



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute  
2000 Volume III: Constitutional and Statutory Privacy Protections in the 21st Century

---

## **Human Cloning, Genetic Engineering and Privacy**

Curriculum Unit 00.03.07  
by Carolyn Williams

When news of a genetically engineered mouse with Down Syndrome (who died some time later) and the cloned sheep, Dolly hit the media, many wondered how these things were possible. Many undoubtedly thought them hoaxes or scientific experiments gone wrong. How many of us, outside of the scientific community had a clue that the next quest would involve the idea of cloning a human being or genetically engineering a better human, once the technology became available?

Much of the technology is now available and with it comes a host of moral and ethical concerns. Is man playing God? Will clones become a subculture? Are we risking genetic disasters? Will this technology benefit all of society or just a select few? Cloned humans and genetically engineered bodies are the stuff that yesterday's science fiction was made of. Today, they are current event topics and promise to become our medical future. We may not be morally prepared for these events, but the technology is here. Do we ignore it, try to regulate it, hope and pray that it goes away or do we embrace this new technology?

### **RATIONALE**

---

This is a preliminary look into the biology, technology, ethics and conscious thought involved in human cloning and genetic engineering coupled with a brief exploration of governmental policy designed to regulate its research and practice. This study reports some of the current data for and against this new bio- technology and argues an individual's constitutional right to privacy in choosing this technology.

I am inclined to agree with Jeremy Rifkin, author of *The Biotech Century* who writes, " Our way of life is likely to be transformed more fundamentally in the next few decades than in the previous thousand years." (1) We are looking ahead to the possibility of cloning or replicating a baby, rather than reproducing one in the old-fashioned ways, growing brains in a jar and correcting genetic disorders in human fetuses. While these ideas may sound sensational and perhaps even frightening to some, they are fast becoming a part of our medical environment.

Cloning and genetic engineering dominate tomorrow's medical environment. That is the environment into which today's students will enter. They will inherit the responsibilities as scientists, geneticists, doctors, lawyers, politicians, theologians and educators who will decide if these technologies are ethically and morally

acceptable This study will serve as a useful introduction for getting students to think about tomorrow's issues.

## OBJECTIVES

---

In an attempt to keep abreast of this ever-increasing biomedical technology and understand some of the implications that it holds for our future, students will:

- Keep a log of current events as they appear in print and non-print media.
  
- Research selected issues that are raised in the study
  
- Discuss and write about issues of governmental regulations and personal ethics
  
- Hold a formal debate which argues an individual's constitutional right to privacy, in the matters of cloning and genetic engineering. This activity will help students better examine some individual concerns about the technologies while weighing its advantages and disadvantages. It will invite students to take a closer look at selected constitutional amendments for help in clarifying their legal arguments. Also, it will bring about a better understanding of the laws by which related issues involving the right to privacy have been argued in America's courts. Finally, the debate will serve as both a culminating activity to be performed by the students and a tool of assessment for the teacher.

The overall study unit is designed around skills and interests of returning seventh grade students of New Haven's Talented and Gifted (TAG) program. The three topic ideas- cloning, genetic engineering and the right to privacy are presented as independent lesson segments which will become mini lessons within their core unit -"Future Studies." Parts of the unit can be adapted for an eighth or ninth grade mini lesson in biology, social science, drama or writing, with little change of focus.

### Overview

The issues of cloning and human genetic engineering raise significant concerns for a number of people. Generally, the concerns reflect what we presently know and have come to accept about how life is created and nurtured. The possibilities that are predicted as the results of this technology into cloning and genetic engineering are contrary to what we believe. As medical technology increases in this area so does debate surrounding the research and practice thereof.

For some, the concerns have become fears so great that a number of people have called for an outright ban

into the practice of cloning human beings. Likewise, the idea of genetically manipulating human DNA cells raises questions about designing ideal human beings and also prompts a call for banning such research.

Those who support the idea of a ban see no benefits in practicing cloning.. Some concerns go toward ideas of immorality for creating in laboratories that which God intended in nature. Others feel that there is much to be gained by continuing the research and testing its possibilities. For that group, cloning offers benefits to infertile couples or those seeking to solve medical problems.

There are those who feel that genetic research technology would be used for immoral purposes. It raises questions of who will be the beneficiaries? How do we guard against creating a preferred race, a selected intelligence or behavior? How do these ideas of creating and engineering life fit into the traditional scheme of procreating? Cloning and genetic engineering eliminate human individuality and deny diversity, according to proponents of the ban.

On the other side of the issue, there is much to be gained by forging ahead with research into this technology and its application. The benefits could well outweigh the fears that many have conjured up about genetic disasters. The problem is that actual results cannot be obtained without testing it on human beings. While early discovery promises that human genome technology has the potential to help solve numerous medical problems that relate to aging, replacement of human body parts, infertility and what we now view as incurable diseases, we cannot know what will happen without applying the technology.

Proponents of the ban feel that the rich and the powerful will dictate who is cloned or how those clones will function in society? Do we dwell on the possibility that some races or classes of people will be eliminated because they were not chosen to be cloned? Do we hold those same fears about genetic engineering? That somehow medical science will be responsible for providing society with a new social weapon over the underprivileged? Are there any good reasons to take the risks?

