

GCSE (9–1)

Transition Guide

TWENTY FIRST CENTURY SCIENCE BIOLOGY B

J257

For first teaching in 2016

**KS3–KS4 focus
Reproduction**

Version 1



GCSE (9–1)***TWENTY FIRST CENTURY SCIENCE BIOLOGY B***

Key Stage 3 to 4 Transition guides focus on how a particular topic is covered at the different key stages and provide information on:

- Differences in the demand and approach at the different levels;
- Useful ways to think about the content at Key Stage 3 which will help prepare students for progression to Key Stage 4;
- Common student misconceptions in this topic.

Transition guides also contain links to a range of teaching activities that can be used to deliver the content at Key Stage 3 and 4 and are designed to be of use to teachers of both key stages. Central to the transition guide is a Checkpoint task which is specifically designed to help teachers determine whether students have developed deep conceptual understanding of the topic at Key Stage 3 and assess their 'readiness for progression' to Key Stage 4 content on this topic. This checkpoint task can be used as a summative assessment at the end of Key Stage 3 teaching of the topic or by Key Stage 4 teachers to establish their students' conceptual starting point.

Key Stage 3 to 4 Transition Guides are written by experts with experience of teaching at both key stages.

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Key Stage 3 Content

- Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the fetus through the placenta



Key Stage 4 Content

- B5.5 What role do hormones play in human reproduction?
- B5.5.1 describe the role of hormones in human reproduction, including the control of the menstrual cycle
- B5.5.2 explain the interactions of FSH, LH, oestrogen and progesterone in the control of the menstrual cycle**
- B5.5.3 explain the use of hormones in contraception and evaluate hormonal and non-hormonal methods of contraception
- B5.5.4 explain the use of hormones in modern reproductive technologies to treat infertility**

Comment

The concepts studied by learners at Key Stage 3 are built upon whilst studying the Key Stage 4 content.

Learners begin to study the structure and function of both the male and female reproductive systems along with the menstrual cycle. They will have also studied fertilisation, gestation and birth including the effect of maternal lifestyle. Learners should be able to recall details of these processes and are expected to build upon them at Key Stage 4. They should be confident in describing the events of the menstrual cycle as this is a topic that is developed much further to include the actions of hormones.

By the end of Key Stage 3, learners should be able to label the male and female reproductive systems and describe how they work together in sexual reproduction. They will also have labelled and be able to describe, in simple terms, the events that occur in a 28 day menstrual cycle.

At Key Stage 4, the learners knowledge of the menstrual cycle is expanded upon and it is expected that they will be able to give specific details about each hormone and how the changes in hormone concentration in the blood influence the events that occur in the menstrual cycle.

Challenges learners face when tackling this topic at GCSE:

The major problem that learners often encounter with this topic is the application of what are often unfamiliar words to graphical data. Learners will have to become comfortable with the terminology before they can begin to apply it to diagrams and charts such as those that are commonly used to describe and explain the menstrual cycle.

One way of supporting learners in this is to teach the functions of hormones such as oestrogen first. A glossary of terms may prove useful for the learners in doing this. The learners could then be presented with a menstrual cycle and asked describe the changes to the relative concentration of each hormone. They could then use the glossary to help explain the changes that are occurring.

Using card sort activities with 'name of hormone' and 'action of hormone' can prove useful for the learners as they can work in pairs with one giving feedback to the other. A similar card sort can also be useful when looking at 'parts of the reproductive system' and 'functions'.

Learners at Key Stage 4 are often unaware that there are 4 hormones responsible for controlling the menstrual cycle and as a result, the learners often get confused about the function of each one.

It is important that learners are aware that a 28 day menstrual cycle and ovulation on day 14 are only used as examples and that the actual duration and point of ovulation varies between females. Learners will be required to make links back to earlier topics involving cells and enzymes but it may also be of benefit to learners to make links back to topics such as B4 respiration. They may find it helpful to highlight specific cells such as sperm cells that have many mitochondria and pose questions such as 'why does the fluid that the sperm cells swim in contain sugars (fructose)?'

Learners will go on to study how hormones are used in contraception and infertility treatments. These should be tackled after the learners have a sound understanding of the menstrual cycle. As these techniques require application of the menstrual cycle it could be useful to introduce the subject matter and allow the learners to research and develop their understanding. Learners could be assessed on this topic in the exam via simple recall, application or by an extended answer so building this type of assessment into your teaching will benefit the learners.

