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## Level 1 Science, 2015

### 90948 Demonstrate understanding of biological ideas relating to genetic variation

9.30 a.m. Tuesday 10 November 2015  
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas relating to genetic variation.	Demonstrate in-depth understanding of biological ideas relating to genetic variation.	Demonstrate comprehensive understanding of biological ideas relating to genetic variation.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL the questions in this booklet.**

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–10 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

**TOTAL**

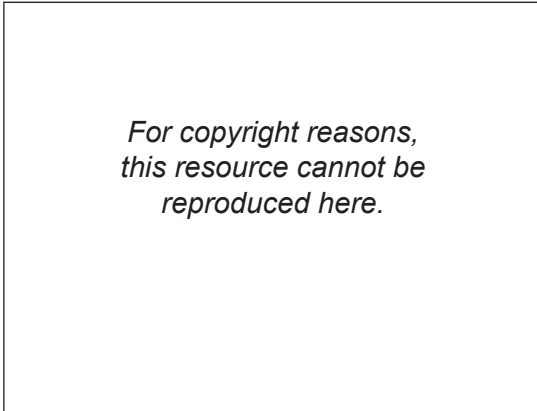
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## QUESTION TWO: DNA, ALLELES, GENES, AND CHROMOSOMES

A snail known as *Cepaea nemoralis* can have either a plain shell or a banded shell.



Plain shell

[http://en.wikipedia.org/wiki/List\\_of\\_non-marine\\_molluscs\\_of\\_Ireland](http://en.wikipedia.org/wiki/List_of_non-marine_molluscs_of_Ireland)

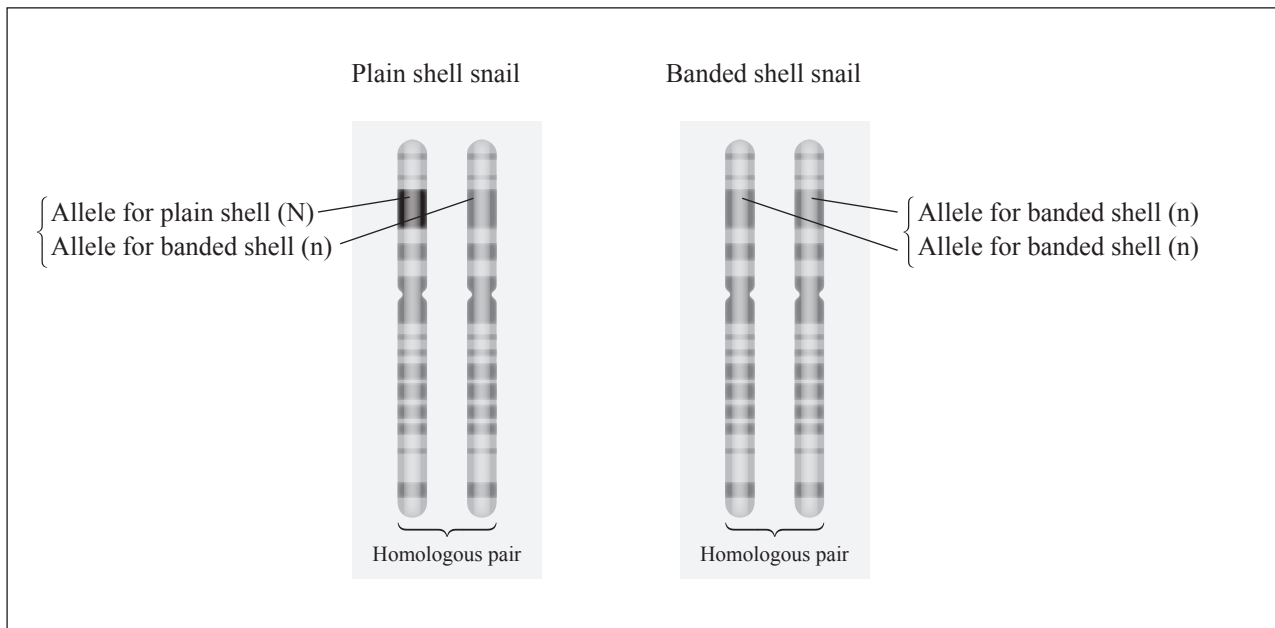


Banded shell

<http://de.wikipedia.org/wiki/Hain-B%C3%A4nderschnecke>

The diagrams below show the homologous chromosomes that contain the gene for shell pattern for each of the snails in the photographs above.

