

Name_____ Date_____

Conception to Birth

Sperm are made with the haploid number of chromosomes through meiosis. Sperm, then, have 23 chromosomes instead of 23 pairs of chromosomes, since meiosis allows each sperm to have half the original number of chromosomes. Sperm carry one chromosome that determines sex. The chromosome that determines sex can be either X, which results in a female or Y, which results in a male. Egg cells carry only X chromosomes because females have two X chromosomes. Thus in humans, the sex of a child is determined by the male parent.

- Every human male has one X and one Y chromosome in every cell
- Every human female has two X chromosomes in every cell
- A male sex cell can have either one X chromosome OR one Y chromosome
- A female sex cell must have an X chromosome

When the sperm and egg unite, the chromosomes will combine to form 23 pairs of chromosomes. Twenty-two pairs determine everything about the offspring but the 23rd pair determines the sex of the offspring. If two X chromosomes combine, the result is a female offspring and if an X combines with a Y chromosome, the offspring is a male. Sex determination takes place at fertilization.

Once the egg has been fertilized and the **zygote** is formed, there are two stages of development from fertilization to birth.

- **Embryo** stage takes place over the first eight weeks
- **Fetus** stage takes place from eight weeks to birth

Embryo Stage

Once fertilization has taken place in the oviduct, the zygote is moved into the uterus and implantation occurs.

Fetus Stage

The developing child will begin to form bone cells around the ninth week of pregnancy or approximately at the end of the first trimester. Once this stage is reached, the child is called a fetus until it is born.

The development of a single cell zygote to a child born nine months later is a truly awe-inspiring journey. Approximately 40 sets of mitosis produce trillions of cells differentiated into tissues and organs that make a single offspring.

There are three trimesters in a pregnancy:

First Trimester (Weeks 1-12):

- Size: 10 cm
- Limbs, eyes, spine (4 weeks).
- Bone cells (9 weeks).
- Major organs have begun to form (liver, stomach, brain, heart, limbs, head).
- The fetus is particularly sensitive to alcohol, smoking and other drugs
- The development of bone cells marks the change from an embryo to a fetus.

Risk Factors:

- Harmful substances can pass from the mother's bloodstream through the placenta and into the fetus.
- These include cigarette smoke, alcohol, radiation, pollutants, certain drugs.
- Genetic disorders increase with the age of the mother.

Second Trimester (Weeks 12-24):

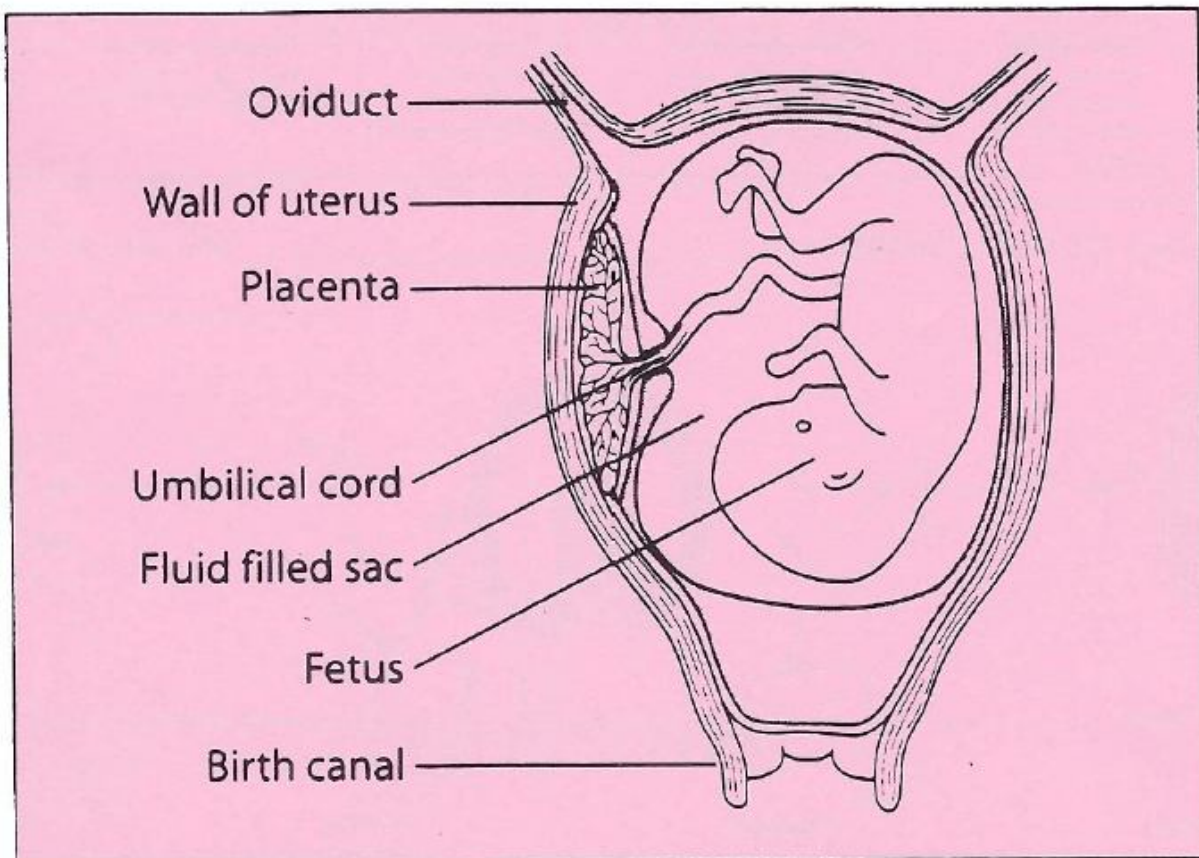
- Size: 30 cm at 24 weeks.
- Skeleton forms.
- Brain grows fast; nervous system starts to function.

