Introduction

Assisted reproduction has become more widely used in recent years. The technological advancements have widened the definition and possibility of parenting. Career-oriented women, gay and lesbian couples, single mothers and infertile couples are among the people who may now become parents. With the broadening possibility of becoming a parent, should there be any restrictions or does everyone have the right to have children? How much control should people have over the conception of their children and are there any scenarios in which the technologies should not be used? What are some of the new ethical questions resulting from the improvement in these technologies? This module will provide a background on some of these technologies and how they work, present some of the ethical questions, and facilitate the formulation of opinions about the issues.

Student Learning Objectives:

1. Understand the different technologies, how they work and why they are used.
2. Think critically about what characteristics and genetic traits should be in the parent's control.
3. Formulate ethical opinions on genetic control, savior siblings and what to do with excess embryos.

Procedures & Activities

This unit uses a student-centered and interactive approach to teaching, in order to allow for a maximum degree of student participation. Each activity is marked as an individual, partner, or group activity, or as a teacher-directed class discussion.

The following icons are used to designate the different types of activities:

- Individual Activity
- Partner Activity
- Group Activity
- Teacher-Directed Class Discussion

A. Pre-Unit Questions

Individual Activity

Students should answer these questions individually at the start of the unit. The purpose of the activity is to collect the student's individual thoughts before being presented with any information in the unit, so teachers should avoid answering too many questions about terminology that is used.

1. What technologies, if any, are you familiar with and do you have any strong opinion about their use?
2. What characteristics would you want to be able to select in a child? Would this selection be ethical?
3. Under what circumstances is it inappropriate to use these technologies? Should we place restrictions on science?

B. Philosophical Dimensions

Teacher-Directed Class Discussion

The purpose of this section is to provide students with a philosophical background to help frame their decisions about the ethics of these reproductive technologies.
Information from:

Fundamental Ethical Question: “Is it simply wrong for us to use our knowledge of human biology to exercise power over the processes of human reproduction?” (Munson, 383).

Basic Views:

**Natural Law View**
This view is accepted by the doctrines of the Roman Catholic Church and bases morality on what is natural. Under this view, all technologies for controlling human reproduction are wrong. Even though children are usually expected in marriage, if no measures are “wrongfully taken” to frustrate the possibility of birth (such as contraception), the use of artificial insemination or in vitro fertilization is categorically proscribed and intrinsically bad. Additionally, many of the technological processes themselves are also objectionable under this view. For example, artificial insemination involves masturbation, which is prima facie wrong.

**Utilitarian View**
Utilitarianism holds that the best course of action is that which maximizes the overall good of society. In this view, no reproductive technologies are in themselves objectionable. The ethical permissibility of reproductive technologies in this view depends on the specific procedure and whether it is likely to lead to more good than not. It is reasonable to assume that philosophers that hold this viewpoint will likely approve of most, if not all procedures. Rule utilitarianism is a branch of the broader utilitarian view that deems actions as moral if they follow a set of rules that lead to the greater good. Instead of looking at each situation independently, every case is assessed by the same set of rules. A philosopher holding this view might oppose any or all of the procedures. “If there is strong evidence to support the view that the use of reproductive technology will lead to a society in which the welfare of its members will not be served, then a rule utilitarian would be on firm ground in arguing that reproductive technology ought to be abandoned”(Munson, 383).

**Kantian Ethics**
Kant’s ethical theory revolves around the idea of the “Categorical Imperative.” Categorical imperatives are good in and of themselves and should always be followed. To put it more simply, they are the “golden rules” of morality. One of the most important categorical imperatives is to never use someone as a mere means but rather as a means to an end or an end in itself. Kantian principles do not provide grounds to reject reproduction technologies in general but “the maxim involved in each action must always be one that satisfies the categorical imperative” (Munson, 383).

Some cases of IVF, artificial insemination, and cloning would be morally wrong. Even though embryos may not be considered persons or moral agents under Kantian law because they do not have autonomy, they are potential persons and might be deserving of protection.

**Ross's Ethical Theory**
W.D. Ross's ethical theory is based on the idea that the only prima facie duty we hold is to promote duties of beneficence. In other words, we are obligated to help others better their lives. In order for these technologies to be ethical under this view, they must promote the well being of others. Most of the technologies listed below are objectionable because they help satisfy a shared desire and help a couple in need.