Although cloning and genetic engineering invite numerous questions about human behavior and society's views of the value of life, would a government ban stifle the potential progress that this technology might bring to our lives? Would an outright ban be a violation of one's constitutional right to find out if our fears are justified?

## Cloning.

---

Columbia encyclopedia describes "Clone" as a group of organisms, all of which are descended from a single individual through asexual reproduction, as in a pure cell culture of bacteria. Except for hereditary material that come about by mutation, all members of a clone are genetically identical.

"To create a clone, doctors begin with a single egg cell from any woman. The nucleus of the cell (the part containing the genes) is taken out and replaced with the nucleus of a cell from the person being cloned. The cell can then be implanted into any woman and allowed to grow, develop and be born like any baby. But the woman who carries it is not its mother. It has no mother or father as we understand these terms. It is a clone—a genetic duplicate of its donor." (2)

Cloning is not new. It has existed for years with plants and more recently, with some invertebrates. Now we move to the realm of human cloning. That is cause for more serious consideration. A human being is more

than just his or her genes and a clone is more than just a copy of his or her donor. A clone and its donor are identical twins, each with its own individuality and its own soul. These twins will be years apart in age and subject to the environment in which each lives

While the idea of cloning a human being does raise various concerns, mostly fears, the facts as we know them today are that a clone is a duplicate of another human being. It is no less human or any less individual than the human from which it is copied. However, that knowledge remains to be tested and at this time the country is not prepared to find out if cloning works in practice as it does in theory.

## **Lesson 1 Handout 1 Been There; Done That...**

---

The ideas which follow have been proven successful in medical laboratories across the country. Scientists have the technology. What they don't have is permission from government or sanctions from the public to experiment with cloning human beings. It is my belief that the scientific community will not abandon the research simply because of a governmental ban. Rather they are more likely to continue it away from public scrutiny with the idea that views of society will change with time. To date, the research which makes human cloning possible has yielded the following successes: (3)

first successful freezing of bull semen - 1950

frogs cloned from asexual tadpole cells- 1952

frogs cloned using cells of older tadpoles- 1962

"Baby Louise" was conceived in a laboratory dish through in vitro fertilization -1978

"Baby M" was born to a surrogate mother through artificial insemination-1983

Dolly, the sheep was reproduced in the exact genetic image of its mother- 1996/ 1997

Cloning of a Rhesus monkey whose reproductive development is close to a human's-1997.

Cloning of two more sheep, Molly and Polly with human blood clotting proteins in their milk which will be extracted to treat human hemophilia -1997

Cloning has been successful in these areas. What makes the difference in trying it with human beings? There is a fear that "embryos will be manipulated to produce a child with the desired eye or hair color or with enhanced physical prowess or intelligence. Another fear is that a human will be cloned to provide organs for transplants for its genetic twin." (4) We cannot know if these things will happen.

## Lesson 1 Handout 2 Things That Make Your Brain Itch

---

Three questions follow which may be considered by many as sensational or even outrageous on the subject of human cloning. Admittedly, the ideas do bring about a sense of awe. They are included here to stimulate open-ended discussions into what may be actual results of human cloning, as it is known, today. Because of the very nature of cloning technology, these situations will become realities should individuals be allowed to legally practice cloning in this country.

The questions are taken from Lee Silver's *Remaking Eden*. The information which follows each question briefly summarizes Silver's research and is offered to aid you in your discussion of cloning as a reproductive choice. Each summarized response is followed by a citation note which indicates a range of pages where further clarification of the information can be found in the text.

*-Could a woman give birth to her identical twin sister?*

Consider the futuristic account of Jennifer and Rachel which begins in the year Jennifer is a thirty-five year old single woman who wants to have a child. Jennifer is well aware that cloning is illegal under federal law, except in the case of infertile women. Unlike twentieth century women who had to rely on sperm donated by a male, Jennifer decided to use her own cells to create new life.

A dozen or so eggs are recovered from Jennifer's ovaries and each is fused with a donor cell taken from the inside of her mouth. The incubated eggs yield healthy embryos that are then implanted into Jennifer's uterus. Nine months later, a healthy baby girl, Rachel is born to Jennifer.

Clearly Jennifer is Rachel's birth mother because Rachel was born from Jennifer's body. Rachel has no father because there is no male involvement. Jennifer is not Rachel's genetic mother. Genetically, Jennifer and Rachel are twin sisters. This means that Rachel's genetic parents are the same as Jennifer's genetic parents. Rachel's genetic parents are in reality the two people that are traditionally referred to as her grandparents. Fascinating? (5)

*-Could a child have two genetic mothers?*

Technically it is possible to produce a fully healthy child through the fusion of two embryos from two different women. The eggs are harvested from both women and each fertilized using donated sperm from one single donor. The fertilized eggs are then incubated for the necessary period. After which the selected embryos from each of the two women are pushed together. They immediately stick to each other. From what was two embryos, there is now only one. While there is more clinical work to be done the resulting embryo shares two genetic mothers. Amazing! (6)

*-Could a man become pregnant?*

"Is Male pregnancy possible? Probably yes. Is male pregnancy feasible? No, not at this time. It's not just a question of whether the baby lives, but whether the pregnant man himself survives the birth." The three ingredients that are essential for pregnancy are a fertilized egg, a hormonal environment to allow implantation and a living womb within which the embryo can grow and form a placenta. All of these occur naturally in a woman, but would have to be duplicated for a man's body. Presently, that duplication is a far reach into the future technology of cloning.

