

**PERENNIAL PROBLEM:**

What to do about Nurturing Human Development

**CONTINUING PARENTING CONCERN:**

Understanding Development

**RELATED CONCERN:**

A Healthy Prenatal Environment

**DESIRED RESULTS FOR STUDENTS:**

Students will examine the factors that contribute to the well-being of the pregnant woman and her unborn baby.

**LEARNER OUTCOMES:** Students will:

1. Explore the context of prenatal development.
2. Consider the factors that ensure the well-being of the father, mother, and the birth of a healthy baby.
3. Examine approaches for assisting parents to achieve a healthy prenatal environment.
4. Analyze the consequences of environmental and hereditary influences on prenatal development.

**SUPPORTING CONCEPTS:**

- A. Prenatal Care
- B. Influences of Healthy Prenatal Development

**BACKGROUND INFORMATION:**

At no other time are the lives of two people, mother and unborn baby, closer than during the prenatal period. The unborn baby is surrounded by its own protective world, a world that meets its basic needs and from which a unique individual is born. This world inside the mother's body provides a safe "home" for the growing fetus to which the mother is responsible for eating, breathing, and eliminating wastes for both of them. The most damaging effect of environmental hazards can occur in the first 8 weeks.

The National Foundation March of Dimes uses the slogan "Be good to your baby before it is born." This slogan should be taken very seriously because prenatal care should start before pregnancy. It is important to remember that pregnancy is a condition, not an illness; a pregnant woman is not sick.

Having good health before pregnancy is important. By planning ahead, a woman can ensure that she and her baby are off to a healthy start. Good nutrition, proper exercise, sufficient rest and attention to personal care for yourself all affect pregnancy. The following are some of the many important actions that can help lead to a healthy pregnancy for both mother and child.

**Maintain a healthy weight and exercise regularly:** Exercise is good for a pregnant woman. Benefits of working out include feeling good and maintaining a healthy weight. Regular

exercise that is enjoyable helps her feel better and enjoy her pregnancy better. It will also provide her baby with a healthier environment.

**Stop smoking, drinking alcohol, using drugs, and reduce caffeine intake:** Smoking, drugs, alcohol and caffeine can affect everyone detrimentally but are particularly bad for pregnant women. When a pregnant woman takes any kind of drug, drinks alcohol, or smokes (tobacco or marijuana), the unborn baby is affected also.

When a pregnant woman smokes, her baby does, too. Cigarette smoke crosses the placenta to her baby. Tobacco smoke contains many harmful substances such as nicotine and carcinogens; which are cancer-causing agents. Smoking during pregnancy increases the risk of fetal death or damage. Women who smoke during pregnancy risk delivering premature babies who usually have lower than average birth weights. These newborns are likely to develop health problems in early infancy which can continue on throughout the rest of their lives.

Drinking alcohol (hard liquor, wine, or beer) can also be detrimental to the unborn baby. Alcohol is absorbed into the pregnant woman's bloodstream and crosses the placental barrier. Excessive and chronic drinking during pregnancy increases the risk of having a baby born with fetal abnormalities.

Fetal Alcohol Syndrome (FAS) is a pattern of malformations and disabilities resulting from a pregnant woman drinking heavily during her pregnancy. FAS will not occur if the father was drinking heavily or if the pregnant woman was drinking a very small amount of alcohol on rare occasions. Heavy drinking on a consistent basis or binge drinking on an occasional basis can produce FAS. Fetal Alcohol Syndrome is currently the leading cause of mental retardation in the United States.

Fetal Alcohol Effects (FAE) is a condition where children are born with less dramatic physical defects, but with many of the same behavioral and psychosocial characteristics as those with FAS. FAE is often thought of as lower on the continuum than FAS, but this is not correct. Many individuals with FAE, while looking quite normal, have significant deficits in their intellectual, behavioral, and social abilities which prevent them from leading normal lives.