C. Reproductive Technologies

**Teacher-Directed Class Discussion**

The purpose of this activity is to provide students with an overview of the technologies available and their usages.

Information from:


**IVF-In Vitro Fertilization**
The woman is given reproductive hormones that cause the ova to ripen. Several mature eggs are then taken and placed into a nutrient solution to which sperm is added. The eggs that were able to fertilize are then placed into another solution where they undergo cell division. Once this is complete, the embryo is implanted into the uterus.

**GIFT-Gamete IntertFallopian Transfer**
This technique is similar to IVF but instead of waiting until an embryo is formed to put it into the woman, the ova and sperm are inserting directly into the fallopian tubes through an incision in the abdomen. The fertilization then takes place inside the woman's body, rather than externally.

**ZIFT-Zygote IntraFallopian Transfer**
The egg and sperm are cultured outside the body, and then the zygote is placed into the woman's fallopian tubes. This procedure rectifies the view that the fallopian tube is the safest environment for embryo development.
IVC-Intravaginal Culture
Ova are placed in a tube to which sperm is added. The tube is then inserted into the vagina and kept next to the cervix. Normal intercourse can take place while the tube is in place. After two days, the tube is removed, the contents separated, and any fertilized ova are transferred into the uterus.

ULR-Uterine Lavage Embryo Retrieval
Used by women who have a functioning uterus but who are unable to ovulate or do not wish to use their ova (e.g. she is the carrier of a lethal gene). Another ovulating woman is inseminated with donor sperm and the fertilized egg is washed out of the uterus after around 24 days, before it becomes embedded in the uterine wall. Once retrieved, the embryo is implanted into the woman being assisted. The main issue with this treatment is the possibility that the embryo might not be washed out before it embeds on the uterine wall. If this happens, the donor needs to decide whether or not she wants to have an abortion.

PZD-Partial Zona Dissection
Involves using microtechniques to drill holes in the zona, the protective membrane of the ovum, to make it easier for sperm to pass into the interior. This reduces the egg’s resistance to penetration.

ICSI-Intracytoplasmic Sperm Injection
This technique can help 50-60% of infertile men become fathers. Sperm is examined microscopically and the best-shaped and most active one is injected directly into the egg cell.

DNA Transfer
This technique involves replacing the nucleus of an older egg with one from a younger donor egg. The goal is to utilize the cellular mechanisms of the younger cell while maintaining the genetic material of the maternal egg. Many critics believe this technique to be too similar to human cloning.

CD-Cytoplasmic Donation
The cytoplasm is removed from a younger donor egg and injected into an older egg. This is a very new technique but data shows that this will increase the developmental success of the recipient egg.

Artificial Insemination
A semen specimen is placed in a syringe that is attached to a catheter. The catheter is inserted into the cervical canal and the semen is slowly injected into the uterus. The overall success rate is 85-90%.

Student Questions:
1. Which procedure seems to be the most natural and therefore least controversial?
2. Did your thoughts on the role of the parents change after learning about these technologies?
3. Do any of these technologies seem to be controlling nature with too substantial an influence? Should some of them not be permitted?

B. “Playing God” - The ethics of o spring selection

Individual Activity

Group Activity
Pre-implantation Genetic Diagnosis (PGD) provides IVF patients with the ability to choose the embryo that is most desirable. This activity will help the students think about what characteristics can ethically be selected for and against.

Students should complete the chart individually and then discuss as a group.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Yes</th>
<th>No (because...)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hair Color</td>
<td></td>
<td></td>
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<tr>
<td>Sex</td>
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<tr>
<td>Height</td>
<td></td>
<td></td>
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<tr>
<td>IQ/Intelligence</td>
<td></td>
<td></td>
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<tr>
<td>Sexual Orientation</td>
<td></td>
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<tr>
<td>Down Syndrome</td>
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<tr>
<td>Cancer Predisposition</td>
<td></td>
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<tr>
<td>Alzheimer’s disease susceptibility</td>
<td></td>
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<tr>
<td>Obesity</td>
<td></td>
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<tr>
<td>Near-Sightedness</td>
<td></td>
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</tbody>
</table>