Third Trimester (Weeks 24-38):

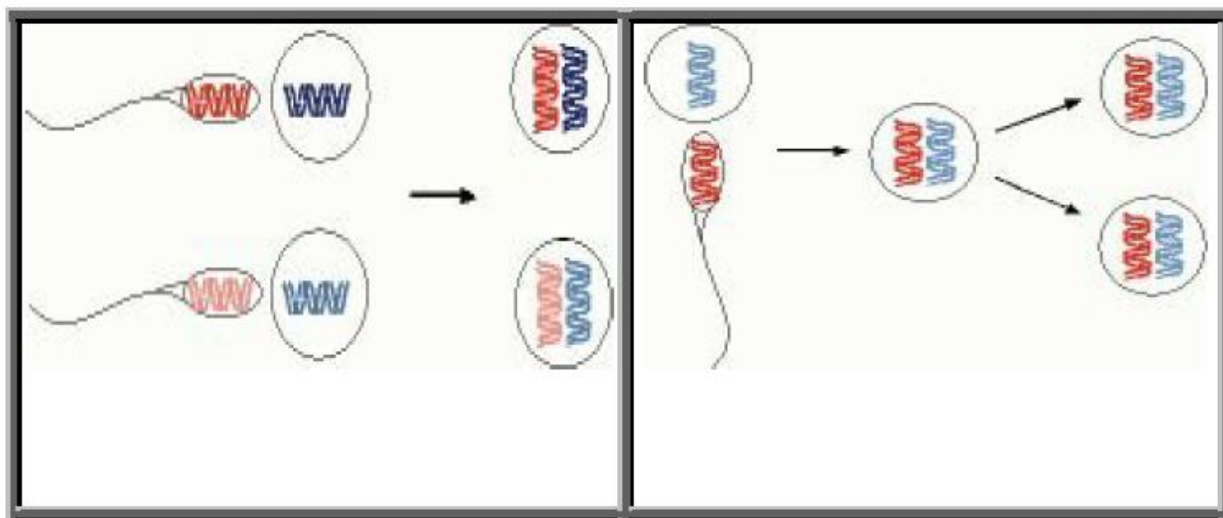
- 50 cm; weighs 2700-4100 grams.
- Rapid increase in size.
- Fetus opens its eyes
- Brain grows a lot.

Birth:

- Dramatic changes in hormone levels (progesterone and estrogen) start the birth process.
- Dilation Stage: Cervix opens, amniotic fluid released (water breaks). Lasts 2-20 hours.
- Expulsion Stage: Contractions of the uterus cause the baby to be pushed through the cervix and birth canal. Lasts ½ hour to 2 hours.
- Placental Stage: The placenta and umbilical cord are expelled. Happens 10-15 minutes after birth.



The Development of Twins



Twins occur in about 1% of all pregnancies in which 30% are identical twins and 70% are non-identical (fraternal) twins.

A single baby is formed when an egg cell is fertilized by a single sperm cell to form a zygote.

Identical twins start out from a single fertilized egg cell (zygote). Unlike a single baby, the fertilized egg cell will split into two separate embryos

Non-identical twins develop from two fertilized egg cells (zygotes). During ovulation, two egg cells are released and fertilized by two different sperm cells. Non-identical twin embryos develop separately each having their own placenta.