**The function of the genome**

Some children have been learning about the genome.

They suggest what the genome does.

**Emily**

It affects an organism’s characteristics.

**Tia**

It carries information from parents to their offspring.

**Alfie**

It stores genetic information.

Who do you think is right?

|  |  |
| --- | --- |
| **A** | All of them. |
| **B** | Only two of them. |
| **C** | Only one of them. |
| **D** | None of them. |

*Biology> Big idea BHL: Heredity and life cycles > Topic BHL1: Inheritance and the genome > Key concept BHL1.2: The structure and function of the genome*

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| **Diagnostic question** |
| **The function of the genome** |

**Overview**

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| --- | --- |
| Learning focus: | The structure and function of organisms depends on proteins made by cells using instructions stored in the DNA of the genome. |
| Observable learning outcome: | Recall that all organisms store heritable genetic information in their genome inside cells. |
| Question type: | Talking heads, simple multiple choice |
| Key words: | genome, heredity |

**What does the research say?**

Lewis, Leach and Wood-Robinson (2000) asked students aged 14-16 why genes and chromosomes were important. Most of the students suggested that they affect an organism’s characteristics (73% for genes, and 63% for chromosomes), but far fewer suggested that they transfer genetic information from parents to offspring (14% for genes, and 12% for chromosomes).

Science education researchers have acknowledged that we live in a genomic era. The genomes of humans and many other organisms have been sequenced, and the study of the functions and importance of genes has broadened to whole genomes. Teaching and learning about inheritance and genetics at school must aim to prepare students to live and work in the genomic era (Stern and Kampourakis, 2017). Up to the age of 14, a useful approach may be to embed ‘pro-genomics’ and ‘pre-genomics’ practices – for example, use of language and concepts that dispose students to thinking about whole genomes rather than just genes, and that represent the first steps on a learning progression that will enable fuller understanding of genomics to be built later (Airey, Moore and Bennett, 2018).

**Ways to use this question**

Students should complete the question individually. This could be a pencil and paper exercise, or you could use the PowerPoint presentation with an electronic voting system or mini white boards.

*Differentiation*

You may choose to read the speech bubbles and the question to the class, so that everyone can focus on the science. In some situations it may be more appropriate for a teaching assistant to read for one or two students.

**Expected answers**

A – All of them.

**How to respond - what next?**

If there is a range of answers, you may choose to respond through structured class discussion. Ask one student to explain why they gave the answer they did; ask another student to explain why they agree with them; ask another to explain why they disagree, and so on. This sort of discussion gives students the opportunity to explore their thinking and for you to really understand their learning needs. Responses often work best when the activities involve paired or small group discussions, which encourage social construction of new ideas through dialogue.

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

**References**

Airey, J., Moore, A. and Bennett, J. (2018). Viewed as a whole: syntheses of research evidence and teaching support resources related to genomics education in schools. A report to the Wellcome Genome Campus Public Engagement Team: University of York, UK.

Lewis, J., Leach, J. and Wood-Robinson, C. (2000). All in the genes? Young people's understanding of the nature of genes. *Journal of Biological Education,* 34(2)**,** 74-79.

Stern, F. and Kampourakis, K. (2017). Teaching for genetics literacy in the post-genomic era. *Studies in Science Education,* 53(2)**,** 193-225.