

OVERVIEW

BIG IDEA

Human reproduction involves a lengthy, complex, and internally coordinated process.

OBJECTIVE

4.4 Describe the events of pregnancy.

AGENDA

1. Data Analysis: # of Births
2. Events after Fertilization
3. Trimesters of Pregnancy
4. Support Structures for Fetus
5. Complications of Pregnancy

HOMEWORK

Analyze the graph on intended pregnancies among various subgroups. Answer the questions about the data.

LESSON 4.4

Pregnancy

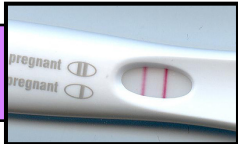
SUMMARY:

This lesson will prepare students with some basic background on the initial stages of pregnancy, some key events in the three trimesters, common pregnancy complications, and support structures for the growing fetus. Students will engage in readings and discussion questions, along with data analysis during the Do Now and Homework portions of the lesson.

STANDARDS:

Next Generation Science Standards:

LS1.A: Structure and Function



Pregnancy

Obj. 4.4: Describe the events of pregnancy.



Use the table below to answer the questions about births.

Number of births to females under 20 years of age, 2010

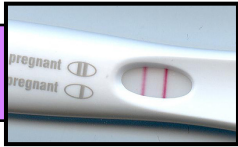
Total ¹	Illinois	United States
Females under 20 years of age	14,988	372,175
Females aged	Illinois	United States
Under 15	190	4,497
15-17	4,645	109,173
18-19	10,153	258,505
15-19	14,798	367,678
Mother's race/ethnicity	Illinois	United States
Non-Hispanic white	4,805	145,070
Non-Hispanic black	5,457	89,902
American Indian or Alaska Native ^{2,3}	*	7,508
Asian or Pacific Islander ^{2,3}	97	6,311
Hispanic ⁴	4,532	123,609

1. How many babies were born to teens in Illinois in 2010?
2. How many babies were born to girls under 15 years old in the US in 2010?
3. How many babies were born to Black and Hispanic teens in Illinois during 2010, respectively?
4. How many babies were born to Asian and American Indian teens in Illinois in 2010, combined?
5. What age group produced the fewest babies in 2010? What age group produced the most babies?
6. Approximately what percentage of teen births occurred in Illinois in 2010 (yes, you may use a calculator if you have one, or make a great estimate)?
7. Which race/ethnicity produced the highest number of babies in Illinois and the United States in 2010, respectively? Why do you think there is this difference between our state and the nation?

DO NOW:

Answers:

1. 14,988
2. 190
3. 5457, 4532
4. 97
5. Under 15, 15-19
6. Approx. 4%
7. Non-Hispanic black, Non-Hispanic white, Answers will vary.

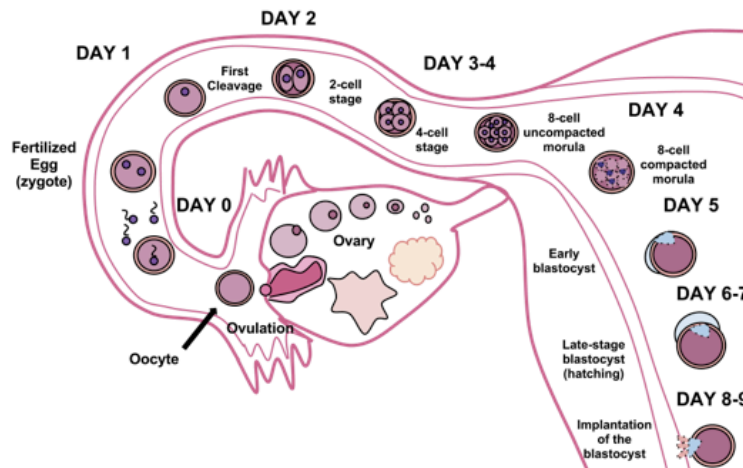


With a partner, discuss the trends you observed in the table and answer the following questions
1) What do you think is impacting the pregnancy numbers?
2) What is one strength and one limitation with the way the data is presented in the table?



Fertilization, Cell Division, Implantation

Once the sperm and egg meet in the fallopian tube, a series of cell divisions occur on the journey to the uterus, where implantation will occur in the uterus wall. Follow the diagram below to observe the timeline and stages of this journey.



Terms for the Stages of Development

ZYGOTE: When a single sperm enters the mother's egg cell, the resulting cell is called a zygote. The zygote contains all of the genetic information (DNA) needed to become a baby. The zygote spends the next few days traveling the fallopian tube and dividing.

BLASTOCYST: The zygote continues to divide, creating an inner group of cells with an outer shell. This stage is called a blastocyst. The inner group of cells will become the embryo, while the outer group of cells will become the membranes that nourish and protect it. The blastocyst reaches the womb (uterus) around day 5, and implants into the uterine wall on about day 6. At this point in the mother's menstrual cycle, the lining of the uterus has grown and is ready to support a baby. The blastocyst sticks tightly to the lining, where it receives nourishment via the mother's bloodstream.