When a pregnant woman takes drugs the unborn baby does too. Some drugs can cause severe damage to an unborn baby. The use of drugs in pregnancy may affect a child's IQ, attention span, and learning ability. It is important to remember that the safest approach to drug or alcohol use during pregnancy is no use at all.

Coffee, tea, chocolate and some soft drinks contain caffeine. It is unclear as to the exact amount of caffeine it takes to affect the fetus. Because of this uncertainty many doctors recommend pregnant women reduce the amount of caffeine they consume.

**Stay healthy:** A pregnant woman should try to avoid infections by washing her hands frequently, have regularly scheduled checkups, and visit the doctor if she is sick. It is important to see a health care provider early in pregnancy to get the proper care for the mother-to-be and developing fetus. Medical supervision is the best insurance for safe and successful childbearing. Women who don't get early prenatal care are much more likely to have babies who are sick and need extra medical care after birth.

**Try to lessen the stress in life:** It is important that expectant mothers find time to take care of themselves during pregnancy. There has been research that suggests that high levels of stress in expectant mothers can result in pregnancy problems. It makes sense to cut down on the stress in their lives as much as possible. They need to consider ways to reduce stress levels by exercising, managing time, resting and taking time to do things that they enjoy.

**Eat a healthy and well-balanced diet:** The unborn baby lives on what the mother eats. Eating a variety of foods each day is the best way to make certain that both mother and baby are getting all the nutrients they need. Foods from each of the five food groups – fruits, vegetables, bread and cereal, milk and milk products, and meat or other protein foods - should be included daily. A nutritious diet will aid in achieving a more comfortable pregnancy and in delivering a healthy baby.

**Health of the baby's father:** In recent years more attention has been given to the father's contribution in pregnancy. A father's drug habit at the time of conception may influence the outcome of pregnancy. It is important that the father also discontinue the use of drugs, alcohol, and tobacco. Quitting smoking will improve the health of everyone in the family since secondhand smoke is nearly as dangerous as firsthand smoke. Smoking, in fact, increases the baby's risk of Sudden Infant Death Syndrome (SIDS).

**Effect of HIV/AIDS:** HIV (human immunodeficiency virus) is the virus that causes AIDS (acquired immune deficiency syndrome); 2 out of every 1000 women who enter pregnancy are HIV positive. Research has shown that an infected woman can pass the virus to her baby as early as the 8<sup>th</sup> week of pregnancy. If a woman is in the early course of the illness she may have an uneventful pregnancy, birth, or breastfeeding. However, research shows that the risk of a woman infected with HIV passing the virus to her baby can now greatly be reduced and nearly eliminated. If she takes an AZT during pregnancy and has a Cesarean delivery, she reduces the risk of passing the virus (Curtis, 2004).

**Birth Defects:** According to the Center for Disease Control and Prevention, birth defects affect about one in every 33 babies born in the United States each year. They are the leading cause of infant deaths, accounting for more than 20% of all infant deaths. The risks of hereditary abnormalities can be predicted and prevented by genetic counseling. There are more than 13,000 known inherited gene disorders. Each year in the United States about 150,000 babies are born with some type of birth defect. In addition, certain ethnic groups have a higher chance or incidence of specific genetic defects. Certain medications, chemicals, and pesticides can also put a couple at risk (Curtis 2004). Genetic counseling brings couples together with professionals who are trained to deal with questions and problems associated with the occurrence of genetic problems.

Some hereditary factors may cause prenatal development not to proceed normally, causing birth defects. Some of these defects, such as sickle cell anemia, cystic fibrosis, color blindness and muscular dystrophy can be traced back to parent's genes. Down syndrome, also known as Trisomy 21, is a well known inherited disorder and is characterized by mental retardation and slow physical development. Women over 35 have an increased risk of bearing a baby with Down syndrome. Testing, such as an amniocentesis, can be done to see whether or not the baby has Down syndrome. An amniocentesis is a process where a small amount of amniotic fluid surrounding the baby is withdrawn and is examined for defects. Other types of prenatal testing include Triple Screen (MSAFP), blood tests, and Alpha-fetoprotein tests.

