Ziad was born with poor eyesight: he is colour-blind. This disorder was genetically passed down to him by his mother, and yet she does not suffer from colour-blindness herself. How can that be? Well, Ziad's particular type of colour-blindness (the inability to distinguish between red and green) is the most common kind and is caused by a genetic defect on the x chromosome.

Since he can't rely on colour to help him go about his daily activities, Ziad has to find other ways of coping. How do you think he manages? To help you answer this question, try to imagine what Ziad has to do to dress himself properly, find the family car in a parking lot, identify insects for his collection or choose fresh fruit and vegetables at the grocery store.

Maria suffers from diabetes. Because her pancreas doesn't produce insulin, Maria can't control the amount of sugar in her bloodstream. Insulin is very important because it helps our bodies efficiently use the energy in the food we eat and keeps our bodies in good working order.

Unfortunately, there is no cure for diabetes, but the disease can be controlled. To do so, Maria has to inject herself with insulin before each meal. She can never skip meals and she must always keep a few healthy snacks on hand, especially before and after strenuous physical activity. Maria is a very active teenager. She plays soccer twice a week after school and she also sings with the school choir twice a week. At the moment she is planning a two-week family vacation to South America to visit her grandparents. What precautions do you think Maria has to take if she wants to do all these activities without any difficulty?
**Genetic Mutations**

**How Genetic Mutations can affect the Human Body (page 2)**

### Scenario 3 - Nicholas

Nicholas has been a heroin addict for several years now. Despite his doctor's frequent warnings, Nicholas still shares needles with other heroin addicts. This is dangerous because when needles are shared, the contaminated blood of a person infected with the HIV virus, or other diseases, can be transmitted to another person. The HIV virus can eventually cause AIDS, where a person's immune system breaks down and they become highly susceptible to a range of illnesses, including some that can cause death. Currently there is no cure for HIV or AIDS.

One day, a friend Nicholas had shared needles with told him he had AIDS. Worried and convinced that he was infected too, Nicholas decided to get tested. He and his doctor learned that he had in fact contracted the HIV virus. Several years went by and Nicholas still did not develop AIDS, so he and his doctor decided to do some more medical tests. The HIV virus can stay in the human body for several years without any signs of illness: this is the HIV-positive period. The disease can show itself as early as two years after being infected by the HIV virus or as late as ten years. They discovered that Nicholas’ genetic code contained two mutant copies of a certain gene. Luckily, this mutation protects the cells against attacks by the HIV virus. Less than 1% of Caucasian, or white, males have this mutation. Thanks to this mutation, Nicholas will spend the rest of his life without ever developing AIDS, although he will still be a carrier of the HIV virus and he could infect others.

In this case, the mutation had a positive effect on someone's health. Use your imagination to think up beneficial genetic mutations that would make humans even better. You can use super-heroes like Superman as your inspiration.