

## Teaching ideas for Chapter 7, *Nucleic acids and proteins*

Some students find the biochemistry of this topic challenging, particularly if they are not studying Chemistry with HL Biology. Modelling the molecules, replication and protein synthesis can be helpful.

### Practical activities

- Invite students to compare the process of editing a piece of writing with the importance of single copy and repetitive sequences of DNA and the removal of introns before translation.
- Pairing exercises in which students must distinguish between terms that are easily confused can be helpful in understanding and fixing terminology in the mind. Examples might be 'introns' and 'exons', '5' end' and '3' end' of DNA, 'transcription' and 'translation', 'sense' and 'antisense', 'nucleosome' and 'polysome'.
- There are some good animations for DNA replication at: [www.freesciencelectures.com/video/dna-replication-process/](http://www.freesciencelectures.com/video/dna-replication-process/)
- Protein structure provides an excellent opportunity for 3D modelling of structure, either using commercially available kits or as computer simulations. Students can distinguish visually between globular and fibrous proteins.
- Provide students with a table of codons and their equivalent bases (Table 4.1, page 68 of the Coursebook) and ask them to produce a protein from a given sequence of DNA to reinforce their knowledge of transcription and translation.
- Practical work involving enzymes can be used in conjunction with Chapter 3, *The chemistry of life*. This could include the use of catalase from vegetable or animal sources (such as liver) to catalyse the breakdown of hydrogen peroxide. Alternatively students could investigate the enzymes involved in photosynthesis by studying the rate of photosynthesis in different conditions (see Chapter 3 and Chapter 8). The breakdown of starch by amylase also provides a good reaction with a clearly observable endpoint.

### Links to TOK

- Students can discuss the relationship between the lock-and-key hypothesis and the induced fit hypothesis for enzyme action and consider why there was such a long time period between the proposals of the two.
- Students could consider how the acceptance of the induced fit hypothesis compares with the acceptance of the proposal that the long stretches of repetitive sequences of DNA have a function.

### Links to ICT

- Students can model the 3D structure of proteins and DNA using computer simulations.
- Enzyme practical work could involve the use of pH probes, temperature sensors and other continuously recording data loggers.