

# TET 103: CHILD DEVELOPMENT (0–3 YEARS)

P. Kyalo Mulwa  
School of Education  
University of Nairobi  
Department of Educational Communication and Technology  
Email: [peter.kyalo@uonbi.ac.ke](mailto:peter.kyalo@uonbi.ac.ke)  
Mobile: +254 422 824/0771 897 750

---

---

---

---

---

---

---

---

## Lecture 3: Conception & Pre-natal Development

### Objectives

- At the end of this lecture the learner should be able to:
  - a) Define conception
  - b) Describe the conception process
  - c) Explain prenatal development stages

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 2

---

---

---

---

---

---

---

---

### Conception

- The development of a human being begins at conception when a single sperm cell contributed by the male fertilizes the ovum egg, furnished by the female which is another single cell.
- Fertilization takes place in the fallopian tube.
- The fertilized egg which is called a **zygote** is made up of small particles inside of larger ones.
- The central portion of the zygote is called the **nucleus** and contains the chromosomes bearing the genes.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 3

---

---

---

---

---

---

---

---

### The Prenatal Period

- The prenatal period begins after fertilization
- The prenatal period can be divided into three stages as follows:
  1. Stage 1: The Germinal/Zygotic Stage (0-2 weeks)
  2. Stage 2: The Embryonic Stage (2-8 weeks)
  3. Stage 3: The Fetal Stage (3-9month)

---

---

---

---

---

---

---

---

### Stage 1: The Germinal/Zygotic Stage (0-2 weeks)

- Several hours after fertilization the one celled zygote, now floats down the fallopian tube, divides to produce two cells.
- A second division takes place to produce four cells.
- The rate of cell division continues until at about the sixth day more than 100 cells (each one smaller, but with exact copies of DNA) have been produced.

---

---

---

---

---

---

---

---

### Stage 1: The Germinal/Zygotic Stage (0-2 weeks)

- In some cases the first division of the zygote produces two identical cells which separate and develop into two individuals.
- The result will be monozygotic or identical twins.
- In other cases two ova are released and each is fertilized producing dizygotic or fraternal twins.

---

---

---

---

---

---

---

---

**Stage 1: The Germinal/Zygotic Stage (0-2 weeks)**

- By the end of the first week, the dividing cells have formed a hollow, fluid filled ball called a **blastocyst** which moves through the fallopian tube into the uterus.
- The cells start the process of differentiation - that is, they separate into groups according to their future functions.
- Some cells move to one side of the hollow sphere and form the embryonic disc, from which the embryo will grow.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 7

---

---

---

---

---

---

---

---

**Stage 1: The Germinal/Zygotic Stage (0-2 weeks)**

- The other group of cells begins to develop into the supportive structures and the protective layers covering the embryo.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 8

---

---

---

---

---

---

---

---

**Stage 1: The Germinal/Zygotic Stage (0-2 weeks)**

- The other group of cells begins to develop into the supportive structures and the protective layers covering the embryo.
- Sometimes between the seventh and ninth day **implantation** occurs - the blastocyst, now floating in the uterus burrows deep into the uterine lining, breaking tiny blood vessels to obtain nutrients and starts to grow.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 9

---

---

---

---

---

---

---

---

**Stage 1: The Germinal/Zygotic Stage (0-2 weeks)**

- This process triggers hormonal changes in the woman's body that signal the beginning of pregnancy.
- The implantation period which takes place within a period of two weeks is delicate and uncertain.
- About 30% of the zygotes do not implant successfully.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

10

---

---

---

---

---

---

---

---

**Stage 1: The Germinal/Zygotic Stage (0-2 weeks)**

- This is caused by:-
  - Incomplete formation of the zygote caused by the sperm and ovum not joining properly.
  - Cell duplication not beginning for unknown reasons
  - The uterine environment being inhospitable.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

11

---

---

---

---

---

---

---

---

**Stage 1: The Germinal/Zygotic Stage (0-2 weeks)**

- For preventing implantation in these cases nature eliminates most prenatal abnormalities in the very earliest stages of development.
- For a woman, unsuccessful implantation may resemble a heavy monthly period that arrives sometimes late.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