The type of medical care selected during pregnancy and delivery of the baby depends on personal preferences and finances. The choices include general practitioners, obstetricians, nurse practitioners and certified nurse-midwives. Information for what is available in communities can be found at local hospitals, public health departments or medical societies. There are services available in more communities for those parent-to-be who need financial help. A variety of health care providers are generally available.

Teen pregnancy, especially when women are younger than 17, increases the health risks for both mother and baby. Babies born to teen parents often do not receive adequate nourishment and prenatal care. There is also a risk of having a baby being born prematurely

and having a low birth weight. When a teenager becomes pregnant before the growth of her own body is complete, it is much harder for her to support the physical demands of an unborn baby for 9 months. It is important for pregnant teens to obtain good prenatal care from the earliest months of pregnancy.

Pregnancy can be an exciting time for the future parents. With proper health care and avoidance of known harmful effects, parents can greatly increase the chances for a normal, healthy baby.

#### Teacher Preparation:

1. If you have given birth to your own children, think back to your own pregnancies. What concerns did you have about prenatal development? What, if any, hereditary factors were taken into consideration before or during pregnancy? If you have never had children, what concerns have friends or relatives who have gone through pregnancy shared with you? If willing and you have them; share your ultrasound pictures and hospital bills with the class to help them understand the realities of pregnancy and birth.
2. Are there any pregnant teens and/or teenage mothers and fathers in your class? In your school? How much information have they been given on prenatal development? What are their concerns? What support systems, if any, are available to pregnant teens in your school and in the community? Would these teens be willing to talk about their experiences in your class?

Note: TM in the activities refers to transparency master and SM refers to student master.

#### DIRECTED ACTIVITIES:

##### Supporting Concept A: Prenatal Care

1. **“Introduction”:** Using, “Prenatal Development and Birth Vocabulary” (SM-1), review the prenatal development and birth vocabulary with students. (*Awareness of Context*)
2. **“Prenatal Development”:** Divide the class into nine groups. Have each group of students research one month of prenatal development. Students will present their findings, with brief explanations and/or illustrations, to the rest of the class. (*Awareness of Context*)

Have students complete the worksheet, “Embryo & Fetal Development” (SM-2). Discuss with the class about the appropriate month for each of the statements.

If available, show the National Geographic DVD, “Biology of Prenatal Development,” to the class. The DVD describes human prenatal development through all 38 weeks of pregnancy, emphasizing the first trimester developmental period when all body systems and more than 90 percent of all body parts emerge and begin to function. (Available through the National Geographic online store)

3. **“Teen Pregnancy Quiz”:** Go online to <http://www.teenpregnancy.org> and print off a copy of the “Teen Pregnancy Quiz.” A new quiz is created every year. Have students take the quiz individually and then post results. Go over the answers and talk with students about smart decisions and ways to prevent teen pregnancy. (*Awareness of Context, Desired Results, Alternative Approaches, Consequences of Action*)
4. **“What are the Odds?”:** Have every student in the class get out a scrap piece of paper and crumple it up into a ball. Place an empty trash can on a desk or on the floor in a central

location in the room. Have students try to make a basket from where they are sitting. Keep track of how many students make the basket. Once everyone has attempted it, ask the students the following:

“No one can be sure of the outcome beforehand, right? There was uncertainty involved. But there was also always a chance that someone would make the basket with the entire class trying. And \_\_\_ of you did make it. Now imagine if 360 million students tried to make a basket. Is it likely that at least one person would make a basket?”

