Engineering Connection

Curing Blindness with Gene Therapy Certain diseases of the retina and eye, including some that can cause blindness, have genetic causes. With recent advances in technology, genetic engineers now have tools that may allow them to reverse the genetic damage and perhaps restore patients' sight. Clinical trials have shown promise in this area, with more research emerging every day.

Using library and Internet resources, research the factors scientists must consider when developing a gene therapy for blindness. Write a report to discuss the pros and cons of medical advances, using gene therapy as the example. Reference information from a range of sources to develop a clear dialogue that explains the technical, safety, social or other factors related to medical advances such as gene therapy.

FIGURE 1: Scientists are developing therapies for genetic eye diseases.

Music Connection

Does Practice Make Perfect? Scientific studies have found that when it comes to musical talent, genetics may play an important role. Practice or no practice, it's possible that some aspects of musical ability may be hard-wired into our genes.

Using library and Internet resources, research studies that have examined the role genetics may play in the development of musical talent. Form your own opinion about whether practice, genetics, or both are the key to becoming an expert musician. Write a blog post stating your opinion. Cite evidence and examples from credible sources to support your claim.

FIGURE 2: Musicians practice many hours every week.

Life Science Connection

Beneficial Mutations Small changes, or mutations, in DNA can result in new or modified phenotypes. If those mutations occur in germ cells, they may be passed on to future generations. Some scientists think that changes in environmental conditions, such as global warming, may cause an increase in the rate of mutations. Scientists have found evidence that the genetics of several species, such as brown-lipped snails and red squirrels, are changing in response to higher temperatures.

Using library and Internet resources, research at least three organisms scientists claim have mutations that became more common due to changing environmental conditions. Make an infographic explaining what mutations are and how they happen. Then, describe why scientists think certain mutations are helping some species survive in environments with higher temperatures. Not all scientists may agree with the causes for the changes observed. If you find evidence supporting a different claim, explain the counterargument and why scientists may draw different conclusions. Use evidence from credible resources to support your claims.

FIGURE 3: Shell color and banding pattern in brown-lipped snails are dependent on temperature.