Activities

Basics of reproduction: BBC

Resources: http://www.bbc.co.uk/bitesize/ks3/science/organisms_behaviour_health/reproduction/activity/

The BBC provide an animated presentation on puberty and sexual intercourse. As part of the animation is a test yourself quiz. This resource would make an ideal starter activity as it covers many of the basics for many of the topic areas in this module.

Fertilisation: BBC

Resources: <http://www.bbc.co.uk/education/clips/z6tkq6f>

A short 7 minute video clip provides details of ejaculation, ovulation, monthly cycles and fertilisation. This could be used as an introduction to the contraception aspect of this module.

Menstrual cycle: NHS

Resources: <http://www.nhs.uk/video/pages/menstrualcycleanimation.aspx>

A short animation provides learners with a description of the menstrual cycle. There are further links that learners can use to discover more about the menstrual cycle.

Checkpoint task

Task 1

The idea of Checkpoint task 1 is to identify what learners remember about male and female reproductive systems. The work at GCSE will develop the learners' understanding of these concepts.

The style of examination questions at GCSE may require learners to identify particular parts of the reproductive systems and describe how these two systems work together to result in fertilisation of an ovum. Some questions may be simple recall to label diagrams or complete tasks such as a gap fill activity but other questions may require more detailed and require structured answers.

The more straightforward questions that assess the basic concepts of reproduction such as those studied in Key Stage 3 need to be covered in detail before moving onto the GCSE content and the application of this knowledge.

Task 2

The second Checkpoint task allows learners to use information regarding the menstrual cycle and answer questions about it. The learners should interpret the diagram showing the events that occur in the menstrual cycle first. Learners may benefit from an explanation to help them as the style may be unfamiliar to them. They can then move on to the questions. This task requires application of the information in the diagram so it will help to highlight those learners that may know the key words without fully understanding how they relate to the menstrual cycle. This can be a good guide to decide when and at what level to introduce the GCSE content to the lessons. Learners will need a sound understanding of the menstrual cycle before the hormonal control is introduced.

Checkpoint Task:

<http://www.ocr.org.uk/Images/311845-reproduction-checkpoint-task.doc>

Activities

Reproduction mini activities: kscience

http://www.kscience.co.uk/revision/reproduction/reproduction_index.htm

Kscience provides a variety of resources that include sorting activities, labelling activities and quizzes. This resource could be incorporated into the whole lesson as individual mini activities or particular activities could be used as homework tasks.

Menstrual cycle quiz: geekymedics

<http://geekymedics.com/menstrual-cycle-quiz/>

Learners are able to take a multiple choice quiz that on completion provides feedback with an explanation of the answer.

Sex Hormones: abpschools

<http://www.abpschools.org.uk/page/modules/hormones/horm4.cfm>

Learners are able to look at the change in the concentration of hormones at various stages in the menstrual cycle. The animation will allow learners to move backwards and forwards through the cycle and develop an understanding of the process. It would make an ideal self study resource.

Activities

Contraception: NHS

<http://www.nhs.uk/conditions/contraception-guide/pages/what-is-contraception.aspx>

The NHS provided detailed information on 15 methods of contraception. Learners can use this information to develop an understanding of hormones used in contraception.

Hormones in contraception: S-Cool

<http://www.s-cool.co.uk/gcse/biology/fertilisation/remember-it/s-cool-revision-summary>

Revision notes are provided on the role of hormones in the menstrual cycle. This will allow learners to easily and clearly summarise the role of these hormones. The resource also details on male and female reproductive systems and the use of hormones in conception.

IVF: HFEA

<http://www.hfea.gov.uk/IVF.html>

Learners can develop an understanding of IVF treatments using this resource by the Human Fertility and Embryology Authority. It is most suitable for the more able learner but the resource could be used to develop resources more accessible for all learners.

Menstrual cycle fact file: Womens Health

<http://www.womenshealth.gov/publications/our-publications/fact-sheet/menstruation.html>

Learners can use this resource to produce their own fact file on the menstrual cycle. They could also use the menstrual cycle animation to annotate their own diagram of the menstrual cycle.

Resources, links and support

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