Science offers as proof, the birth of Baby Louise in 1978 which has shown that a woman's eggs can be fertilized in vitro. Those eggs can then be inserted into a man's body through a tiny glass needle. That satisfies the first ingredient. The second ingredient is satisfied without new research. Doctors have already successfully stimulated the pregnancy environment in post menopausal women. With hormonal injections to stimulate the pregnancy environment, the implantation should likely take hold in a man in the same way that it does in a woman. That leaves the question of the living womb- the third and final ingredient. Again, science offers as proof, some abnormal pregnancies in which a woman's abdomen acting as the womb have successfully resulted in live and healthy Cesarean births. Although many are dangerous to the mother and the fetus, some have occurred with positive results. While this kind of birth would represent a greater danger for men if spontaneous hemorrhaging occurred, the question remains. If a woman's abdomen can act as a womb, why can't a man's?

The definitive answer(s) to the initial question are, "Yes," male pregnancy is possible, but still, only through the help of a surrogate mother.. "No," it is not likely to be tried by men or by clinicians who are asked to perform such a procedure for men. However, in our future, there will be males who will seek such a procedure and they will be accommodated. Think about that! (7)

## **Lesson 1 Handout 3 To Clone or Not Clone**

---

Should human cloning be feared? Or should we, as a society be fair in allowing individuals to make that choice for themselves with the hope that each will be morally responsible in that choice? While public sentiment runs against the idea of moral responsibility, do we have enough information for or against the technology to make the moral judgment on which an outright ban would have to be based?

The Journal of the American Medical Association reports that various public officials are proposing legislation to outlaw human cloning or at the very least impose restrictive limits on the research that will lead to cloning. To date, researchers fear that the US Congress could pass laws banning research on human cloning. A directive issued in 1997, by President Clinton to ban the use of federal funds for human cloning research suggests that an outright ban to continue the research and eventually the practice will be the next step taken by Congress. The directive not only bans the use of federal funds to public research companies, but also urges those who receive private funding to accept a voluntary five- year moratorium on such research, at least " while the National Bioethics Advisory Commission (NBAC) reviews the issues and prepares a report. (8)

The directive was published in April of 1997, the Commission promised a report by the end of May in that same year. The NBAC examined ethical, legal and religious implications of cloning before urging a moratorium on human cloning. By Spring of 1999, Skeptic Magazine reported "The Commission concludes that at this time it is morally unacceptable for anyone in the public or private sector, whether in a research or clinical setting; to attempt to create a child using somatic nuclear transfer cloning." (9) Somatic cell nuclear transfer was the technology used to clone Dolly, the sheep. Scientists feel that the same technology could be used to clone humans.

Ethical concerns against cloning as outlined by the Commission:

\*diminished sense of individuality and personal autonomy

- \*degradation of the quality of parenting and family life
- \*whether parents would be tempted to seek excessive control over cloned children
- \*re-opening of the door to Eugenics (dating back to 1930's)

Ethical arguments for cloning as outlined by the Commission:

- \*protecting personal choice
- \*maintaining privacy and freedom of inquiry
- \*encouraging the development of powerful new technologies

Religious opinions taken from various sources were as varied as religious practices in this country, each guided by the philosophy to which each subscribed. The opinions were so varied and so entrenched the NBAC was prompted to conclude that “.. there is so single ‘religions’ view on cloning humans, any more than for most issues in biomedicine.” (10) Their conclusion represented the ideas of those who felt that using this kind of technology to create a child would be immoral and could not be justified. Others held that it could be morally justified under certain circumstances, but it should be strictly regulated in order to prevent abuses.

Catholic teaching refers to human cloning as something out of the norm. The cloning of human beings would be a violation of the natural moral law. The Catholic Medical Association CMA is opposed to any attempts at human cloning and finds it “-contrary to the method of procreation designed by God.” (11)

We can not know what harm or benefits cloning will bring to our human existence, as we know it today. We do know however, that much of what we fear in this technology will continue to play a role in our changing evolution.

To conclude this segment, I quote from Lee Silver, “For human beings, though, it’s not just a question of whether cloning could work, it’s a question of whether it could work safely. A basic principle of medical ethics is that doctors should not perform any procedure on human subjects if the risk of harm is greater than the benefit that might be achieved.” (12) Physicians would be obligated to refrain from practicing cloning technology unless they are sure that it causes no greater dangers than that which is associated with natural conception. As it stands now, can they be sure if they are banned from practicing?

## Sample Lesson 1 Cloning

---

### Objective

To examine some prominent positions about human cloning.

### Procedure

Read and discuss the opening section on cloning. Take an informal survey to find out if students understand what cloning is and how it happens.. Now find what individuals feel about cloning. Are they for or against it, based on their present knowledge? Why ?

Engage students in some dialog about cloning as a personal choice. Allow them to speak freely as to whether anyone would choose cloning for any reason. Guided questions should be general at this point. Follow the discussion with some focus on first impression ideas of what might be considered beneficial or harmful about cloning.