D. Children as Commodities

Teacher-Directed Class Discussion

Information from:


In this activity, lead the class in discussions about the following topics:

a. Designer Babies
Would the ability to select traits in a child undermine the unconditional love between parent and child? Would it force parents to look at their children as a designed product instead of a human being?

b. Selective Abortion
Which traits should legitimately be selected against? Should parents be able to just “try again” and search for another, “better” embryo to use if the disorder is not fatal? Parenting is all about being prepared for anything that might happen. Why should conception be any different? Would selective abortion of embryos with disabilities lead to further inequality and discrimination of existing people with disabilities?

E. Savior Siblings

PGD also allows for the possibility to screen for tissue matching, typically to provide an existing child with the genetic means to overcome a fatal disease. Parents are typically encouraged to do everything that is best for their children but is it possible to take it too far? Is it ethical to have another child simply for the purpose of saving a current one?


Storyline: In Los Angeles, the eleven-year-old Anna Fitzgerald seeks the successful lawyer Campbell Alexander, trying to hire him to earn medical emancipation from her mother, Sara, who wants Anna to donate her kidney to her sister. She tells the lawyer the story of her family after the discovery that her older sister Kate has leukemia; how she was conceived by in vitro fertilization to become a donor; and the medical procedures to which she has been submitted since she was 15 years old to donate to her sister. Campbell accepts work pro bono and the obsessed Sara decides to go to court to force Anna to help her sister (http://www.imdb.com/title/tt1078588/).

This IM accurately portrays the ethical issues and family problems that result from decisions of savior siblings and should give the class good background information.

2. Debate/Discussion:

Group Activity

Students should read the following articles (both of which can be found in Intervention and Reflection):


i. Specifically this excerpt from the section entitled “Means, Ends and Commodication”

1. “A second more practical objection to this argument is that it does not adequately distinguish between creating a child as a saviour sibling and creating a child for some other ‘instrumental’ purpose-for example, completing a family; being a playmate for an existing child, saving a marriage, delighting prospective grandparents, or providing an heir. Perhaps these things are different from creating a saviour sibling but, if they are the difference isn’t that they are any less ‘instrumental’ for in all these cases, the child is used as a means”(Munson, 417).

c. Split the class into two groups to debate the following statement:

Pre-implantation genetic diagnosis (PGD) should not be used to nd embryos to be savior siblings because this uses the child as a means rather than an end.

F. Excess Embryos

Teacher-Directed Class Discussion

Partner Activity
One of the main ethical issues involved with IVF and PGD treatments is the existence of excess embryos. The most plausible options to solve this problem include: cryopreservation (freezing), donating the embryos for reproductive use by other couples, disposal, or donation for scientific research or training. There are as many as 400,000 frozen embryos in storage in the US alone.

Have everyone choose a partner to discuss the following questions:
1. What is the best option for dealing with excess embryos?
2. Is it ethical to dispose of the excess embryos?
3. What should be done if the couple gets divorced? Who should get the rights to the embryo?
4. What should be done if both members of the couple die? Who should get the rights to the embryo?

G. In the News

**Group Activity**

**Teacher-Directed Class Discussion**

The purpose of this section is to present the students with actual news stories about ethical issues involving reproductive technologies while also having them formulate their own opinion about different topics. Split the class up into equal groups, one for each article (or have them choose an article, depending on the size of the class). They should read and prepare a presentation for the class that includes the following:

- Brief summary of the story
- How it relates to the topics learned in this section
- Their personal opinion on the topic

1. Meet the Twiblings
   a. Link: http://www.nytimes.com/2011/01/02/magazine/02babymaking-t.html?_r=1

2. IVF Lottery Raises Eyebrows in U.K.

3. Who's on the Family Tree? Now It's Complicated

4. The Two-Minus-One Pregnancy

H. Conclusion

Teachers should have students return to the original questions:

a. Do you have any strong opinions about the use of certain reproductive technologies learned about in this lesson?

b. Of the characteristics you stated you would want to be able to select, would the selection be ethical?

c. Under what circumstances is it inappropriate to use these technologies? Should we place restrictions on science?

Based on the activities of the unit, have their answers changed?

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