FIFTH GRADE
LESSON X
FERTILIZATION-HEREDITY

Objective
Students will
• Discuss sexual intercourse and fertilization
• Understand fetal development
• Describe how gender is determined
• Demonstrate an understanding of heredity and dominant/recessive traits

Concepts
1. Explain that when genes from the sperm cell (male) and egg cell (female) come together, they combine in a unique recipe that creates a particular person. As the genes combine to form particular characteristics, one of the genes is more influential in the final result. It is called the dominant gene. The less influential gene is called the recessive gene.

2. Explain that a human has 46 chromosomes, a structure in the cell that carries the genes. Each person begins as one cell when the egg meets the sperm. That one cell gets 23 chromosomes from the egg, 23 chromosomes from the sperm. One of those chromosomes carries the genes that determine gender. (It might be helpful to draw a cell and label the chromosomes in it with various genetic characteristics.) Each egg has chromosomes called X, which determines gender. A sperm contains either an X or Y gender chromosome. If two X chromosomes unite when the new cell is formed, the result is a female. If the X from the egg combines with a Y from the sperm the result is a male. Gender is determined by the sperm.

3. Fertilization occurs when an ovum and a sperm combine to form a new cell. For this to happen, a man places his erect penis in the woman’s vagina. Semen containing sperm cells is ejaculated into the vagina. Millions of sperm cells are deposited at one time. If an ovum (egg) is in the woman’s fallopian tube, a sperm may combine with the ovum and fertilize it. A single cell is formed. This cell divides into two cells and continues to divide. The fertilized ovum travels down the fallopian tube to the uterus where it attaches itself to the lining of the uterus. The developing ball of cells is called an embryo. This attachment of the embryo to the lining is the beginning of pregnancy.

4. Discuss the development of natural relationships between men and women—meeting, friendship, dating, growth of love based on mutual respect, trust, caring, commitment, and marriage. Part of beginning love is the desire to be physically close. The closest a man and woman can be physically is during sexual intercourse. This is one way for a man and woman to express love.
Materials
- “Genes: What I Look Like” worksheets
- Chart (or overhead) “A New Life Begins, Fertilization to Birth”
- 2 plastic bowls
- Tape, stapler, construction paper
- Question box

Activity Choices
1. Discuss dominant/ recessive traits
2. Duplicate and distribute “Genes: What I Look Like” worksheet
3. Discuss genetic characteristics
4. Inventory their own characteristics and indicate if they are dominant or recessive
5. Compare similarities with family members
6. Have students predict outcome of the combination of genes
7. Have students make this or have it ready for their analysis. Take 2 plastic bowls of the same size. Place 23 pieces of construction paper inside. Label some of the pieces with genetic characteristics (eye color, hair-line, finger length, etc.). Also label one of the “chromosomes” to represent the gender chromosome. Tape the 2 bowls loosely together to represent the egg. Make several “sperm” cells out of the six-inch strips of construction paper. Draw 23 chromosomes on each “sperm” and label some specific genetic characteristics. Make some of the sperm with the X gender chromosome. Make some with a Y. Fold and staple the sperm so that the notations are not visible.
8. To demonstrate fertilization, choose 1 “sperm” and drop it into the “egg.” Open the bowls and sort out the “chromosomes.” See what the resulting “baby” would look like in terms of the characteristics labeled and also what gender it would be.
9. Define and describe growth and stages of fetal development using “A New Life Begins.” Include:
   A. nourishment of the fetus
   B. importance of pre-natal care
   C. heredity
10. Exceptional Education Inclusion Activity
   A. Have student bring in pictures of each of their parents
   B. Have them list the physical characteristics they got from each
"GENES: WHAT I LOOK LIKE"

Directions: Pair up with another student and look for the following characteristics in one another. Then, follow your teacher’s instructions for marking on your worksheet the genetic characteristics you observe in yourself.

DARK HAIR

CLOCKWISE HAIR WHORL

WIDOW’S PEAK

LARGE EYES

LONG EYE LASHES (3/8" or more)

EYE COLOR:

BROWN, HAZEL OR GREEN

BLUE OR GREY

TURNED-UP NOSE

BROAD LIPS

D= dominant, R= recessive
"GENES: WHAT I LOOK LIKE"
(continued)

FREE EARLOBES

EAR POINTS

HAIR ON MIDDLE JOINTS OF FINGERS

STRAIGHT LITTLE FINGERS

SHORT FINGERS

FRECKLES

TONGUE ROLLING

TONGUE FOLDING

D = dominant, R = recessive
<table>
<thead>
<tr>
<th>Time</th>
<th>Approximate Size</th>
<th>DEVELOPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Day</td>
<td>Single cell</td>
<td></td>
</tr>
<tr>
<td>7 Days</td>
<td>Group of cells</td>
<td></td>
</tr>
<tr>
<td>10 Days</td>
<td>The heart begins to beat</td>
<td></td>
</tr>
<tr>
<td>15 Days</td>
<td>The nervous and endocrine systems begin to form</td>
<td></td>
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<tr>
<td>20 Days</td>
<td>The organ systems begin to form</td>
<td></td>
</tr>
<tr>
<td>25 Weeks</td>
<td>The baby is born- The feet are open - The lungs move more - Heart starts beating - Choroid plexus can increase</td>
<td></td>
</tr>
<tr>
<td>26 Weeks</td>
<td>Weight 25 to 35 centimeters</td>
<td>Length</td>
</tr>
<tr>
<td>27 Weeks</td>
<td>Weight very light - The legs is fully developed</td>
<td>Length</td>
</tr>
<tr>
<td>28 Weeks</td>
<td>Development rapidly - The lungs appear - The fingers and toes become visible - The eyebrows start to grow - The ears and nose are visible - The skin begins to look more like an adult</td>
<td>Length</td>
</tr>
<tr>
<td>29 Weeks</td>
<td>Skin develops - The lungs, heart, and nervous system fully grown</td>
<td>Length</td>
</tr>
<tr>
<td>30 Weeks</td>
<td>The fingers and toes develop rapidly - The lungs cannot breathe - The heart starts to pump</td>
<td>Length</td>
</tr>
<tr>
<td>31 Weeks</td>
<td>All organ systems are functioning</td>
<td>Length</td>
</tr>
<tr>
<td>32 Weeks</td>
<td>The baby is fully developed</td>
<td>Length</td>
</tr>
<tr>
<td>33 Weeks</td>
<td>The baby is fully developed</td>
<td>Length</td>
</tr>
<tr>
<td>34 Weeks</td>
<td>The baby is fully developed</td>
<td>Length</td>
</tr>
<tr>
<td>35 Weeks</td>
<td>The baby is fully developed</td>
<td>Length</td>
</tr>
</tbody>
</table>

*Such is human reproduction a miracle - Reproductive system forms in 3 weeks - The heart starts beating in 4 weeks - The lungs begin to function in 7 weeks - The brain begins to function in 9 weeks - The baby is fully developed in 40 weeks.*