Assume the allele for plain shell (N) is dominant over the allele for banded shell (n).



(a) In the diagram above, which snail is heterozygous for shell pattern?

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Explain why you chose this snail.

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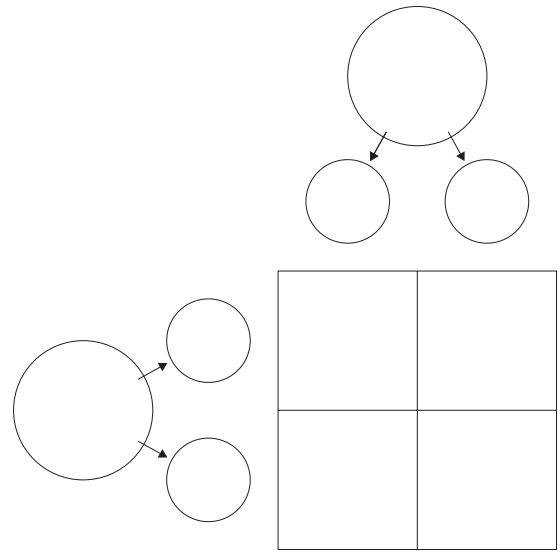
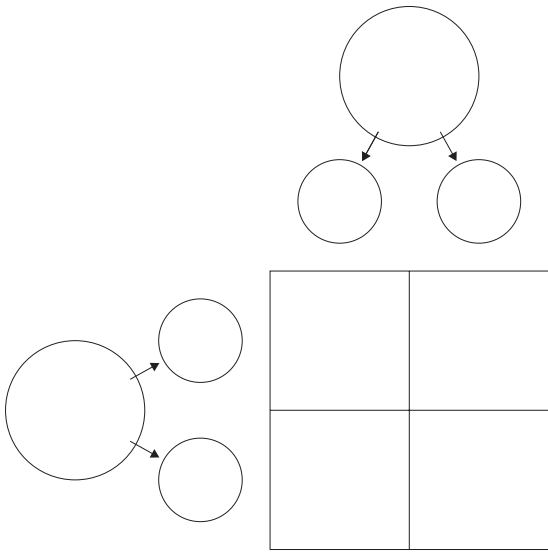
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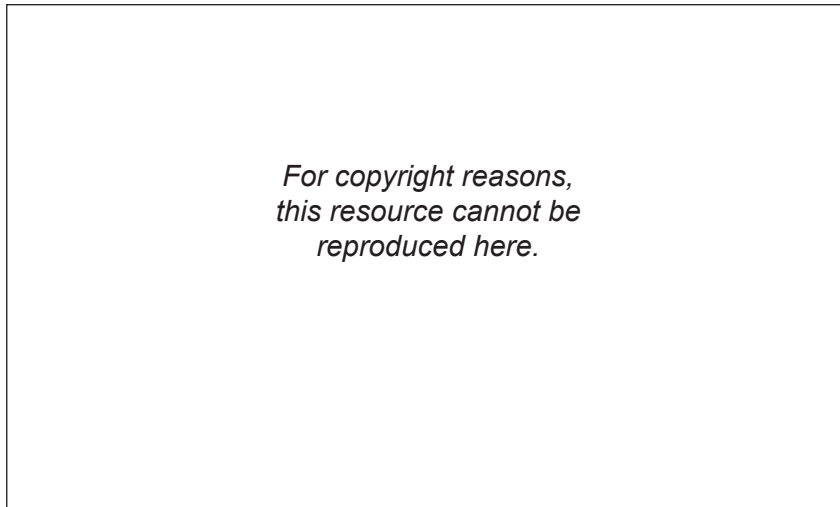
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**QUESTION THREE: VARIATION IN PLANTS**

The photograph below shows a large number of plants that are all the same species.



<http://blogs.ext.vt.edu/soybean-update/files/2013/08/Brown-Stem-Rot-IMAG0159.jpg>

- (a) The yellow-brown colour in some of the plants has been caused by a disease. The disease is present throughout the field, but affects only some plants. This is because of variation in the plants.

Explain why variation means not all the plants get the disease.

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- (b) The plants in the photograph were grown from seeds. Seeds are the result of sexual reproduction.

- (i) Name one process that occurs during sexual reproduction, and explain how it results in variation.

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