

# the first 9 MONTHS



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the first  
9 MONTHS

## WITNESS THIS MIRACLE IN THE MAKING

People have marveled at and tried to understand the miracle of life for centuries. It's a mystery how two microscopic cells can unite and become a new human being! This has puzzled and delighted everyone from poets and philosophers to scientists and parents since the beginning of time.

Now, thanks to recent advances in medical science and imaging techniques, we have the unequalled privilege of observing the developing life within the mother's womb. With this technology, we can see the miraculous fusion of two cells that culminates in a fully formed human life in a mere 266 days. Witness this miracle in the making as we journey through the first 9 months of life.

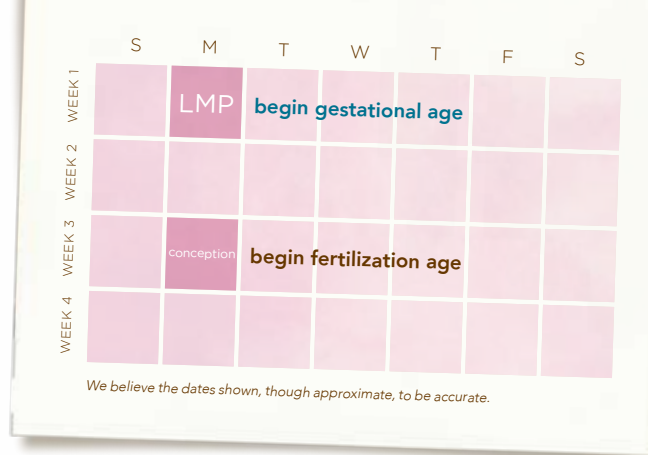
*It's a mystery how two microscopic cells  
can unite and become a new human being!*

## DATING YOUR PREGNANCY.

Pregnancy terminology can be confusing. There are two ways of dating pregnancy:

**Gestational age** is the term traditionally used by health care professionals to date pregnancy and refers to how long it's been since the **first day of the mother's last menstrual period (LMP)**. The **gestational age** (in bold blue throughout this booklet) begins two or more weeks before the fertilization of the egg by the sperm.

**Fertilization age** (shown in bold brown) refers to how long it's been since **conception: the fertilization of the egg by the sperm**. Most women ovulate (release a mature egg from the ovary) in the middle of their monthly cycle. For instance, if a woman has a 28-day cycle, she will typically ovulate around the 14th day after her last period began. If a sperm fertilizes the egg, at that moment a new life begins, and this becomes the first fertilization day.



The pregnancy test was positive!  
How far along am I?

Today's date: \_\_\_\_\_

First day of your last menstrual period:  
\_\_\_\_\_

How many weeks has it been since then?  
\_\_\_\_\_

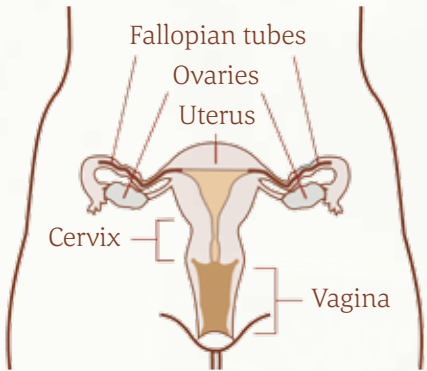
If you are pregnant, this is the **gestational age** of your pregnancy (shown in bold blue in this booklet). Based on this information, your baby will be due 40 weeks from the first day of your last period.

My due date: \_\_\_\_\_

You can also estimate your due date by taking the first day of your last menstrual period, subtract 3 months, and add 7 days.



# female reproductive SYSTEM



BEFORE A WOMAN EVEN MISSES HER MENSTRUAL PERIOD, IF AN EGG HAS BEEN FERTILIZED, THIS IS WHAT OCCURS IN A NORMAL PREGNANCY:

## 2 Weeks | Conception day

The egg and sperm most often unite in the fallopian tube (tube from the ovary to the uterus) to form a single cell called a zygote. This tiny new cell, smaller than a grain of salt, contains all the genetic information for every detail of the newly created life—the color of the hair and eyes, the intricate fine lines of the fingerprint, the physical appearance, the gender, the height and the skin tone.

## Days 2–5

This new life is now called an embryo, and his or her cells continuously divide while traveling down the fallopian tube before arriving at the uterus, around days 3 to 4. Meanwhile, the lining of the uterus prepares to receive this new life.

Drawing of sperm and egg © Kts | Dreamstime.com / Image of female reproductive system from the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services



### 3 Weeks | 1 Week

The embryo begins to implant in the lining of the uterus on about day 6. Once this occurs, hormones trigger the mother's body to nurture the pregnancy and prevent her monthly periods. A blood test can show that the mother is pregnant. Around day 8, the baby is about the size of the "period" used in this sentence.

### 4 Weeks | 2 Weeks

A pregnancy test taken at this point can measure hCG, the pregnancy hormone in the mother's urine, and tell her if she is pregnant. By now, the embryo is completely attached to the lining of the uterus and draws nourishment from its mother.

### 5 Weeks | 3 Weeks

The heart, about the size of a poppy seed, is the first organ to function. The first signs of brain development are evident, and the foundation for every organ system is already established and beginning to develop.

*The heart begins to beat just  
21 days after fertilization,  
or 5 weeks after the mother's  
last menstrual period began.*



Embryo photo used with permission of GE Healthcare

## 6 Weeks

**Just 4 weeks after fertilization**, the baby is growing rapidly and measures  $\frac{1}{8}$  of an inch long. The basic structure for the entire central nervous system (brain and spinal cord) has formed. The eyes are developing, and the arm and leg buds are now visible. The beating heart can be seen on an ultrasound scan—it's already beating about 100-120 times a minute!