Read aloud with the class “Been There; Done That” and invite the students to ask questions about the reading. If there are no questions, pose some. For example, Is Baby Louise any less human than you are? Would a child born through a surrogate be loved differently than an adopted child? Would a cloned child necessarily be treated differently from either of these?

Choose one of the questions from “Things that make your Brain Itch” Engage students in critical thinking exercises to ease them into the idea of evaluating their personal positions through writing about any one of the topics that is suggested by the questions. Challenge or charm them to use their critical and creative thinking strengths to write and present a persuasive essay, or to create an original poem, short story, one- act play, song or any other idea that might demonstrate their understanding of the concepts and allow for some learning challenge at the same time.

## Genetic Engineering

---

### Lesson 2 Handout 1 Genetic Engineering and its possibilities

By definition, the term “genetics” is “ the biology of heredity; especially the study of mechanisms of hereditary transmission and variations of organismal characteristics.” The term “Engineering” is “The application of scientific principles to practical ends, as the design, construction and operation of efficient and economical structures, equipment and systems.” Genetic engineering allows scientists to identify, store and manipulate the very chemical blueprints (DNA) of living organisms. By reprogramming the genetic codes of living organisms, scientists potentially will be able to customize and mass produce a completely new culture of human beings.(13)

One of the most significant changes within the twentieth century and early decades of the twenty-first century



is the development of our ability to manipulate life through genetic engineering. Science promises to achieve in overnight laboratories the process of natural selection which would otherwise take millions of years in nature. Research predicts that one day geneticists may be able to remove traits from human beings that are considered undesirable and replace them with more acceptable ones. However, that is in our future. Currently, the battle is to be able to freely and legally complete the research that will eventually lead to this kind of genetic engineering of humans.

At this point, members of this society, like those in Canada and Europe raise questions in protest of the ethics and the morality of such practices. Should the US follow other countries and allow this protest to lead to an outright ban or stiff regulations against genetic engineering? An outright ban not only limits potential medical breakthroughs, but limits personal freedoms as well.

Humans have some 100,000 genes which serve as instructions to the body. What will it mean to know the complete human genome, asks Eric Lander of MIT's Whithead Institute. According to Lander, some of the genes identified are linked to diseases like cancers of the breast and colon, Alzheimer's, Glaucoma and Parkinson's. Figuring out how the genes work promises to lead to prevention and or advanced treatment.(14)

Genes are located in the nucleus of every living cell. Each gene is a molecule of a chemical called DNA which acts like a master code to determine characteristics of the individual. When the living cells reproduce themselves, by dividing in two the DNA is reproduced exactly. Genetic engineering brings about a specific mutation (changes in the structure of a DNA molecule) in a specific gene. "Once scientists determine the gene or groups of genes that contain the characteristics that they want to change, a computer "maps" the exact structure of the DNA molecule, locating the part that must be removed and replaced by new coding material that will change the information that the gene sends to the body." (15)

Some biotech companies are concentrating their efforts in the field of tissue engineering and fabrication of human organs. While others are turning their attention to understanding how genes switch on and off and interact with their environment to cause genetic diseases. Still others have dedicated their energies to creating artificial human chromosomes, a development that could lead to the customized design of genetic traits in the sex cells, or in the embryonic cells just after conception.

Scientists are projecting that by the year 2011, they would have learned how to program the development of cells that could be transplanted into humans. However, it will take many more years before they're able to fool cells to develop into an entirely new organ like a liver or a kidney.

" Researchers hope to move beyond the notion of transplants and into the era of fabrication, and are already well along in research to fabricate human heart valves, breasts, ears, cartilage, noses and other body parts." (16) Following the wisdom of Robert Langer and Dr. Joseph P. Vacanti, leaders in this field, Rifkin agrees that "The idea is to make organs, rather than simply move them." Researchers in this field predict that by the year 2020 ninety-five percent of human body parts will be replaceable with laboratory grown organs.

One example of how this extraordinary technology would work may be told in the story of a ten year old boy into whom a laboratory- grown human organ was expected to be transplanted in 1998. At Boston's Children's Hospital, director of tissue engineering at Harvard Medical School, Dr. Anthony Atala grew a human bladder in a glass jar. Atala's research team seeded a plastic scaffolding made to represent the three dimensional shape of a bladder with bladder cells from the patient. The human cells grew over the frame in the laboratory jar and was expected to be transplanted- making it the first tissue-engineered organ ever transplanted into a human. What should happen with this new technology is "-eventually the scaffolding over which the cells had been

growing will be destroyed by the patient's own enzymes, leaving a fully functioning human bladder." (17)

While all of these things might possibly result from genetic engineering, many believe that there is great danger in man altering the order of nature. Altering genes in humans could have dramatically different results than those discovered in lab mice. "The human body tends to reject anything foreign, like a virus carrying a corrective gene into a diseased cell." (18) So far, experimental treatment has been confined to treating life-threatening diseases and altering somatic cells which pass on altered genes to future generations. Where should lines of human intervention be drawn?

