For years, Michelle and Demarcus Kingston have dreamed of having one son and one daughter. Now that their first child, a son, is two years old, they want to ensure that their next child is a daughter. They do not want to leave the sex of their baby to chance. Current medical science allows them to choose the sex of their child before conception.

Scientists developed genetic screening to help families avoid having a child with fatal genetic disorders. Now, many families are using genetic screening to decide the number of boys and girls in their families. Scientists believe people will be able to screen for other traits within the next 10 to 20 years. In the future, parents may be able to determine a range of traits including their child’s height and eye color, whether or not the baby will have attention deficit disorder, and even the child’s personality type.

Groups opposed to genetic screening think people are “playing God” when they use science to choose a baby’s traits. Science fiction authors have created worlds in which ongoing genetic testing is common. For example, in the movie Gattaca, people with less-than-perfect genes were denied good jobs and became a lower class of citizens called “Invalids.”

Many people fear having a baby will soon turn into a shopping trip, as parents create “designer babies” by choosing genes for eye and hair color, height, and IQ. Because genetic screening is very expensive, some people worry that it will widen the gap between rich and poor. The rich may have future access to genetic screening, but the poor may not.

Supporters of genetic testing say our world is changing and people should change with it. However, few doctors currently consent to using genetic testing to select for traits such as eye color or height. They use the procedure only under certain circumstances. For example, doctors can use genetic screening to help families prepare for a child with special needs.

However, experts warn that screenings may indicate that an unborn child is at risk for a disorder even though it is actually fine. This rare “false positive” result can be alarming and add stress to a pregnancy. Similarly, a “false negative” result assures parents that the fetus is not likely to be affected by a condition, even though it is actually at high risk.

Countries around the world are dealing with the issue differently. In France, genetic testing is only allowed to be performed by doctors for medical purposes. In the United States, the government does not regulate genetic testing; only doctors and their patients make decisions about genetic screening. Do you think the government should regulate genetic testing?

Questions for Classroom Discussion:
• What does the phrase “playing God” suggest?
• How can genetic screening help a family?
• In your opinion, what is the most controversial use of genetic screening?
• What do you think is the least controversial use of genetic screening?
• Do you think the U.S. should adopt regulations similar to those of France?
USE THE FOCUS WORDS *and alternate parts of speech

range (noun) the extent covered; variety

*Sample Sentence: The classroom walls show the range of vocabulary words that we’ve learned this year.
*Turn and Talk: Do you listen to a wide or narrow range of music genres? Explain.

range (verb) to include everything between two points

*Sample Sentence: The number of students per class in American schools usually ranges from 10 to 40.
*Turn and Talk: Would you enjoy living in a place where the average temperature ranges from 85°F to 95°F? Explain.

regulate (verb) to control with rules or laws

Sample Sentence: In the United States, the government does not regulate genetic testing; only doctors and their patients make decisions about genetic screening.

Turn and Talk: How does your school regulate student behavior in the hallways?

circumstance (noun) a condition or fact that affects a situation or event

Sample Sentence: Depending on their circumstances, parents make different choices about whether or not to proceed with genetic testing.

Turn and Talk: Describe the circumstances that led you to have an argument with a friend or parent.

conception (noun) beginning of a pregnancy; beginning of an idea

Sample Sentence: After conception, a fetus can undergo genetic testing.

Turn and Talk: What are some important things for women to do after conception to make sure that their baby will be healthy?

genetic (adjective) relating to or involving genes

Sample Sentence: Scientists developed genetic screening to help families avoid having a child with fatal genetic disorders.

Turn and Talk: Do you think genetic tests could be used to predict someone’s personality? Explain.
DO THE MATH

Option 1: After conception, a fetus can undergo genetic testing. Doctors can test for a range of conditions, including Down syndrome. Parents in different circumstances make different choices about whether to test. In some countries, the government regulates genetic testing.

Maternal age is the leading risk factor for whether a child will be born with Down syndrome. According to the National Down Syndrome Society, an adult woman’s risk of having a child with Down syndrome ranges from about 0.05% at age 20 to 10% at age 49. For this reason, doctors often recommend that older pregnant women undergo genetic testing to find out if their fetus could have this condition.

Which of the following is equivalent to 0.05% – 10%?

A. $\frac{1}{5} - \frac{1}{20}$
B. $\frac{1}{6} - \frac{1}{2}$
C. 1% – 20%
D. $\frac{1}{2000} - \frac{1}{10}$

Option 2: A range of genetic tests can be done before conception, too. For example, some people who are thinking about having children get tested for a mutation in a gene known as the CFTR gene. This mutation can lead to cystic fibrosis, or CF. The CFTR gene helps regulate sweat, mucus, and digestive fluids. If one parent does NOT have the mutation, then the other parent does not need to get tested; in this circumstance, their children will not have CF. If each parent has one CFTR gene, each child they produce will have a 25% chance of having cystic fibrosis.

Mr. and Mrs. Stein both have one CFTR mutation. If they have two children, what are the chances that both children will develop CF?

1/16, .0625, or 6.25%


Discussion Question: Either before or after conception, many parents consider a range of possible genetic tests. Others decide not to do any testing. Some people’s decisions about these kinds of questions are regulated by their moral or religious beliefs. What circumstances might make people decide not to do genetic testing?
Ms. Kahn is teaching her science class about genetic testing. Her students have a range of opinions about whether or not genetic screening should be regulated by the government.

“I don’t think that pregnant women should have genetic tests for their babies,” says Shana. “It’s wrong to make choices about a baby’s future based on his or her genes.”

“I agree with you about a baby who is already conceived, Shana,” Colleen replies, “but some people might want to be tested even before they decide to have a child. Some genetic tests can tell adults if they are carriers for a fatal genetic disease like Spinal Muscular Atrophy. In the circumstance that both parents carry the gene, their child might have the disease when it is born. The parents might choose to adopt instead.”

Shana asks, “What does it mean to be a ‘carrier’ of the gene?”

“Maybe one of you can do some research to find out,” suggests Ms. Kahn.

Shana found this topic very interesting and decided to investigate this question. She found the following graphic to help her understand the way genes can move from generation to generation.

Science can help us understand reasons for things, but deciding whether something is right or wrong can be much more complicated. Have a class discussion about why issues related to genetics are controversial.
DEBATE THE ISSUE

Pick one of these positions (or create your own).

A  Genetic testing should be illegal under all circumstances.

OR

B  Genetic testing should only be allowed for medical purposes.

OR

C  Genetic testing should be available for any purpose, such as selecting a baby’s sex.

OR

CREATE YOUR OWN

Jot down a few notes on how to support your position during a discussion or debate.

Can you show me evidence in the text that...

You make a good point, but have you considered...

I believe that...

I agree with you, but...

Be a strong participant by using phrases like these:
TAKE A STAND

Support your position with clear reasons and specific examples. Try to use relevant words from the Word Generation list in your response.

range | regulate | circumstance | conception | genetic