

**Teachers' Guide for
Pure by Karen Crossing**



Second
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About the Novel

The idea for *Pure* came when Karen Krossing heard an interview with Maureen McTeer on CBC radio. McTeer had published a new book about the ethical and legal implications of genetic technologies. The interviewer asked something like, “How would a teen feel to have been genetically ‘arranged’ by his/her parents?” With that one question, Krossing knew this was an ideal topic for a teen novel. Teens are determining their futures, breaking away from their parents to define themselves, and to find out that your parents had decided your genetic makeup would be so invasive.

Krossing began writing the novel by asking questions: What if parents could genetically choose a child—ensure she grew up unusually smart, healthy, or attractive? How would a teenager react to the news that her parents had genetically enhanced her? What if that genetic enhancement came with unexpected physical and social consequences?

In *Pure*, fifteen-year-old Lenni is a gifted healer to some and to others only skidge—an illegal genetic experiment gone wrong. Set in a future where genetic-engineering of humans is forbidden, this novel tells of Lenni’s escape from Dawn, a community controlled by the Genetic Purity Council, or Purity.

The story begins as Lenni discovers her mysterious healing powers, which eventually lead to tormenting seizures. When her powers become obvious to Purity, Lenni is placed in the medical unit for genetic testing, although she is certain that she has pure, unaltered DNA. At the unit, she gets to know Redge, a skidge who would rather remain in a wheelchair than submit to another unsuccessful treatment designed to help him walk. Then Lenni learns the horrible truth: that her parents illegally altered her before birth, in fact, choosing who she would be. Lenni must deal with the prejudices against her and escape from Purity, who plans to sterilize and confine her. Together, Lenni and Redge search out a way to belong—and make a difference.

Pure is about how we create ourselves and how we will treat our genetic underclass. Who has the right to choose our genetic make-up? And how can one person determine who she is in the face of genetic controls and biases?

Pre-Reading Activities

1. From the cover, what do you think the book will be about?
2. Consider the title *Pure*. What does it mean to you?
3. Find a newspaper article about new genetic technologies and share it with the class. Discuss the ramifications of the technology together.
4. What do you think our world might be like in fifty years? In your version of the future, imagine the type of food we might eat, where and how we might live, what type of jobs there might be, how we might spend our leisure time, and what our natural environment might be like. How accurate do you think your vision is? Explain what was challenging about imagining a future world.
5. Consider the quote by Leonard Cohen at the front of the novel, which is from his song "Anthem." What do you think he means? How might it apply to the novel?

Timeline of Major Genetic Advances

Over the last 100 years, there has been an explosion of information in the area of genetics. This timeline shows some of the major landmarks of genetic history.

- 1866 Gregor Mendel discovers, in his study of pea plants, that traits are transmitted from parents to offspring by independent units, later called genes. Although his observations were largely ignored for years, they lay the groundwork for the field of genetics.
- 1869 Freidrich Miescher identifies the chemical material DNA within cells.
- 1882 Walter Fleming studies the behavior of rod-shaped bodies within a cell and calls them chromosomes.
- 1883 The word, which refers to the science of improving the human race through breeding, comes into use. Eugenics becomes popular later, in the 1900s, and is used to fuel racist beliefs and introduce involuntary sterilization laws.
- 1902 A human disease, alkaptonuria, is first attributed to genetic causes by Archibald Garrod. The discovery is the first to show how the study of inheritance can benefit the practice of medicine. Also, the chromosome theory of heredity is proposed.
- 1909 The word “gene” is first used to describe Gregor Mendel’s unit of heredity.
- 1911 Thomas Hunt Morgan studies fruit-fly chromosomes, showing that the chromosomes carry genes. He determines that some genetically determined traits are linked.
- 1944 DNA is first connected to the inheritance of traits.
- 1953 Francis Crick and James Watson determine that the structure of the DNA molecule is a double-helix, which carries genetic code.
- 1955 Joe Hin Tjio determines that the number of chromosomes in humans is 46.
- 1966 Marshall Nirenberg and others crack the genetic code, explaining how the four-letter code of DNA is translated into the 20-letter alphabet of amino acids, the building blocks that make up proteins.
- 1976 The first genetic-engineering company, called Genentech, is founded.
- 1977 DNA sequencing methods are developed.

- 1981 Scientists successfully add inherited genes to laboratory animals. The resulting transgenic animals provide a new way to test the functions of genes.
- 1984 Genetic fingerprinting, which uses DNA to identify individuals, is developed. It becomes a tool for police to identify criminals.
- 1990 The Human Genome Project, an international effort to sequence all the DNA and map all of the genes in humans, is launched.
- 1994 Studies identify genes for a variety of conditions including: bipolar disorder, melanoma, hearing loss, dyslexia, thyroid cancer, sudden infant death syndrome, and prostate cancer.
- 1995 The first full genome sequence of a living organism other than a virus is completed for the bacterium *Hemophilus influenzae* by Craig Venter.
- 1996 A sheep named Dolly, the first mammal to be born from a cloned adult cell, is born in Scotland. She died with health problems after only six years, promoting a discussion of the risks of premature aging in clones.
- 2001 A private US company, Advanced Cell Technology announces that it has cloned human embryos to make lifesaving therapies for a wide range of human diseases.
- 2003 Successful completion of the Human Genome Project, which details the complete human genetic sequence.
- 2004 Clonaid, a human cloning company, claims that the first cloned human was born but refused to provide proof of the birth.
- 2005 Controversies continue over human and animal cloning, research on stem cells, and genetic modification of crops.

