Follow-up Discussion
Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their ‘Everything We Think We Know About…’ list. It might also be helpful to review the list by marking each entry with a ‘+’ or ‘−’ to show which facts were correct and which were incorrect.

Thought-provoking discussions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion topics.

• Are genetic mutations good or bad? Explain.
• Explain why DNA is like a secret code. How is the code written?

Follow-up Activities

• In pea plants, yellow peas are dominant over green peas. Use a Punnett square to predict the phenotypes and genotypes of offspring from a cross between a plant hybrid for yellow (Yy) peas and a plant purebred for green (yy) peas.
• Have students interview family members and select a specific inherited trait that can be shown on a pedigree chart (i.e., left-handedness, color-blindness, tongue-rolling, eye color).
• The history of science and scientist role models, including women and minority scientists, can be introduced by reading aloud to students for ten minutes each day about science ‘heroes’ such as Barbara McClintock, Rosalind Franklin, James Watson, Francis Crick, Herbert Boyer, Stanley Cohen and Kary Mullis.
• ‘Your Genes, Your Choices’ is a publication of the American Association for the Advancement of Science that addresses the ethical, legal and social issues that are raised by genetic research. Students can access the online book at http://ehrweb.aaas.org/ehr/books/index.html. Assign small groups to read and discuss different chapters, and report back to the rest of the class about the specific scenarios that they read about.

Suggested Internet Resources
Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

• gslc.genetics.utah.edu/
The Genetic Science Learning Center has developed this excellent online genetics curriculum that includes detailed classroom activities and other resources.

• www.thetech.org/hyper/genome
‘DNA: The Instruction Manual for Life’ contains basic information on genes and heredity.

Follow-up Activities (Continued)

• vector.cshl.org/dnathb/1/concept/index.html
‘DNA From the Beginning’ is an animated primer on the basics of DNA, genes and heredity.

• www.nhgri.nih.gov/DIR/VIP/Glossary/pub_glossary.cgi
This is a useful glossary of genetic terms provided by the National Human Genome Research Institute.

Suggested Print Resources

Program Summary

Many of the characteristics that define who you are as an individual, like the color of your eyes and the shape of your nose, are passed down to you from your parents. These characteristics are called inherited traits, and the transmission of these traits from generation to generation is called heredity. No baby is an exact copy of one parent, but receives a mix of traits from both parents. The key to inherited traits is found in the nucleus of every cell in the body, on structures called chromosomes.

The nuclei of most human cells contain 23 pairs of chromosomes for a total of 46, but specialized reproductive cells called gametes contain half as much genetic information. These cells are produced through a process called meiosis, when one parent cell divides into four gametes. When a female gamete, called an egg cell, is fertilized by a male gamete, called a sperm cell, their nuclei join and the fertilized egg can then develop into an embryo with 46 chromosomes, half from each parent.

Chromosomes contain genetic material called deoxyribonucleic acid or DNA, which is a set of instructions for making every cell within our body. DNA is a long, twisted molecule, and portions of DNA that contain the instructions for making a specific protein are called genes. Human chromosomes have tens of thousands of genes, and it is these genes, called the genotype, that control a person’s characteristics. The actual characteristics that can be observed — like size, color, and shape — are called a person’s phenotype.

A Punnett square is a chart that shows all possible gene combinations in a cross of parents whose genotypes are known. With this chart, it is possible to guess the probable phenotypes, or observable traits, of the offspring. It was the father of modern genetics, Gregor Mendel, who first theorized in the 1800s that genes are inherited in pairs; one from each parent. This would mean that everyone has two sets of instructions for each trait. When Mendel crossed pea plants, he observed that some traits seemed stronger than others so he called them dominant. Other traits, called recessive, would only appear in plants that had two identical sets of instructions, or were purebred, for that trait.

Unzipping and copying itself, DNA is the code that is responsible for carrying traits from generation to generation. Sometimes, chemical changes in DNA cause variations in traits called mutations. Some mutations cause hereditary diseases. They are listed in the order in which they appear in the video.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

inherited trait — A characteristic that makes one person different from another. Eye color and height are traits. For every inherited trait, you have two genes, one from each parent.

(Continued)