

Skills and Strategies

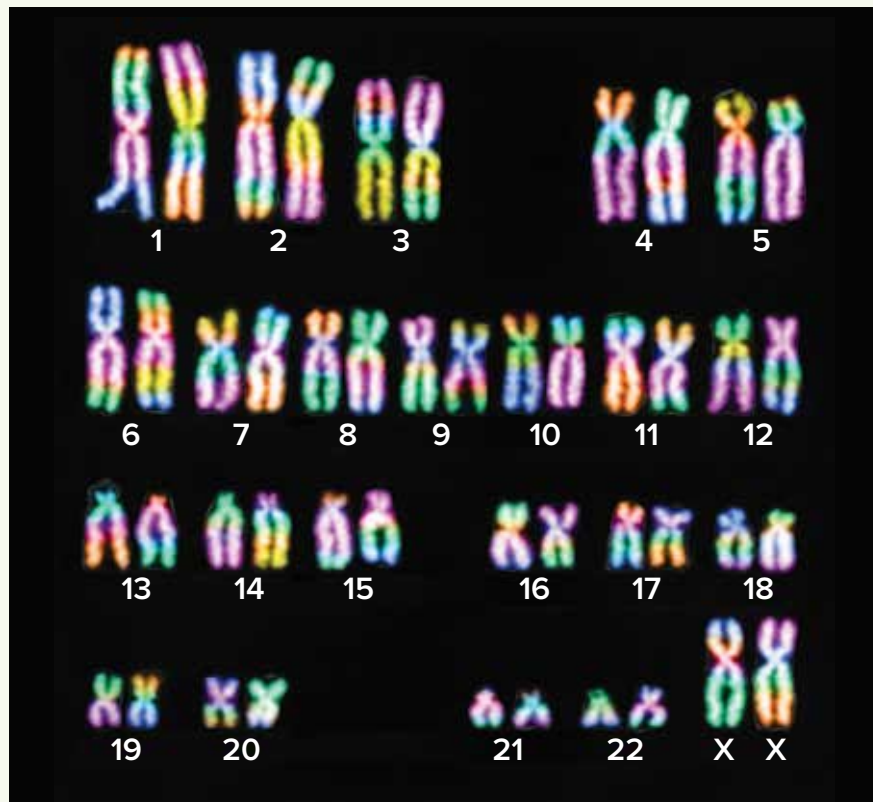
- Questioning and Predicting
- Planning and Conducting
- Processing Information
- Evaluating
- Applying and Innovating

What You Need

- computer with Internet access
- print resources, as needed

Errors in Meiosis and Human Genetic Disorders

A photo of the chromosomes in a human body cell is shown below. This is called a karyotype. It shows the 46 chromosomes organized into 23 pairs. The chromosomes are placed in order of decreasing size, and numbered. One pair is the sex chromosomes, which determine the biological gender of the individual. The two X chromosomes indicate this is the karyotype of a female.



During meiosis, errors can occur. Many of these errors result in gametes that do not survive. However, some gametes do survive. If they are fertilized, they will produce a zygote. Since every cell in an offspring is produced from the one zygote cell, all of the cells in the offspring will contain the error. One type of error that occurs during meiosis in humans results in the zygote not having 23 pairs of chromosomes. In this investigation, you will find out more about a human genetic disorder due to this type of error.

Procedure

1. Do research on genetic disorders that are the result of a change in chromosome number. Develop a list of questions you have or topics that interest you about some of these disorders. Choose an example of a genetic disorder that interests you and that you want to learn more about.
2. Decide which questions you will investigate.
3. As part of your research, find out answers to the following:
 - What is the error and how does the error occur?
 - What are the symptoms that a person who has the disorder experiences?
 - What treatments are available?
 - How does the disorder affect a person's lifestyle and the lives of their family members?
4. Develop a plan for how you will research the topic, and how you will collect and organize the information about it. Choose a format for presenting the information to the class.

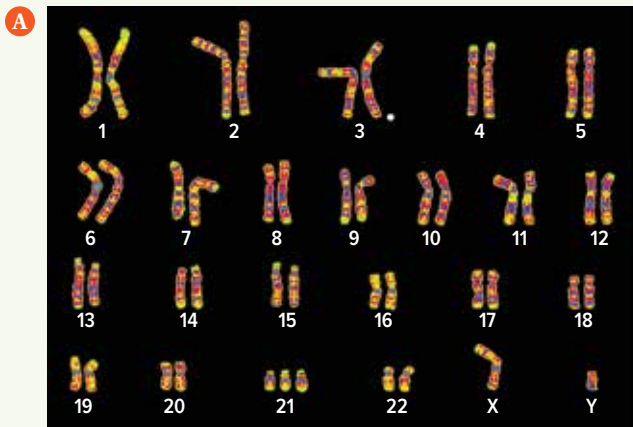
5. Have your teacher approve your chosen topic, research plan, and presentation format.
6. Carry out your plan once your teacher has approved it.
7. Present the information to the class.

Evaluate

1. Did you determine the answers to your questions? If so, what are they? If not, why were you not able to?
2. Do you have any new questions that were not part of your presentation but you are now curious about? What can you do with these questions?

Apply and Innovate

3. How has performing this investigation changed how you view people with a genetic disorder and/or the families who are affected by such disorders?



This karyotype is from a person with Down syndrome. Notice there is an extra copy of chromosome 21. The X and Y chromosomes indicate the person is male.



People with Down syndrome have distinctive facial features. Many also have heart defects and other medical conditions.