Discussion Questions and Activities

Science Connections

1. Looking at the Timeline of Major Genetic Advances, how quickly do you expect genetic technology might develop in the future? Explain your answer.
2. Genetic recombination refers to the formation of new combinations of genes in a fertilized egg that are different from the genes of either parent. Research how genetic recombination happens at a cellular level. How did we do genetic recombination prior to current technologies being available?
3. Why is it important to produce variations in species through genetic recombination? What are the disadvantages of genetic recombination?
4. What is cloning and how does it work?
5. Research the laws on cloning and other genetic technologies in your country. What are the ethical debates surrounding these issues? Do you think cloning and other genetic technologies should be permitted? Explain your answer.
6. What do scientists think about cloning and other genetic technologies? Invite a scientist into your class, or interview one, and report back. What did your scientist have to say?

Language Arts Connections

1. Some characters in a novel are static (do not change during the novel) while others are dynamic (change as a result of the action in the novel). Make a list of the characters who are static and those who are dynamic. Explain how each character changes or does not change.

2. Which character in the novel is most like you? Why?
3. What do you think is the basic message of *Pure*? What other stories can you think of that have a similar message? How are they similar?
4. When Lenni questions why she should be confined for genetic testing, Rylant says, "The public has a right to an uncontaminated environment." (See page 110.) Explain why you agree or disagree with Rylant's position.
5. In the novel, Lenni says, "Healing held a terrifying power – like holding the sun in your hands without getting burned. It was unwieldy. It begged to corrupt. But there were boundaries that shouldn't be crossed." (See page 229.) Write a paragraph either justifying her statements or refuting them.
6. Lenni's parents knowingly genetically altered Lenni, even though they knew it was illegal. Write a defence of their actions concerning Lenni from either Leonard's or Mara's point of view. Then explain why you agree or disagree with the character's reasoning.
7. Write a poem from one character's point of view about how it feels to be skidge.
8. The author creates her own slang language in *Pure*. How do you think slang develops? How do you guess a word's meaning when you've never heard it before? How would you create your own slang? Give some examples.
9. Do you think Lenni should have healed Redge in the last chapter? Explain your answer.
10. Write the next scene in the story. What happens to Lenni and Redge once they escape into the Beyond?

11. Write a review of this book as if you were writing it for a newspaper.

Remember, your readers will want a description of the book as well as your opinion of it and reasons behind your opinion. When you are done, trade reviews with your partner and pretend that you are the editor – the person who has to make the review better. What do you recommend to make the writing more convincing? If you want to go further, you could post your review to a website that includes reviews written by teens.

12. In the 1932 novel *Brave New World*, Aldous Huxley wrote about a state-based eugenics program, with orderly genetic-engineering of embryos designed to assign each one a specific role in society. Read this book and write a 500-word essay comparing the two visions of the future presented in *Pure* and *Brave New World*.

13. Create a class zine or blog about the theme of genetic-engineering. The zine or blog could encompass many forms, from poetry and short stories to illustrations and nonfiction articles. When it is complete, hold a launch party or distribute it to your friends and family. Get them talking about the issues. For resources and zine ideas, look at www.brokenpencil.com.

Creative Arts Connections

1. In the novel, consider how the media portrays lifewort. Do you think it is a fair and unbiased portrayal of the situation? Explain your answer.
2. When describing how she sketches, Lenni says, “Everything else faded away until I was the stylus and Mur was drawing with me.” (See page 62.) Write a

journal entry about what happens to you when you do something creative – like drawing, performing in character, writing, or dancing. Where do you get your inspiration?

3. Create a film or video based on the book or an excerpt from the book. How will you portray this future world on a limited budget? What parts are most important to include or omit?
4. Create a graphic novel based on the book or a scene from the book. You will need to break down the story into panels, translate the story into dialogue, and design your characters. For help, you could read books such as *The Complete Idiot's Guide to Creating a Graphic Novel* by Nat Gertler and Steve Lieber or *Writing and Illustrating the Graphic Novel* by Mike Chinn.
5. Research the controversies surrounding genetic-engineering and make posters that try to convince other people of your opinions. Display your posters around your school. After a few days, interview people to learn which posters evoke the most responses. Do other people find them convincing? Why or why not?
6. In small groups, act out scenes from the novel.

Social Studies Connections

1. Any book about the future is a commentary about our current society, rather than a prediction of what actually will happen. What do you think *Pure* says about our current society? Explain your answer.

2. In 1935, Herbert Albert Laurens wrote in his book *A History of Europe*, “Purity of race does not exist. Europe is a continent of energetic mongrels.” After reading *Pure*, what does “purity” mean to you? Explain why you agree or disagree with Laurens’s statement.
3. The practice of eugenics was used in the 1920s to 1940s to fuel racist beliefs and introduce involuntary sterilization laws. Research this movement and write a brief explanation of the effects of eugenics on society.
4. Today, pregnant women routinely undergo a screening test for genetic diseases such as Down’s syndrome and spina bifida in the fetus. Some genetic conditions can be treated, while others cannot. What are the implications of such testing in terms of possible discrimination based on genetic disability? What if insurance companies could request a genetic screening test before granting policies?
5. In 2004, the first cloned-to-order pet was sold by Genetic Savings and Clone Inc.(www.savingsandclone.com) to an American woman, who paid \$50,000 US for a clone of her deceased cat. For every 100 cloning attempts, fewer than 5 result in live births, and cloned animals tend to suffer more health problems than traditionally bred animals. Animal rights activists complain that this service is not needed since thousands of stray cats are euthanized each year. Research the position of the company and its clients. Do you think this practice should be permitted? Explain your answer.
6. Research the issue of genetically modified foods. Conduct a class debate around the statement: Genetically modified foods should be banned from use.