12

---

---

---

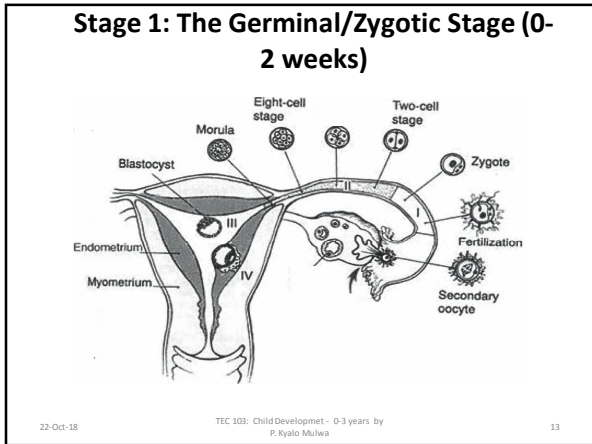
---

---

---

---

---




---

---

---

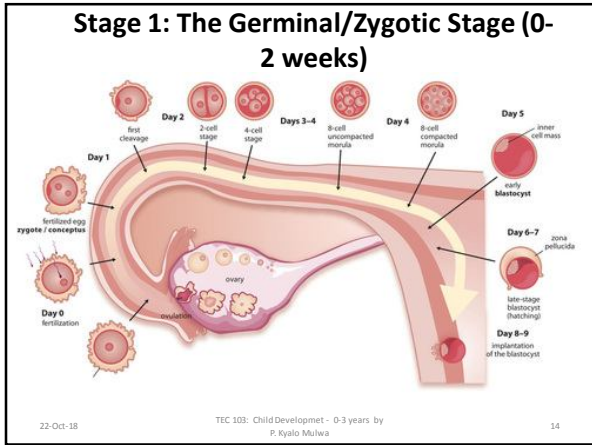
---

---

---

---

---




---

---

---

---

---

---

---

---

### Stage 2: The Embryonic Stage (2-8 weeks)

- The embryonic period extends from implantation until the end of eight week.
- During this period, the most rapid prenatal changes take place as the, groundwork for all the external body structures and internal organs is laid down.
- The developmental changes include both the supportive structures and the embryonic disc.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 15

---

---

---

---

---

---

---

---

**Stage 2: The Embryonic Stage (2-8 weeks)**

**1. Developments of the Supportive structures**

- By the end of the second week three discrete layers have already formed.
- From the outer layer of cells all the tissues and structures that will house, nurture and protect the embryo and later the fetus for the remaining nine months are formed.
- During this period the **amnion**, a thin, tough, transparent membrane that holds the **amniotic fluid** (bag of waters) surrounds the embryo.

---

---

---

---

---

---

---

---

**Stage 2: The Embryonic Stage (2-8 weeks)**

- The functions of the amniotic fluid are:
  - Protects the embryo from hard surfaces and jolts as the mother moves about,
  - Provides liquid support for its weak muscles and soft bones of the fetus
  - Provides a medium in which it can move and change position
  - Keep the temperature of the prenatal world constant.

---

---

---

---

---

---

---

---

**Stage 2: The Embryonic Stage (2-8 weeks)**

- Surrounding the amnion is another membrane called the **chorion** which becomes the fetal components of the placenta, a complex organ made up of tissue from both the mother and the embryo.
- The placenta and the embryo are linked by the **umbilical cord**.

---

---

---

---

---

---

---

---

### Stage 2: The Embryonic Stage (2-8 weeks)

- The placenta has the following functions:-
  - Prevents the bloodstreams of the mother and foetus from coming into direct contact
  - It is also a filter that allows nutrients, oxygen and waste products be exchanged
  - Converts nutrients carried by the mother's blood into food for the embryo
  - It also enables the embryo's waste products to be absorbed by the mother's blood stream, from where they are eventually extracted by her kidneys.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

19

---

---

---

---

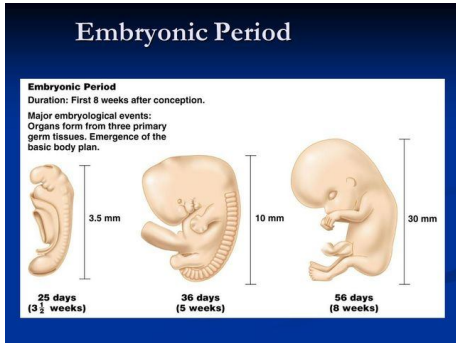
---

---

---

---

### Stage 2: The Embryonic Stage (2-8 weeks)



22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

20

---

---

---

---

---

---

---

---

### Growth of the embryo

- As the embryo grows and increases in size, the cells organize themselves into a hollow sphere.
- By the end of the second week the embryo increases in size by about two million percent and the embryonic disc differentiates into three distinct layers.
- These are:
  1. **Ectoderm** - outer layer which develops into the skin, the sensory organs the nervous system (the brain, spinal cord and the nerves)

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

21

---

---

---

---

---

---

---

---

### Growth of the embryo

- 2. **The mesoderm** - or middle layer which develops into the muscles, skeleton, circulatory system, the excretory system and the inner layers of the skin.
- 3. **The endoderm** - or inner layer which becomes the digestive system, lung urinary tracks, thyroid, thymus and other organs such as liver and lungs heart.

22-Oct-18

TEC 103: Child Developmet - 0-3 years by P. Kyalo Mulwa

22

---

---

---

---

---

---

---

---

---

---

### Growth of the embryo

- At first the nervous system develops fastest with the development of the neutral tube; a primitive spinal cord, in which the top swells to form the brain, and the heart starting to develop.
- At the end of the fourth week of the embryonic period, the nervous system in its primitive form is functioning and the heart is beating - pumping blood around the embryo's circulatory systems and muscles, backbone, ribs and digestive track begin to appear.