We likely can't count on parents-to-be who wish to choose physical characteristics, personalities or talents of their children. It is now possible to screen thousands of genes within individual embryos. Scientists are developing ways in which to remove or replace genes in individuals so as to change their individual attributes. With enough money the perspective parent will be able to include whatever traits he/ she desires in the offspring. Genetic screening also makes it possible to determine what diseases or kind of illness that the child is predisposed to.

There is an even greater concern about the misuse of genetic screening. There have been reported cases of discrimination in providing health insurance coverage to people who are known to be predisposed to life-threatening diseases. There are also reported cases of employee discrimination. One such case involved a social worker who was abruptly dismissed from her job when her employer learned that she was predisposed to Huntington's disease (19)

What does this kind of genetic tracking mean to students in various learning environments? Too often the child who is diagnosed as having a genetic disorder will likely receive less attention and support from teachers who feel that the child will not learn anyway. The handicapped or special need students might well be dismissed totally. For these students the discrimination has social implications far beyond their school years into their adult years, where their genetic profiles will follow them. They will become twice victimized by their genetic

"Segregating individuals by their genetic makeup represents a fundamental shift in the exercise of power."(20) Institutions who hold such information also hold a weapon of absolute power. There is also concern about further dividing society into genetically superior and genetically inferior groups. Those who can afford to program superior traits into their fetuses at conception stand to gain biological, social and economic advantages.

## **Lesson 2 Handout 2**

### **TIMELINE**

from Omni's Future Medical Almanac (partial listing)

When using the information given in this timeline, you will need to check various sources for actual dates of events- given that these dates represent projections and many of them have already occurred. The editors of this book advise its users that they are looking at basic research and ongoing clinical trials, along with the fantasies of medicine's brightest minds and dreams that will change the face of health care. The book presents medical science's cutting edge, but also takes a look at what the future will likely bring. (21)

1986 first human gene therapy trials for ADA and purine nucleoside phosphorylase deficiency begin

. 1987-1990 Genetically engineered drugs to control hemophilia, rheumatoid arthritis, diabetes, heart disease, stress and certain cancers were FDA approved.

1991-1995 Scientists map all fifty cancer genes

1996-2000 Major outline of human gene map is known.

Prenatal genetic screen tests become available for home use. 2001-2010 First human gene therapy traits for Alzheimer's and other diseases resulting from defects in more than one gene begin.

2011-2100 Gene transfer therapy for all hereditary diseases becomes standard practice. All hereditary or genetically linked diseases are eradicated.

## **Sample lesson 2 Genetic Engineering**

Objective: To outline medical advances that could likely result from human genetic engineering.

Procedure:

Introduce the idea of altering one's physical appearance by asking the children which of the following procedures they may consider having done now or in the future through cosmetic surgery? Would anyone have your teeth straightened? Would you go for a hair transplant or permanent weave? Would you consider breast enlargement or reduction?

Explain to the students that these are minor flaws that many consider changing as a way of improving their overall appearances. But there are those that interfere with the quality of one's life and may be necessary in order to save a life or at least provide a greater quality of life.

Engage students in dialog by asking the following questions. If you were born with club feet, would you want to have them surgically corrected? If you were born with a congenital heart disease would you have that corrected?

Now tell them that scientists are working on ways to detect and correct those abnormalities before children are born through genetic engineering.

Have students set up notes for working definitions of the terms found in Vocabulary segment .

Next read the segment entitled "Genetic Engineering and its possibilities" Handout 1. Allow sufficient time for students to record definitions as they find them in the reading.

Discuss the reading by raising questions that relate to students' understanding of the information.. For example ask, " From your reading, can you describe the process by which genes are genetically altered ?"

Next have students discuss and make notes outlining some of the ways in which genetic engineering technology is intended to be used. After taking notes and some discussion, ask students to express their ideas of what it might mean to be a human being in a world where babies are genetically designed and customized in the womb.

What are some of the positive and negative results of people being identified, stereotyped and discriminated against on the basis of their genotype?

Take some time to survey the Timeline- Handout 2. Open a discussion into the possibilities of these things occurring and some of their implications.

Ask students to elaborate on the following ideas by looking at the positive and negative implications. “ Will the ability to eliminate certain diseases ensure that there is no sickness or death from poor health?” “ What could it mean to have a life expectancy of 125 or more years?

Find out if students agree with those who support research on human embryos as a step toward eventually having the ability to eliminate certain diseases or are they more inclined to follow the position taken by those who feel that human experimentation is morally unacceptable even if it does provide knowledge for eliminating certain diseases from the body?

Close the lesson segment by posing these questions . “What are the risks we take in attempting to design a more perfect human?” “How much perfection is enough to satisfy whomever seeks improvement through science rather than nature?”

## **The Right to Privacy**

---

The future of this biomedical technology largely depends upon whether the government is persuaded by those who call for a total ban into the research and practice of human cloning or genetic engineering. Will it instead be guided by signs of changing social times and permits private and public companies limited investigation into the possibilities of these technologies. Would a total governmental ban on such research and practice violate a constitutional right to privacy? Are some limited regulations necessary in order to protect society from itself, even at the risk of a loss of one’s right to privacy?

The struggle to balance the protection of individual rights, social interests and technology against the founding principles and values declared in the Constitution may take on a whole new meaning in the face of this new biomedical technology. What may appear at first glance as a violation of our right to privacy, may in effect be a protection of those rights for individuals who are not among the rich and the powerful.

