

Why Study Prenatal Development?

1

Understanding human development builds scientific literacy.

Learning about embryology and prenatal development provides a science-based understanding of how the human body grows and changes throughout pregnancy. A strong foundation in developmental biology helps students better understand discussions about pregnancy, health, and human development.

2

Developmental milestones reveal a continuous process of growth

From the earliest stages, prenatal development follows a complex and organized sequence of changes, including the formation of organs, development of body systems, and increasing specialization of cells and tissues. Studying these milestones helps illustrate the process of human growth and development.

3

Education helps replace confusion with understanding

Prenatal development is a complex topic that is often discussed without a clear understanding of the underlying biology. Accurate, accessible scientific information helps students evaluate information thoughtfully and develop a stronger understanding of human development.



"Knowledge empowers informed decisions."

An RTL ED Inc
Educational Resource



This brochure is intended as a supplemental educational resource illustrating the major stages of human prenatal development. Developmental milestones are based on standard human embryology references and are measured from fertilization unless otherwise noted.

Questions?

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Embryology & Fetal Development

A basic guide to prenatal human development

Featuring medically referenced developmental milestones from fertilization through birth.



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Prenatal Development Timeline

- Day 1 – Fertilization occurs, forming a unique human zygote with its own complete set of human DNA.
- Week 1 – The developing embryo travels through the fallopian tube and implants in the lining of the uterus.
- Weeks 2–4 – Early development begins as the foundation for major body systems forms, including the brain, spinal cord, nervous system, blood vessels, and early reproductive structures.
- Week 3 – The heart begins beating.
- Week 8 – All major organ systems have formed and will continue growing and maturing throughout pregnancy.
- Week 12 – The developing fetus begins swallowing and making early movements.
- Week 20 – Many mothers begin to feel fetal movement such as kicking, turning, or hiccups.
- Week 25 – The developing fetus can hear sounds from outside the womb.
- Week 28 – Continued growth and maturation occur throughout the third trimester.
- Week 32 – The body continues gaining fat and developing smoother skin.
- Week 38 – Birth occurs after a remarkable journey of growth and development from a single-cell zygote into a newborn with trillions of specialized cells.

Sources: Developmental milestones in this brochure are based on standard human embryology references, including *The Developing Human: Clinically Oriented Embryology* (Moore, Persaud & Torchia) and *Langman's Medical Embryology* (Sadler). Developmental ages are measured from fertilization (conception), not from the first day of the last menstrual period (LMP). To compare with LMP-based dating commonly used in obstetrics, add approximately two weeks.

+ Fertilization: The Beginning of Prenatal Development

At fertilization, a sperm cell and egg cell unite to form a zygote, the first stage of human development. This single cell contains a unique combination of genetic information from both parents and begins a carefully coordinated process of growth and development.

The zygote contains the complete set of DNA needed to guide the formation of specialized cells, tissues, and organs throughout prenatal development.



- Heart – The heart begins beating by approximately Week 3.
- Brain – The brain begins forming during Weeks 2–4. Detectable brain activity is present by approximately Week 6.
- Muscles – Spontaneous and reflexive movements begin by approximately Week 4.
- Arms & Legs – Limb buds appear by approximately Week 4.
- Bones – Bone formation begins by approximately Week 6.
- Elbows – Elbows become distinguishable by approximately Week 6.
- Fingers – Separate fingers are visible by approximately Week 7½.
- Toes – Separate toes are visible by approximately Week 7½.
- Nose – The nose, part of the respiratory and olfactory systems, is present by approximately Week 8.
- Stomach – The stomach, part of the digestive system, is present by approximately Week 8.
- Thumb – Thumb-sucking movements may be observed by approximately Week 9.

Major Developmental Milestones

- Fingerprints & Fingernails – Fingerprints and fingernails begin developing by approximately Week 10.
- Mouth – Baby begins swallowing by approximately Week 12.
- Taste Buds – Taste buds are present throughout the mouth by approximately Week 12.
- Face – Facial features become more defined by approximately Week 13.
- Movement – Many mothers begin to feel Baby's movements around Week 14, although many first notice them closer to Week 20.
- Voice – Movements of the larynx (voice box) can be detected by approximately Week 18.
- Hair – Hair is visible by approximately Week 23.
- Ears – Baby can hear sounds and may recognize familiar voices and music by approximately Week 27.
- Eyes – The eyes respond to light by approximately Week 27.
- Eyelids – Eyelids open and eyelashes are present by approximately Week 28.
- Skin – Baby's skin becomes smoother as body fat continues to develop by approximately Week 32.