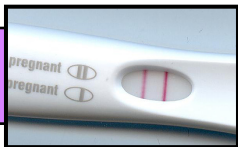
EMBRYO: The cells of the embryo now multiply and begin to take on specific functions. This process is called differentiation. It leads to the various cell types that make up a human being (such as blood cells, kidney cells, and nerve cells).

FETUS: Term for the developing life form, beginning at the 11th week in gestational age, which is the 9th week after fertilization.

Source: <http://www.nlm.nih.gov/medlineplus/ency/article/002398.htm>

DISCUSS: One possible strength: showing totals gives a sense of the extent of the problem; One possible weakness: we don't know the total populations at each age and race/ethnicity, so showing whole numbers may be misleading if we don't know what percentage of the whole those make up

NEW INFO: For more background on this process, numerous websites can be visited. Here are a few good ones:
Complex: http://php.med.unsw.edu.au/embryology/index.php?title=Embryonic_Development
Simple: <http://www.mayoclinic.org/prenatal-care/art-20045302>
Video: http://www.babycenter.com/2_inside-pregnancy-early-fetal-development_10354436.bc
Visual: <http://www.visembryo.com/baby/>

**DISCUSS**

At what stage would you consider the developing life form an actual life? Do you base your answer on scientific evidence or personal beliefs? Why is this such a controversial question?

**READ****The Trimesters of Pregnancy**

Pregnancy usually lasts about **40 weeks**, or just over 9 months, as measured from the last menstrual period to childbirth. Pregnancy is divided into three trimesters. The major events in each trimester are described below.

First Trimester (Week 1 to Week 12)

The events that lead to pregnancy begin with **conception**, in which the sperm penetrates the egg produced by an ovary. The **zygote** (fertilized egg) then travels through the woman's fallopian tube to the uterus, where it implants itself in the uterine wall. The zygote is made up of a cluster of cells formed from the egg and sperm. These cells form the **fetus** and the **placenta**. The placenta provides nutrients and oxygen to the fetus.

Second Trimester (Week 13 to Week 28)

- At 16 weeks, and sometimes as early as 12 weeks, a woman can typically find out the sex of her infant. Muscle tissue, bone, and skin have formed.
- At 20 weeks, a woman may begin to feel movement.
- At 24 weeks, footprints and fingerprints have formed and the fetus sleeps and wakes regularly.
- According to research from the NICHD Neonatal Research Network, the survival rate for babies born at 28 weeks was 92%, although those born at this time will likely still experience serious health complications, including respiratory and heart problems.

Third Trimester (Week 29 to Week 40)

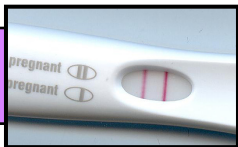
- At 32 weeks, the bones are soft and yet almost fully formed, and the eyes can open and close.
- Infants born before 37 weeks are considered preterm. These children are at increased risk for problems such as developmental delays, vision and hearing problems, and cerebral palsy. According to the March of Dimes, as many as 70% of preterm births occur between 34 and 36 weeks—these are late-preterm births.
- Infants born in the 37th and 38th weeks of pregnancy—previously considered full term—are now considered “early term.” These infants face more health risks than infants who are born at 39 weeks or later, which is now considered full term.
- Infants born at 39 or 40 weeks of pregnancy are considered full term. Full-term infants have better health outcomes than do infants born earlier or, in some cases, later than this period.. Therefore, if the mother and baby are healthy, it is best to deliver at or after 39 weeks to give the infant's lungs, brain, and liver time to fully develop.
- Infants born at 41 weeks through 41 weeks and 6 days are considered late term.
- Infants who are born at 42 weeks and beyond are considered post term.

DISCUSS

Could a baby develop outside the human body? Why or why not?

DISCUSS: This question obviously hints at the abortion debate. While that debate is an important one, it would take much more time than this lesson will allow. It is also a very sensitive issue and should be approached with caution in the classroom. A takeaway of this question for students should be that we can form opinions based on evidence and our own beliefs, but that often there is a lot of “gray area” imbedded in these complex questions.

READ: One interesting visual on the growing baby inside the mother's womb can be found here: <http://www.msichicago.org/whats-here/exhibits/you/the-exhibit/your-beginning/make-room-for-baby/interactive/>



Support Structures for the Fetus

PLACENTA: The placenta is a pancake-shaped organ that attaches to the inside of the uterus and is connected to the fetus by the umbilical cord. The placenta produces pregnancy-related hormones, including chorionic gonadotropin (hCG), estrogen, and progesterone. The placenta is responsible for working as a trading post between the mother's and the baby's blood supply. Small blood vessels carrying the fetal blood run through the placenta, which is full of maternal blood. Nutrients and oxygen from the mother's blood are transferred to the fetal blood, while waste products are transferred from the fetal blood to the maternal blood, without the two blood supplies mixing. The placenta is expelled from the uterus in a process called the after-birth.

UMBILICAL CORD: The umbilical cord is the life-line that attaches the placenta to the fetus. The umbilical cord is made up of three blood vessels: two smaller arteries which carry blood to the placenta and a larger vein which returns blood to the fetus. It can grow to be 60 cm long, allowing the baby enough cord to safely move around without causing damage to the cord or the placenta.