What is a citizen’s constitutional right to privacy as it relates to reproduction choices? Although not stated in the constitution as a fundamental guarantee, the Supreme Court has declared that two types of privacy are protected by the Constitution One type of privacy is interpreted to include the right to make personal decisions. The other covers the right to keep personal information private. It implies freedom to decide without government interference with that choice.

Human Cloning is a reproductive choice and a person has a legal right to choose it as such. If the current ban against human cloning continues it will directly affect the person who chooses cloning as a way of creating a family. That would be a direct interference from government. It would be a violation of the due process clause of the Fourteenth amendment

What are the past decisions handed down by the courts in privacy cases? Earlier Court rulings allowed women the right to choose abortion in Roe v. Wade. Would the same be extended in the choice to create a life The Court has had to acknowledge in vitro fertilization (IVF) as an alternative form of creating life. Would cloning fall into that same category? Yes, it should. It is an alternative form of reproduction, but it is different in that the cloned individual is a genetic duplicate of a previously existing genotype.

“Lori Andrews offers this differentiation.” Cloning is sufficiently distinct from traditional reproduction or alternative reproduction. It is not a process of genetic mix, but of genetic duplication. It is not reproduction, but a sort of recycling, where a single individual’s genome is made into someone else.”(22) Will the wisdom of the Court and the logic of their reasoning rulings mentioned above serve as basis for allowing the practice of cloning? Will the idea of cloning require a broader interpretation of the Constitution?

If indeed, cloning is considered a form of reproduction, the Court has been clear on the matter of fundamental rights to privacy in *Roe v. Wade* (1973) and consequent rulings which followed. Will the Court now reverse itself by upholding a ban on human cloning practice? By doing so is the government violating an individuals’ right to choose if, when and how to beget a child?

By banning human cloning is government protecting privacy rights in that it stops human experimentation and protects the rights of those who wish not to be cloned? People have few legal rights to their body tissues and genes once they leave the bodies. Under current law, it would be easy for someone to get DNA from a hair follicle, or in a medical setting without permission and there is no legal recourse for reclaiming it or its resulting use.

The right to privacy, simply interpreted is a reasonable expectation to be able to choose. Do scientists expect government should interfere with their ability to make new discoveries and pass them on to the general public? Do infertile couples who wish to have themselves cloned expect government to decide that they should not be cloned?

Do pharmaceutical companies expect to be prohibited from developing new drugs to treat known diseases now that their new genome research has led to a better understanding of what causes the body to break down? If scientists have a better understanding of how genes can be manipulated to send different signal to the body, do they expect that government will deny them the right to do so because of a legal ban?

The government ‘s invasion into the privacy of individuals may be best illustrated in the area of genetic testing. “The genetic surveillance and tracking represented by the federally funded Human Genome Project poses enormous threats to our basic rights to privacy and self determination,”(23) If everyone is tested and categorized, the potential for misuse of that information is so great that it screams for legislation to prevent genetic discrimination.

This discrimination is very different from what many in this country already experience. What is different are the mechanisms through which it is applied. It is virtually impossible to escape your genetic profile in the workplace, in seeking health care or insurance coverage, in schools and through bills passed by legislators to test a variety of groups, namely prisoners, welfare recipients immigrants and others who are powerless to stop it.

“Genetic technologies reflect the power differentials in our society; they do not equally benefit all segments, nor are they meant to.”(24) Thus these technologies become social and political weapons in an already divided society.

### **Open -ended Lesson Idea Debate**

To the teacher: An excellent guide for outlining and teaching debate skills is Jon Ericson and James Murphy’s *The Debater’s Guide*. (see “Materials” list)

Introduce the idea of formally debating the issues of cloning or genetic engineering by asking students what

would make them defend either of the technologies? What ideas would they argue against most intensely?

Help students find their positions by engaging them in conversation about the following: What do we fear most about human cloning and genetic engineering? Our greatest worry seems to be that cloned individuals will lack souls. We are afraid that unscrupulous people will be cloned. We fear that super genius will be preferred over natural intellectual abilities. All of which are possibilities. All of which merit the apprehension felt in this country with regard to human cloning and genetic engineering.

Offer students an opportunity to help write statements that will be used as propositions in the debate. When you feel that you have taken an adequate approach a number of ideas, the teacher and students should decide which will be debated.

Consider these statements as starting points. Be sure to include the statement in the reverse when offering choices.

Resolved: Cloning research would be beneficial to humans.

Resolved: Cloning benefits could outweigh the risks.

Resolved: Cloning research should be completely banned.

Resolved: Genetic engineering could be dangerous.

Resolved: Genetic engineering threatens society.

Resolved: Studying the human genome will provide valuable information.

## **For Your Information**

---

The following amendments are written here to help the teacher familiarize students with fundamental rights that are guaranteed by the Constitution. They have been used in previous landmark court cases to argue laws that have been considered an invasion of individuals' right to privacy and should be used here when arguing for or against a governmental ban on cloning and genetic engineering research and practice. These along with other Constitutional Amendments can be investigated in *Your Rugged Constitution* (cited in the Teacher's Bibliography)

Fourth Amendment: "The right of the people to be secure in their persons, houses, papers and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized."

