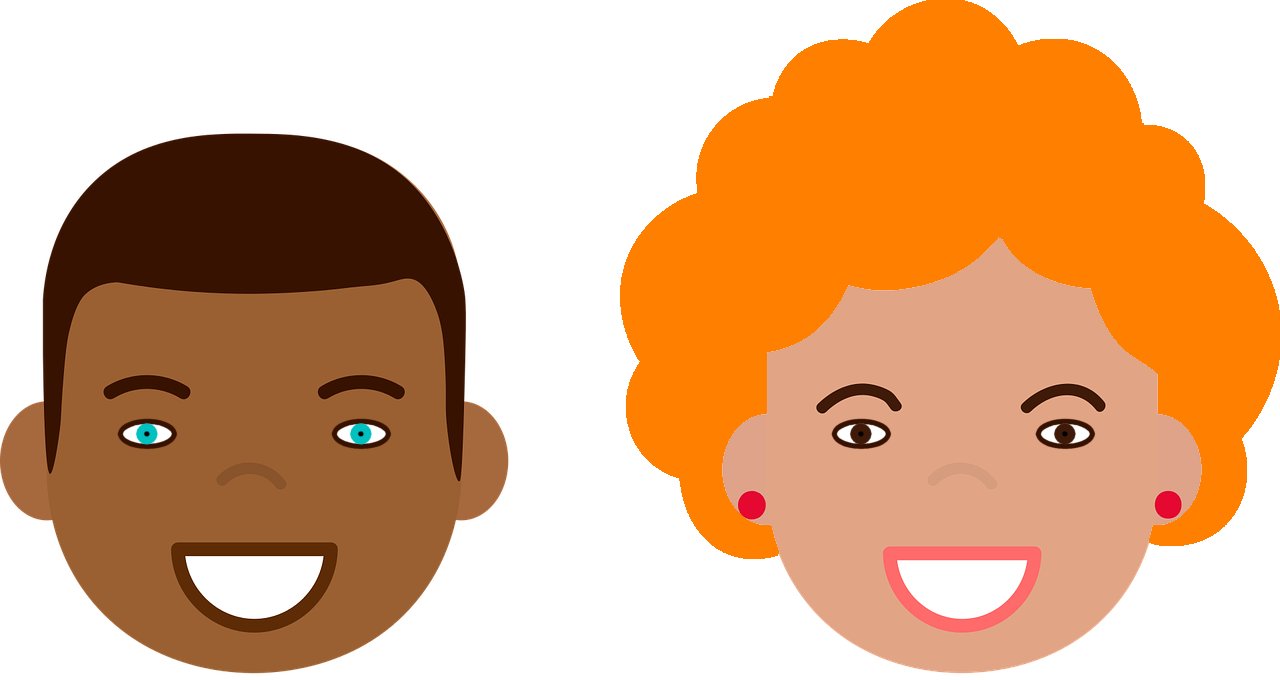
**What will the offspring look like?**

These two people are having a child together.



|  |  |
| --- | --- |
| **The father has:**  Brown hair  Dark skin  Blue eyes | **The mother has:**  Ginger hair  Light skin  Brown eyes |

**To discuss**

1. What features could their child have if it’s a girl?
2. What features could their child have if it’s a boy?

*Biology> Big idea BHL: Heredity and life cycles > Topic BHL1: Inheritance and the genome > Key concept BHL1.1: Heredity and genetic information*

|  |
| --- |
| **Response activity** |
| **What will the offspring look like?** |

**Overview**

|  |  |
| --- | --- |
| Learning focus: | Similarities and differences between family members can be explained by the passing of genetic information from one generation to the next and the effects of the interaction of organisms with their environment. |
| Observable learning outcome: | Recall that offspring inherit characteristics from each of their parents. |
| Activity type: | Discussion |
| Key words: | heredity, reproduction |

This activity can help students’ to overcome misunderstandings about parents-offspring resemblance through group discussion and prediction. It can be used in response to the following diagnostic questions:

* Diagnostic question: Dogs and their puppies
* Diagnostic question: Her mother’s eyes

|  |  |
| --- | --- |
| **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?**

From their everyday experiences (for example, of families and pets) students at age 11 should be aware that living organisms can reproduce to make offspring of the same kind (species resemblance), and that offspring are usually similar but not identical to their parents (body traits resemblance).

These ideas are likely to have been formalised through science education before age 11 (AAAS Project 2061, 2009; Department for Education, 2013). Nevertheless, research reported by a number of authors (Driver et al., 1994; Williams, 2012; Cisterna, Williams and Merritt, 2013; Allen, 2014; Ergazaki et al., 2015) suggests that children up to age 11 have numerous misunderstandings about family resemblance and how characteristics are passed from one generation to the next, including that:

* all characteristics are inherited from an organism’s mother – perhaps because the mother carries the child and gives birth;
* girls inherit most or all of their characteristics from their mother, and boys from their father.

Ergazaki (2015) found that most young children from the age of 5 were familiar with the concept of parents-offspring body traits resemblance. However, Williams (2012) reported that children can struggle to think about more than one source of inheritance simultaneously.

Researchers have used formative assessments coupled with constructivist approaches that enable students to build their own explanations of heredity, which may help to develop students’ understanding and overcome misconceptions, including the use of group discussions and challenging students to use their understanding to make predictions (e.g. Chin and Teou, 2010).

**Ways to use this activity**

Students could generate lists or drawings of the features they think the offspring could have.

Students should complete this activity in pairs or small groups. The focus of the activity should be on group discussion to reach a consensus on what features the offspring could have. 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.

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.

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

**Expected answers**

Students should recognise that both female and male offspring will inherit a mix of features from both parents.

**Acknowledgments**

Developed by Alistair Moore (UYSEG).

Images: pixabay.com/monique\_hernandez (1765192)

**References**

AAAS Project 2061. (2009). *Benchmarks for Science Literacy* [Online]. Available at: <http://www.project2061.org/publications/bsl/online/index.php>.

Allen, M. (2014). *Misconceptions in Primary Science, Second* ednBerkshire, UK: Open University Press.

Chin, C. and Teou, L.-Y. (2010). Formative assessment: using concept cartoon, pupil's drawings, and group discussions to tackle children's ideas about biological inheritance. *Journal of Biological Education,* 44(3)**,** 108-115.

Cisterna, D., Williams, M. and Merritt, J. (2013). Students' understanding of cells & heredity: patterns of understanding in the context of a curriculum implementation in fifth & seventh grades. *American Biology Teacher,* 75(3)**,** 178-184.

Department for Education (2013). *Science programmes of study: key stages 1 and 2 - National curriculum in England (DFE-00182-2013),* London, UK.

Driver, R., et al. (1994). *Making Sense of Secondary Science: Research into Children's Ideas,* London, UK: Routledge.

Ergazaki, M., et al. (2015). Introducing a precursor model of inheritance to young children. *International Journal of Science Education,* 37(18)**,** 3118-3142.

Williams, J. M. (2012). Children and adolescents' understandings of family resemblance: a study of naïve inheritance concepts. *British Journal of Developmental Psychology,* 30(2)**,** 225-252.