could be ‘peer assessed’, with an emphasis on small group discussion to provide constructive feedback rather than simply criticising or assigning a score.

For each type of cell (onion, animal and bacteria), the groups could be asked to agree a ranking for the four pictures from best to worst, together with explanations for their rankings.

**Expected answers**

The drawings provided on the worksheet and in the presentation are based on drawings reported by Haşiloğlu and Eminoğlu (2017). According to the system used in that study, the drawings would be categorised as follows:

Onion cells:

|  |  |  |  |
| --- | --- | --- | --- |
| Correct | Partially correct | Partially incorrect | Incorrect |
| D | A | C | B |

Animal cells:

|  |  |  |  |
| --- | --- | --- | --- |
| Correct | Partially correct | Partially incorrect | Incorrect |
| A | C | B | D |

Bacteria cells:

|  |  |  |  |
| --- | --- | --- | --- |
| Correct | Partially correct | Partially incorrect | Incorrect |
| B | C | D | A |

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Developed by Alistair Moore (UYSEG), based on drawings reported in Haşiloğlu and Eminoğlu (2017).

Images: UYSEG

**References**

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