AMNIOTIC SAC: The amniotic sac is filled with the amniotic fluid. This sac is your baby's home, gymnasium, and protection from outside knocks, bumps, and other external pressures. The amniotic sac allows the fetus ample room to swim and move around which helps build muscle tone. To keep the baby cozy, the amniotic sac and fluid maintain a slightly higher temperature than the mother's body, usually 99.7 F. When the "water breaks," it is this sac that ruptures and this fluid that leaves the body.

Source: <http://americanpregnancy.org/duringpregnancy/fetallifesupportsystem.html>



Common Pregnancy Complications

Miscarriage:

- spontaneous loss of a fetus before the 20th week of pregnancy; may also be called a "spontaneous abortion"

Ectopic Pregnancy:

- The embryo implants outside the uterus; also known as "tubal pregnancy"
- Causes heavy bleeding, severe pelvic pain, dizziness and may result in death if untreated

Preterm Labor:

- When the mother's body is trying to deliver the baby before she has reached full-term (37 weeks).
- Risk of delivering the baby too early when the contractions are closer, stronger, and longer.
- Can feel like menstrual cramping or a subtle backache.
- In serious situations, bed rest and medications are necessary to help the pregnancy go full-term.

Gestational Diabetes:

- Develops during pregnancy (usually 2nd trimester), when a woman's body is not making enough insulin.
- Cannot be treated by pills, most treatment is through diet or insulin.

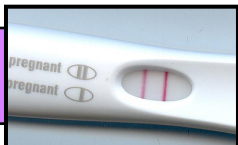
Source: <http://americanpregnancy.org/pregnancycomplications/commoncomplications.html>



On a separate sheet of paper, describe the following terms in three sentences or less: **zygote**, **second trimester**, **amniotic sac**, and **ectopic pregnancy**

READ: Ask students if they have heard of any problems relating to these support structures? (Examples: Placenta previa, premature rupture of the amniotic sac, umbilical cord prolapse, umbilical cord being wrapped around babies neck, meconium aspiration syndrome, etc.)

READ: Ask students if they know of other complications. There are many more than can be added to this list (some common, others not so common) : (Molar pregnancy, Rh Negative disease, Group B strep, Low birth weight, etc.)

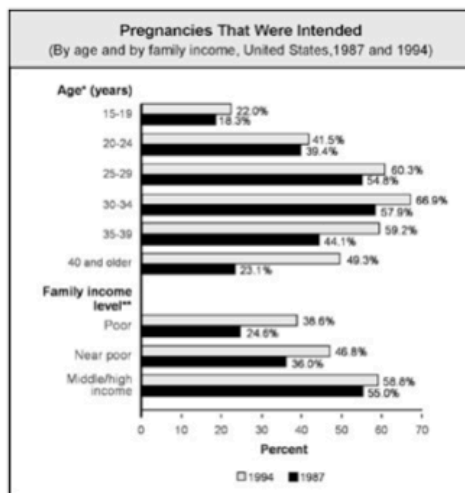


Lesson 4.4 Instructor Guide

MODULE 4: SEXUAL HEALTH



Public health officials collected data on U.S. pregnancies in 1987 and 1994. One variable they measured was whether the pregnancy was intended or unintended at the point of conception. They analyzed compared this data across the 7 year time period with the age and family income level of the couple. Their data is displayed below in Figure 1.



Sources: *Henshaw, S.K. Unintended pregnancy in the United States. *Family Planning Perspectives* 30(1):24-29, 46, 1998. **Brown, S.S., and Eisenberg, L. *The Best Intentions: Unintended Pregnancy and the Well-Being of Children and Families*. Washington, DC: National Academy Press, 1995.

1. The purpose of this study was to determine how _____ and _____ affect whether a pregnancy is more likely to be intended or unintended.
2. Given the information in Figure 1, what percentage of the group with family income levels that are considered poor and are aged 15-19, respectively, have pregnancies that were intended in 1987? _____ and _____.
3. Circle the statement that is supported by Figure 1:
 - a. For all age groups, there were more unintended pregnancies in 1987 than in 1994
 - b. For all age groups, there were more unintended pregnancies in 1994 than in 1987
4. Circle the statement that is supported by Figure 1:
 - a. For all family income levels there were less intended pregnancies in 1987 than in 1994
 - b. For all family income levels there were less intended pregnancies in 1994 than in 1987
5. As the level of family income increases, the percent of pregnancies that are unintended _____.
6. As age group decreases from 30-34 to 15-19, the percent of pregnancies that are intended _____.
7. It could be concluded that unintended pregnancies happen most often among: _____ age group AND _____ income level
8. Which group would you conclude had the highest chance of having an unintended pregnancy in 1987?

HOMEWORK: The purpose of this homework is to provide students with a useful data set (this may be helpful data to draw from in their upcoming case study) to use in more data analysis practice. It may also surprise and shock students to learn how many pregnancies are actually unintended, even among older women.