

Learning Key Concepts: Lab Investigations

Investigate DNA

Students investigate deoxyribonucleic acid (DNA) extraction using kiwi fruit. Guide them through the [Kiwi Lab](#)*. This activity allows students to visually spool the DNA from thousands of cells. Discuss what is happening to the kiwi throughout each step of the lab. Link students' prior knowledge of cells to this unit.

Review the structure of ribonucleic acid (RNA) and how protein synthesis occurs within cells. Demonstrate protein synthesis using models or show a video illustrating this to your students. Guide students as they decode a strand of DNA to a protein.

Ask students to decode at least five phrases in the [decoding activity](#). Provide an example that reminds students of the process of creating an mRNA (messenger RNA) strand from the DNA strand, then creating tRNA (transfer RNA) anticodons from the mRNA codons. Print the two decoding activity handouts on different colored paper so that students sitting next to each other will have different phrases to decode. Then have the students [solve the codes](#) on a separate piece of paper showing the DNA strand, mRNA strand, tRNAs, and the decoded phrase.

Examine Gel Electrophoresis

Guide the students through the [Dye Gel Electrophoresis Lab](#)* during an extended lab period. Discuss proper protocol involved in the use of gel electrophoresis. Ask students to write their thoughts in their science journals about the following questions: How can the components and structure of a DNA molecule be identified? and, How do you produce and analyze a DNA fingerprint using gel electrophoresis? While the gels are running, review the students' responses to the questions and the main concepts of the lab.

View the Human Genome video called *The Secrets of Our Lives*, and Time-Line CD, available from [The Human Genome Project Kit](#)*. Summarize all of the important events. Next, guide students through the [Who's the Daddy? \(Whale Pod\) Lab](#)* during an extended lab period. While the gels are running, ask the students to answer the questions in the student guide and provide an example of how to analyze the gels to determine the father. Assess the students' understanding of the main concepts of the unit through a written [quiz](#).