Relate that to the fact that the average male ejaculates 360 million sperm at one time, and only one sperm has to get through to unite with the female’s egg to cause a pregnancy!  
*(Awareness of Context)*

5. **“Prenatal Care”**: Invite a qualified health care provider to speak to the class on health and physical needs of pregnant women. Before the speaker is present have the students add their own questions to the following list:

- Why is prenatal care important early in pregnancy?
- Why do pregnant teens often wait to seek prenatal care?
- What are some possible consequences of failure to secure prenatal care early in pregnancy?
- How can the father assist in prenatal care?
- What if the father is a teenager?
- What are the consequences of gaining too much weight during pregnancy?
- What about the consequences of not gaining enough weight?
- What are the options for medical care during pregnancy?

*(Awareness of Context, Desired Results, Consequences of Action, Alternative Approaches)*

### **Supporting Concept B: Influences of Healthy Prenatal Development**

6. **“Maternal Nutrition and Fetal Development”**: Nutrition is a major intrauterine environmental factor that could have lifelong consequences for the developing fetus. Have students compare and contrast the differences in food requirements for a teenager and a pregnant woman. In small groups, have students list foods that a typical teenager eats in a day. Answer the following questions in a large group or in small groups:

- What would need to be added and/or subtracted to make this a well-balanced diet for a pregnant woman?
- What are some of the reasons why a pregnant teenager might not be able to follow this diet?
- What would be the consequences to the unborn baby if a healthy diet was not followed?
- Why is it important to have good nutritional habits before pregnancy?
- What are some possible effects on the mother’s health and well-being as a result of poor nutrition?

*(Awareness of Context, Desired Results, Consequences of Action, Alternative Approaches)*

7. **“Harmful Influences on Developing Fetus”**: The choices a woman makes may play a significant role in the pregnancy. Smoking, drinking alcohol, and using recreational drugs can be harmful to the development of the unborn baby. Hobbies or work that involves exposures to

toxic paint, solvents, or lead can also pose risks. Minimizing these risks during pregnancy is a good way to give the baby the best start possible.

Introductory activity: Prepare 2" X 2" pieces of paper equal to the number of students in the class. On 4/5 of the papers write; "healthy baby." On the remaining 1/5 write, "baby with defects." Place all the papers in a box. Focus the student's attention with a statement such as, "It is sometime in the future and you are expecting your first child." Direct each student to select a piece of paper from the box. When all the students have drawn a piece of paper from the box, make a statement, such as, "Today, luck was the only factor in whether you had a healthy baby or a baby with a birth defect." In actuality, many factors play a part in whether the baby is healthy or not. Explain that the risk of birth defects can be reduced by the choices made before and during pregnancy.

Compile a list on butcher paper or on an overhead projector of the factors that may influence or cause irregularities in prenatal development. Include the following examples:

- Maternal illness (rubella, diabetes, strep B)
- Use of alcohol (beer, wine, hard liquor)
- Tobacco
- Caffeine
- Over-the-counter drugs
- Illicit Drugs
- Sexually transmitted diseases
- Exposure to toxic substances (solvents, lead, etc.)

Have students work in groups of 2 or 3 to research these topics online and prepare a display/presentation for the class. Two web sites to suggest are: Department of Health and Human Services; Center for Disease Control and Prevention and the National Institute on Drug Abuse. (*Awareness of Context*)

Invite an obstetrician or pediatrician to speak to the class.  
(*Desired Results*)

**8. "Birth Defects; Genetic Conditions Research Paper":** Have students choose from the following list of common birth defects to research. Use the online reference *MarchofDimes.com* to complete the assignment.

- Achondroplasia
- Autism
- Cerebral Palsy
- Club Foot
- Cystic Fibrosis
- Congenital Heart Defects
- Down Syndrome
- Fragile X Syndrome
- Marfan Syndrome
- The Neurofibromatoses
- Rh Disease
- Sickle Cell Disease
- Spina Bifida
- Tay-Sachs Disease
- Thalassemia

After research have students complete an expository paper answering the following questions:

1. What is it and what causes this birth defect?
2. Is this birth defect preventable?
3. What are the long term effects of this birth defect?
4. Is there a treatment for this birth defect? If so, what is it?
5. How common is the birth defect?
6. How does this defect or disorder affect the family?
7. How does this disorder or defect affect society or all of us?