22-Oct-18

TEC 103: Child Developmet - 0-3 years by P. Kyalo Mulwa

23

---

---

---

---

---

---

---

---

---

---

### Growth of the embryo

- The curled embryo at this stage consists of millions of organized groups of cells with specific functions, although it is only 4mm long  $\frac{1}{4}$  an inch and even before the mother is even aware that she is pregnant
- In the second month the embryo grows to an inch long and an ounce in weight and growth of the structures that we recognize as human develop rapidly.

22-Oct-18

TEC 103: Child Developmet - 0-3 years by P. Kyalo Mulwa

24

---

---

---

---

---

---

---

---

---

---



### Growth of the embryo

- The arms and legs unfold from tiny buds on the sides of the trunks' External genitals are also recognizable in the male embryo, the teste begin to produce androgens - hormones that govern the development of male characteristics.
- The eyes, ears, nose, jaw and neck become visible.
- The full face changes almost daily during the second month.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

25

---

---

---

---

---

---

---

---

---

---

### Growth of the embryo

- The internal organs are being formed that is the lungs, digestive system and excretory system, though not functional.
- The embryo at this stage can sense its world - responds to touch - especially the areas of the mouth, and on the sole of the feet.
- It can also move though, the mother cannot feel the movements. Many miscarriage or spontaneous abortions occur during the embryonic period. They are usually caused by inadequate development of the placenta the umbilical cord, and/or the embryo.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

26

---

---

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- This period begins from the 3<sup>rd</sup> month until birth/or end of pregnancy
- During this long pre-natal period the developing organism begins to increase rapidly in size.
- In the third month the organs, muscles, and nervous system become organized and connected.
- The brain signals and in response the fetus kicks, bends its arm, forms a fist, curls its toes, opens its mouth and sucks its thumb and rehearsal of breathing appears.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

27

---

---

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- External genitals are well formed and the fetus sex is evident
- Other finishing touches appear, such as finger nails, toe nails, tooth buds and eye lids that open and close.
- The heartbeat is now stronger and the doctor can hear it through a stethoscope
- Between 17 - 20 weeks the fetus has grown large enough that its movements can be felt by the mother

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

28

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- The fetus is completely covered with a white cheese like substance called **vernix** which protects the skin of the fetus from chapping during the long period spent bathing in the amniotic fluid
- A white, downy hair covering called **lanugo** also appears over the entire body, helping the vernix to stick to the skin. At the end of this period many organs are well developed – all the neurons that will ever be produced in the brain are present

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

29

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- The eyes are sensitive to light, and the fetus reacts to sound. However, a fetus born at this time cannot survive because its lungs are quite immature, and the brain has not been well developed to the point at which it can control breathing movements and body temperature.
- Between the 22 - 26 weeks the fetus has a chance of survival time outside the womb if born at around this time.
- The point at which the baby can first survive outside the womb is called the age of **viability**.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

30

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- If born between 7-8 months, breathing would still be a problem and oxygen assistance would be necessary
- Although the respiratory centre of the brain is mature, tiny sacs in the lungs are not yet ready to inflate and exchange oxygen with carbon monoxide.
- The brain continues to develop rapidly during this time, the cerebral cortex, the most highly evolved part of the brain and the seat of human intelligence enlarges.
- The fetus responds more clearly to sounds in the external world.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

31

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- By 28 weeks fetuses blink their eyes in reaction to nearby sounds. In the 8<sup>th</sup> month a layer of fat is added under its skin to assist with temperature regulation
- The fetus also receives antibodies from the mothers blood that protects it from illness that could be dangerous to the newborn whose own immune system will not working well until several months after birth

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

32

---

---

---

---

---

---

---

---

### Stage 3: The Fetal Stage (3-9month)

- In the last weeks of pregnancy fetus learn to prefer the tone and rhythm of their mother's voice
- In the final 3 months, the fetus gains more than two kg and grows 7 inches
- It fills the uterus and thus gradually becomes less active.

22-Oct-18

TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa

33

---

---

---

---

---


---

---

---

### Stage 3: The Fetal Stage (3-9month)

#### Fetal Growth From 8 to 40 Weeks



22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 34

---

---

---

---

---

---

---

---

### Other Developments of the Fetus

- Researchers have shown that the human organism does much more than develop physically during the prenatal period.
- A early as 15 weeks, the fetus can grasp, frown, squint and grimace.
- Reflex movements result from the touching of the soles of the feet or the eyelids.
- By 20 weeks the sense of taste, and smell are formed.
- By 24 weeks the response to sound grows more consistent.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 35

---

---

---

---

---

---

---

---

### Other Developments of the Fetus

- At 27 weeks a light shown on the mother's abdomen sometimes causes the fetus to turn its head.
- In the last weeks most fetuses assume an upside-down position in preparation for birth
- Growth of the fetus starts to slow and birth is about to take place.

22-Oct-18 TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa 36

---

---

---

---

---

---

---

---

**Assignment**

1. Define conception
2. Explain the conception process
3. Describe the prenatal development stages

22-Oct-18      TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa      37

---

---

---

---

---

---

---

---

**....END...**

22-Oct-18      TEC 103: Child Development - 0-3 years by P. Kyalo Mulwa      38

---

---

---

---

---

---

---

---