Computer Science Connection

DNA Data Storage The amount of digital data in the world is growing at a fast rate. People need room to store their personal data and institutions need room to store archives of information. Scientists have shown it is possible to code digital information into a strand of DNA and then recreate that information without errors. This technology is still being optimized, but there is real potential for DNA to be a solution for long-term data storage needs.

Using library and Internet resources, research DNA data storage. Create a multimedia sales pitch for a digital archive company explaining how DNA data storage works. Be sure to include information about how the structure and function of DNA makes it a safe way to store information. Think about what questions the client might ask, such as, "What barriers remain for this technology to overcome?"

FIGURE 1: DNA could be used to store digital data one day.

Social Studies Connection

Contributors to Scientific Knowledge The race to discover the structure of DNA involved many scientists with varied backgrounds. The experiences and expertise of the scientists allowed them to approach the problem from different angles. The determination of the double helix structure of DNA was a major accomplishment, but that wasn't the last discovery involving DNA. Since that time, there have been numerous advances in scientific knowledge related to the structure and function of DNA.

Using library and Internet resources, create a biosketch for a scientist that has contributed to our current understanding of DNA. A biosketch is a short, one or two-paragraph summary describing a person. Do not select a scientist whose contributions were outlined in the lesson. Be sure to use appropriate resources, cite evidence for how the scientist collaborated with others and contributed to scientific knowledge about DNA.

FIGURE 2: Many technologies, like gel electrophoresis, have enhanced our ability to manipulate and study DNA.

Life Science Connection

Four-Stranded DNA The double helix structure of DNA is very well-known, so it may be surprising to learn that DNA can take on other structures. One example is four-stranded DNA, which is common in cancer genes. The four-stranded molecule arises from a different folding structure that is linked to sequences of DNA that are rich in guanine.

Using library and Internet resources, research four-stranded DNA. How does the change in structure impact the function of the DNA molecule in gene regulation, especially cancer genes? Make a 3D model of both the double helix and the four-stranded structures of DNA. Then, deliver a presentation to the class that explains the differences in structure and function of these two types of DNA folding, including potential uses for the four-stranded molecule.

FIGURE 3: DNA can form a four-stranded structure.