CPD 1 A road map for SNAB: Building knowledge and principles through the course

Activity 1 Building knowledge and principles through the course

Purpose

- To recognise the gradual building of knowledge and principles through the course.
- To highlight the fact that material that is not included in the specification does not need to be taught.

Tasks

Enzyme building blocks: a case study

There is no section in the SNAB specification entitled 'all you need to know about enzymes' although enzymes are there – woven into the Topics which make up the course.

Task 1

Look through the SNAB specification and identify where enzymes appear.

Task 2

Identify two pieces of enzyme theory that typically appear at Advanced Level but are absent from the SNAB specification.

Task 3

Areas of biology that are absent from the SNAB specification would be suitable for students to investigate for their A2 coursework. They would be investigating something new for them and not merely repeating something that has already been done as a class experiment. Although the Student book does not provide detailed information on these areas, any general biology textbook in a local library or an Internet search would provide the background needed. Suggest some titles of A2 investigations that could be undertaken that are linked to areas of enzyme theory not covered in the SNAB specification.

SNAB thematic web-weaving

Task 4

Look through the SNAB specification and map out the theme of genetic inheritance.

Task 5

The cross-linking and revisiting of ideas will help students in the AS examination where there are questions that require them to draw on their knowledge and understanding in unfamiliar situations.

Look at the AS thematic question below and consider the questions that follow.

(a) Explain how the molecular structure of cellulose makes it suitable for making cell walls. (4)

(b) Polygalactouronase is an enzyme which breaks down calcium pectate, a substance that cements plant cells together. It is produced by the cells of fruit such as tomatoes as they ripen. This aids the dispersal of the seeds contained within the fruit.

(i) Suggest how the texture of the fruit changes as a result of the production of this enzyme. (1)

(ii) Suggest how the change you have described would aid the dispersal of the seeds. (1)

(iii) What is the advantage to a supermarket owner of a variety of tomato which has been genetically modified to produce much less polygalactouronase than usual? (1)

Edexcel Paper 6132/01 June 2003 question 3

Q1 Identify the learning outcomes in the specification which are needed to answer it.

Q2 Why do you think some candidates would find this style of question difficult?

Q3 Which teaching strategies do you think would be most appropriate for preparing your students for this type of question?

Note: Other examples of thematic questions include:

- June 2003 question 2
- January 2004 questions 3 and 6
- June 2004 question 6.

What's been left out?

Task 6

Look through the AS SNAB specification and identify areas of biology that normally appear in AS biology but have been omitted.

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Teacher/Lecturer

Activity 2 Building knowledge and principles through activities

Purpose

- To consider how activities can be used to support learning of content and skills.

Tasks

Task 1

Look at the Student sheets for Activities 1.5, 1.12 and 1.23. Identify the content learning outcomes from the specification that each is addressing and any skills that could be developed through these activities.

Task 2

How could the DNA model-building activity in Topic 2 be used to encourage independent learning?

Task 3

Look at the exam question below to try to answer the questions that follow.

Garlic is known to contain an antibacterial substance called allicin.

(a) Suggest an advantage to a plant in producing antibacterial substances in its cells. (1)

(b) The presence of antibacterial substances in garlic can be demonstrated by grinding garlic in ethanol to produce an extract. A sample of this extract is then applied to a small disc of filter paper.

  (i) Describe how you would demonstrate that this disc contained an antibacterial substance. (4)

  (ii) A newly discovered rainforest plant is thought to contain a powerful antibacterial substance. Explain how you would compare the effectiveness of this new substance with allicin in garlic. (3)

(c) Suggest how this newly discovered plant substance might have a useful application which does not involve genetic modification. (1)

Edexcel Paper 6132/01 June 2004 question 7

Q1 Identify the core practical in Topic 4 on which this exam question is based.

Q2 What is the *minimum* knowledge students would need in order to start doing this activity in an intelligent fashion?

Q3 What is the *minimum* knowledge that students might be allowed to 'discover for themselves' by carrying out the activity?

Q4 What techniques and skills might a student gain from this activity?

Note: Other pilot exam questions that refer to core practicals include:

- January 2003 Unit 1 question 2
- June 2003 Unit 2 questions 1(a) and 6.

Activity 3 Using knowledge to reach well-informed decisions

Purpose

- To highlight how discussion and role play activities can be valuable in helping students in completing exam questions.

Tasks

Look at the exam question below and then do the tasks.

When a spinal injury occurs, many neurones (nerve cells) die and cannot be replaced naturally by the body. Researchers at the Washington University Medical School in St Louis (USA) have reported that the injection of embryonic stem cells into damaged spinal cords of rats could enable recovery to take place.

(a) Explain why embryonic stem cells can be used to provide replacement neurones when most other cells cannot. (2)

(b) The research on rats might suggest that a similar treatment could be applied to humans who are suffering the effects of severe spinal injury. Suggest why the use of such a procedure would be controversial. (5)

Edexcel Paper 6132/01 June 2003 question 7

Task 1

Identify the learning outcomes in the specification where the knowledge required to deal with this question can be found.

Task 2

Identify the dilemma which underlies this question.

Task 3

Consider to what extent the question requires candidates to put themselves in someone else's shoes.

Task 4

Consider the range of alternative responses that could be appropriate when answering this question (before checking the mark scheme).