You deny federal officials the authority to arrest you or to search your home or other possessions without a warrant. You get protection of your liberty and privacy except when it seems clear that you have broken the law.

Fifth Amendment " No person shall ...; nor be deprived of life, liberty or property without due process of law; nor shall private property be taken for public use, without

just compensation.” You deny the government certain dictatorial powers over your life, your freedom and your property. You get safeguards that are vitally important to a free people.

Ninth Amendment: “The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.”

You deny to the federal government any authority over certain unspecified and indefinite rights. You get (a) protection against interference with any rights that were not thought of in 1791, (b) further assurance that the people’s power will not be seized by a dictator.

Fourteenth Amendment: “All persons born or naturalized...and of the state wherein they reside.” “No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States, nor shall any state deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.”

. You deny the state any authority over certain rights and privileges no matter how legal the procedure. You get protection from the federal government if the state restricts any of those rights.

## **VOCABULARY**

genes, DNA, genetic engineering, genetic enhancement, eugenics, biotechnology, stem cell, embryo,

## **CONCLUSION**

---

As technology pushes human genetic engineering into our short-term future and human cloning becomes closer to a present-day reality, debate surrounding government regulations into the research and practice thereof also increases. As I write, research on the use of human embryos and DNA sequencing continues and raises new possibilities for replicating humans, growing new body parts in laboratories and eradicating the body of fatal diseases.

In the spring of 2000, the announcement that scientists had successfully deciphered the human genome signals that human cloning and human genetic engineering are inevitable. Will current government regulations be adequate enough to halt the research and practice? Will the US government examine the potential “good” of this technology and provide the necessary funding for what has been dubbed “ A Brave New World

In principle, a total governmental ban on scientific research will stifle progress, force the research underground and likely lead to a variety of illegal practices much like that which happened with abortion. The overall question becomes are we a better moral society if we choose not to legalize human cloning and genetic engineering, or are we impeding scientific progress under the guise of morality? Is this an invasion of privacy that should be allowed?

## Notes

1 Rifkin, Jeremy The Biotech Century p1

- 2 ibid. p27
- 3 Lester, Lane P. & Hefley, James Human Cloning, p 9-12
- 4 \_\_\_ Bio-medical Ethics p
- 5 Silver, Lee Remaking Eden pp117-120; 168-69
- 6 ibid. p182-86
- 7 ibid. p195-99
- 8 \_\_\_ Issues in Law and Medicine Fall 1998, p217
- 9 Miele Frank, Skeptic Magazine p248
- 10 \_\_\_ Issues in Law and Medicine, Fall '98 , p218
- 11 ibid. p218
- 12 Silver, Lee Remaking Eden p103
- 13 \_\_\_ Newsweek, Apr.10, 2000 p54
- 14 McCuen, Gary E. Hi- Tech Babies p31
- 15 Rifkin, Jeremy. The Bio-Tech Century p 162
- 16 ibid. p 163
- 17 \_\_\_ Bio-Medical Ethics p188
- 18 Silver, Lee. Remaking Eden p167
- 19 Rifkin, Jeremy. The Bio-Tech Century p168
- 20 Teresi, Dick & Adcroft, Patrice. eds. Omni's Medical Future Almanac p267
- 21 Andrews, Lori B. The Clone Age p254
- 22 Bereano, Phil. Tikkun Sept'99 p23
- 23 ibid. p24



## Bibliography

---

### Teacher

Alderman, E.& Kennedy, C. *The Right to Privacy* (New York, Vintage, 1997.)

An easy-to read presentation of various individual cases involving the invasion of constitutional privacy.

Andrews, Lori B *The Clone Age: Adventures in the New World of Reproductive Technology*. (New York, Henry Holt and Company, 1999.)

A personal account of the author's experiences inside the world of reproductive technology.

Findlay, Bruce & Esther. *Your Rugged Constitution*, (Stanford, Stanford University Press, 1950.)

A quick guide to constitutional amendments and the founding principles of freedom upon which the constitution is built.

Freely, Malcolm M. & Krislov, Samuel. *Constitutional Law* (Canada, Little, Brown & Company, 1985.)

A casebook designed to help the average student of liberal arts understand the language, policy and framework of the constitution

Lester, Lane P. & Hefley, James C. *Human Cloning* ( Grand Rapids, Fleming H. Revell , 1998.)

A presentation of biological, theological and sociological discussion of issues in human cloning and genetic engineering.

McCuen, Gary E. *Hi-Tech Babies; Alternative Reproductive Choices* ( Hudson, Gem Publications, 1990.)

A handy source for outlining ideas in conflict - a particularly good reference for outlining a debate on the issues of government regulation of new reproductive technologies.

Rifkin, Jeremy . *Harnessing the Gene and Remaking the World; The Biotech Century* ( New York, Jeremy P. Tarcher / Putnam, 1998.)

This book accounts the coming era of biotechnology. It highlights a variety of concerns of how science has become manipulative over nature

Silver, Lee M. *Remaking Eden; Cloning and Beyond in a Brave New World* ( New York, Avon Books,1997.)

The author uses a combination of facts and stories to describe a likely future of mankind in the world of reproductive technologies.

