

The online resources used to respond to these questions can be found on the Cancer Risks student E-Sheet. <http://www.sciencenetlinks.com/Esheet.cfm?DocID=167>

## **Toxicville**

Which community/communities are being affected by cancer? (*Jensen Beach, Florida and Dover Township/Toms River, New Jersey are the communities.*)

Who is developing cancer and what makes this unusual? (*Children are developing cancer at a rate that is higher than the average.*)

Explain the alleged causes of cancer according to the article. (*Some believe that toxic chemicals are playing a role, specifically pesticide exposure.*)

How have the communities reacted to the high incidence of cancer? (*Answers may vary from discussing individual families seeking legal remedies to communities attempting to hold corporations that may have caused the pollution accountable.*)

How have local government and health agencies responded? Give a specific example. (*Answers may vary and can range from testing water samples, sampling soil and dust, and so on. Some students also may give specific answers that are more opinion based in that they find the response adequate or inadequate. When discussing these questions with the class, challenge students to support these opinions with facts.*)

What conclusions can you draw from the article about the relationship between cancer and the environment? (*Answers may vary. Some students may say there is a definite link, others may be more cautious. At this point, you may want to note student responses and check to see if answers change based on further study of the issues involved.*)

What other types of information might you need to convince you that these cancers are due to chemicals and pollutants in the environment? (*Answers may vary, but generally students should be led to the understanding that further studies or research might be needed to come to a conclusion. Students should be engaged in a discussion of what type of scientific evidence might be needed and the difference between research-based and anecdotal evidence.*)

## **Understanding Gene Testing**

How do gene mutations occur? (*Gene mutations can be either inherited from a parent or acquired. An inherited mutation occurs in the germ cells and can be passed from one generation to another. An acquired mutation occurs in the DNA of an individual cell and is only passed on to the cells that result from cell division of the cell with the mutated DNA. When discussing the answer to this question, you may find it helpful to have students review mitosis and meiosis.*)

What are the factors that can determine the outcome of a gene mutation? (*The impact of a particular mutation depends not only on how it alters a protein's function but also on how vital that particular protein is to survival.*)

Do most cancers result from random mutations in one's lifetime or from an inherited mutation? (*Most cancers come from random mutations that develop in body cells during one's lifetime— either as a mistake when cells are going through cell division or in response to injuries from environmental agents such as radiation or chemicals.*)

### **Known and Probable Carcinogens**

According to the article, what causes cancer? (*Cancer is caused by an abnormality or change in a cell's DNA.*)

What is a carcinogen? (*Any substance that can cause cellular changes that can lead to cancer.*)

Do all carcinogens act directly on a cell's DNA? (*No, some do other things such as cause cells to divide at a higher rate. This faster cell division can potentially increase the chances that DNA changes, or mutations, will occur.*)

Which two types of cancer studies are described in the article? (*1. Animal studies in which laboratory animals are exposed to very high doses of suspected carcinogens. 2. Epidemiologic studies which study human populations to determine which factors might be linked to cancer.*)

### **What Are the Risk Factors for Developing Cancer?**

What is a risk factor? (*It is anything that increases a person's chance of getting a disease.*)

Describe some factors that are likely to play a major role in increasing a person's risk of cancer. (*Age, gender, family history, carcinogens in the environment, tobacco and alcohol use, diet, and sun exposure are all factors that could play a role.*)

What are some behavioral choices that could affect your cancer risk? (*Examples could include smoking, alcohol or drug use, high-fat diet, lack of exercise, and prolonged exposure to the sun.*)

Describe some environmental factors that are discussed in the article. (*Exposure to chemicals, certain infectious diseases, radiation, and smoking are some possible answers.*)