Clearly define for the students the expectations for the paper (length, form, content).  
(*Awareness of Context, Desired Results, Consequences of Action, Alternative Approaches*)

9. **“Parent Panel”**: Invite one or two parents of children with handicapping conditions resulting from defective genes or hereditary disease to share their experience during pregnancy, birth, and childhood. (*Awareness of Context*)

#### **RESOURCES:**

Curtis, G., & Schuler, J. (2004). *Your pregnancy week by week*. Da Capo Press

Francis, J. (2002). *What to expect when you are expecting*. New York, NY: Workman Publishing Company, Inc.

## PRENATAL DEVELOPMENT & BIRTH VOCABULARY

1. **Conception:** The union of an ovum and a sperm, resulting in the beginning of a pregnancy.
2. **Sperm:** Male cell.
3. **Ovum:** A female cell, also known as an egg.
4. **Uterus:** The organ in a woman's body in which a baby develops during pregnancy. One end, the cervix, opens into the vagina; the other is connected on both sides to the fallopian tubes.
5. **Fallopian Tube:** Two very fine tubes that conduct the egg from the ovaries to the uterus.
6. **Prenatal:** Development of a baby during the period before birth, of which there are three stages.
7. **Periods of Development:**
  - Zygote:**
    - First stage in the development of a baby
    - Begins at conception (fertilization of egg and sperm)
    - Ends at implantation into the uterus
    - Rapid cell division
  - Embryo:**
    - The first 8 weeks
    - Looks like a tadpole
    - End of 8 weeks, embryo is 1 inch long and less than an ounce
    - All major body organs and systems are formed but not completely developed
    - Most sensitive period because the basic foundations are being made
  - Fetus:**
    - Begins at 8<sup>th</sup> week and lasts until birth
    - Baby's heartbeat can be heard for the first time
    - Rapid brain growth continues
    - Lungs and heart mature
    - 38 to 40 weeks is full term
8. **Placenta:** Connected to the fetus via the umbilical cord which is composed of blood vessels and connective tissue.
9. **Lanugo:** Soft woolly hair that covers the fetus.
10. **Amniotic Fluid:** Amniotic fluid is the watery liquid surrounding and cushioning a growing fetus. It allows the fetus to move without the uterus being too tight against its body.
11. **Umbilical Cord:** A long tube that connects the fetus to its placenta. It contains major arteries and veins that exchange nutrients and oxygen-rich blood between the embryo and placenta.
12. **Vernix:** A natural "waxy" or "cheesy" white substance that covers the skin of the fetus and protects it from water logging.



**EMBRYO & FETAL DEVELOPMENT**

Many changes occur during pregnancy. Use the numbers 1-9 (designating the month of development) to complete each statement.

1. \_\_\_\_ Soft downy hair covers the fetus.
2. \_\_\_\_ Eyes are forming.
3. \_\_\_\_ Fetus assumes position for delivery.
4. \_\_\_\_ Fetal movements are definite and felt by the mother.
5. \_\_\_\_ Embryo length is  $\frac{1}{2}$  of an inch long.
6. \_\_\_\_ Fetus is 2 inches long.
7. \_\_\_\_ Fetus eyes are open.
8. \_\_\_\_ Fetus can hear sounds
9. \_\_\_\_ Fertilized egg divides rapidly.
10. \_\_\_\_ Fat forms on fetus.
11. \_\_\_\_ Fetus can see changes in light.
12. \_\_\_\_ Fetus weighs 1.5 pounds.
13. \_\_\_\_ Male or female reproductive organs begin to form.
14. \_\_\_\_ Fetus hearing develops.
15. \_\_\_\_ Fetus is 6-8 inches long.
16. \_\_\_\_ Fetus is 8-12 inches long.
17. \_\_\_\_ Lanugo and vernix are almost gone.
18. \_\_\_\_ Urine is produced.
19. \_\_\_\_ Heart is pumping blood.