Starer, Daniel. *Hot Topics* (New York, Simon & Shuster, 1995.)

The user will find this an extremely useful companion in outlining arguments for and against today's issues, with some background information on the past, present status and future outlook of topic.

\_\_\_\_\_"Biomedical Ethics- Opposing Viewpoints (San Diego, Greenhaven Press, Inc., 1998.)

A tool for the critical thinker who wants to understand his own argument as well as that of his opponent. This book offers a range of discussion on various aspects of cloning and genetic research.

## Student readings

Beecroft, Simon. *Future Files Super Humans* ( Brookfield, Copper Beech Books, 1998).

A beginner's guide to bionics, living computers, cloning and the future of mankind.

\_\_\_ *The Macmillan Atlas of the Future*, (New York, Macmillan Publishing USA, 1998)

A comprehensive reference of current events as they shape our futures in the 21st century and beyond. Students will find fascinating full-color charts, graphs and illustrations, along with a technology calendar and world table. Pick up a copy.

Tambini, Michael. *Future* ( New York, Alfred A. Knopf Inc., 1998.)

An easy-to-read and well illustrated guide to advancing technologies that are changing our world. This handy little classroom aid also features a brief timeline of 20th century technology that has shaped our lives.

Teresi, Dick & Adcroft, Patrice eds. *Omni's Future Medical Almanac* ( New York, McGraw-Hill Book Company, 1987.)

Information at your fingertips makes this a quick reference guide for medical breakthroughs that are available to the public, current research in the field and a list of the top clinics where one can find help for a variety of medical concerns.

## Materials you may want to locate

Devore, Norton & Lawson. *Creativity Design & Technology* ( Worcester, Davis Publications, Inc., 1989.) Hodgson, John *Bio-Technology Changing the way Nature Works* ( Oxford, Equinox Ltd., 1989). \_\_\_ *Science, Technology & Society Populations* (Paramus, Globe Book Company, 1993) film- 1978 " The Boys from Brazil" reveals a plot to clone Hitler novel- 1932 " Brave New World" by Aldous Huxley pictures a utopian society who has no value for human life, rather worships science and machines novel- 1978 *In His Image* by David Rorvik exposes a supposed factual account of a millionaire who has himself cloned by a master scientist TV series- 1993 "The X Files" features psychotic Clones movie- "Blade Runner," brings a dimwitted clone to the screen movie- 1993 "Jurassic Park" shows cloned Dinosaurs movie- 1996 "Multiplicity" spotlights the imperfections of the human clone

Articles worth reading

## cloning

Calvin, Jonathan. "Me, My Clone and I" *The Humanist* v60 i3 (May 2000) p39

A brief article in defense of cloning.

Duin Julia "Reckless Reproduction" v13 i15 ( July 19,1999) p41. A brief article arguing the morality of reproductive technology.

Miele, Frank. "The Man Who Would Be Cloned" *Skeptic* v7 i2 (Spring 1999) p54

A revealing interview with physicist, Dr. Richard Seed, who is making plans to clone his wife, but who's general focus is in the area of cloning for infertile couples.

Miele, Frank. "How Close Are We to Cloning Time? *Skeptic* v7 i42 (Spring 1999)

p48. An introduction to the science and ethics of human cloning.

Rogers, Arthur & Ashraf, Haroon. "UK's position on Human Cloning provokes hostile reaction in Europe Union". *The Lancet* v355

i9212 (Apr. 2000) p1344.

A brief news article discussing the validity of a patent to practice human cloning.

Stephenson, Joan. "Threatened Bans on human Cloning could hamper advances." The Journal of the American Medical Association. v277 n13 (April 2, 1997) p102(3). An abstract offering perspectives and medical news about the public's reactions to cloning and researchers concern about possible further cloning bans. \_\_\_\_ "Executive summary of Cloning Human Beings: Report and Recommendations of the National Bioethics Advisory Commission". Issues in Law & Medicine v14 i2 (Fall 1998 ) p217. This article offers a summary of the Commission's findings in support of their recommendations to halt cloning research. \_\_\_\_ "Human Cloning" Issues in Law & Medicine v15 i3 (Spring 2000) p323

A position paper of the Catholic Medical Association in opposition to cloning.

## genetic engineering

Bereano, Phil. "The Politics of DNA's Meaning" Tikkun ( Sept 1999 v14 i15) p23

An article in opposition to genetic surveillance as a tracking device which threatens our basic rights to privacy

. Hall. Stephen S. "The Recycled Generation" New York Times Magazine (Jan.30,2000) p30 A refreshing article outlining some of the potentially positive discoveries from stem cell research into slowing the aging process. Williams, Patricia J. "Brains in a Bottle." The Nation, v270 i14 (Apr.10,2000) p9

A brief article announcing the success of experiments in genetic enhancement of memory in a laboratory mouse

\_\_\_\_\_ "The Race to Decode The Human Body " Newsweek (Apr.10,2000) p50.

The first in a series of articles which discusses the Genome Project as a science that is transforming today's medical practice.

---

<https://teachersinstitute.yale.edu>

©2019 by the Yale-New Haven Teachers Institute, Yale University

For terms of use visit <https://teachersinstitute.yale.edu/terms>