## 7 Weeks

The baby is now  $\frac{1}{3}$  of an inch long and is making its own blood. Depending on the baby's gender, the testicles or ovaries are beginning to form.

## 8 Weeks

The baby is now about  $\frac{1}{2}$  of an inch long. The elbows and fingers can be seen. Some reports show that the embryo can move its trunk and limbs. Lungs begin to develop. Taste buds are forming on the tongue, tooth buds for "baby teeth" are taking shape in the jaw, and eyelids are beginning to form.

Embryo photo used with permission of GE Healthcare



.....  
*At 8 weeks, the embryo can respond to touch by reflex.*  
.....



## 9 Weeks

The baby measures  $\frac{3}{4}$  of an inch long and weighs almost  $\frac{1}{8}$  of an ounce. The developing ears and nose are visible, and there is pigment in the retina. Nipples can now be seen on the chest. The limbs and fingers are growing rapidly, and the bones in the arms are beginning to calcify and harden.

## 10 Weeks

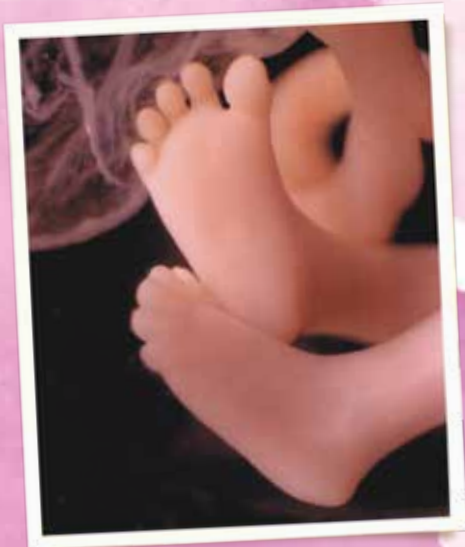
The baby's brain is growing rapidly. Each minute it produces almost 250,000 new neurons! The upper and lower portions of the arms and legs are clearly seen, as well as the fingers and toes. By now the external ear is fully developed. A baby boy begins to produce the male hormone, testosterone.

### YOU SHOULD KNOW:

*Fetal lengths and weights given are merely averages. In this booklet, the measurement given before 20 weeks indicates the length from the top of the head to the rump, or bottom. Measurements given after 20 weeks indicate the length from head to heel.*

*At 10 weeks, for the first time in development, the brain can make the muscles move on purpose.*





.....  
*These are the “young one’s”  
feet at 13 weeks. Although  
they’ve been kicking for  
about a month, his mom  
can’t feel the movement yet.*  
.....



### 11 Weeks

Because the baby has all of the major organ systems and is a distinctly recognizable human being, he or she is no longer called an embryo, but is now known as a **fetus**, a Latin word for “**young one**.” The baby is about 2 inches long and can yawn and suck. The eyelids are fully formed and closed to protect the developing eyes. The kidneys begin to produce urine. During the next several weeks, his or her body will grow rapidly, increasing in weight 30 times and tripling in length!

### 14 Weeks

Now 3½ inches long, the “young one” is coordinated enough to find his or her thumb and suck it. Fingernails and toenails are beginning to grow. The baby is also able to swallow and urinate.

Fetal photo © Zrodlo Foundation, Krakow, Poland



*The gender of the baby might be seen on ultrasound at **16 weeks**.*

### **16 Weeks**

The heart beats between 110 and 180 times per minute and pumps about 6 gallons of blood each day. If she is a girl, millions of eggs are now forming in her ovaries. At almost 5 inches in length and weighing nearly 4 ounces, the baby can coordinate the movement of its arms and legs, though his or her mother will not likely feel it yet.

### **18 Weeks**

In just 2 weeks, the fetus has almost doubled its weight to 7 ounces. The skeleton is hardening and calcifying and is visible on ultrasound. Reflexes such as blinking and frowning are now developed. The baby has its own unique fingerprints and toeprints.

### **20 Weeks**

The fetus is now about 10 inches long from head to heel and weighs 11 ounces. The baby has unique waking and sleeping patterns and even has a favorite position to sleep in. The pregnancy is about half over, and the mother is beginning to “show.” Studies indicate that babies can feel pain at 20 weeks, and possibly even earlier.

Fetal photo © Zrodlo Foundation, Krakow, Poland



*By **18 weeks**, fetal movement—commonly known as “quickenings”—can usually be felt by the mother.*





.....  
*At 22 weeks, the baby is about 11 inches long and weighs about 1 pound.*  
.....

### 22 Weeks

If the baby is male, his testicles are beginning to descend from the abdomen to the scrotum. Hair is visible on his or her head and body. From now until about 32 weeks, the baby feels pain more intensely than at any other time in development.

### 24 Weeks

The baby now weighs approximately 1½ pounds and inhales amniotic fluid in preparation for breathing. The ear has developed to the point where the baby recognizes his or her mother's voice, breathing and heartbeat. About a week ago, rapid eye movements began, an activity associated with dreaming. The baby may have a blink-startle response resulting from sound applied to the mother's abdomen. Some babies born at this stage of development are able to survive.

### 26 Weeks

Now the baby weighs almost 2 pounds, and he or she can react to sounds outside the mother's body. Eyes can now respond to light, and the permanent teeth buds are apparent in the gums. Eyelashes and eyebrows are well-formed, and the hair on the baby's head is growing longer.

Fetal photo used with permission of GE Healthcare

### 28 Weeks

The baby is now approximately 15 inches long and weighs about 2½ pounds. With the support of intensive care, a baby born at this stage is capable of breathing air. The brain is developed enough to coordinate rhythmic breathing and regulate body temperature. As the baby continues to gain weight, the skin becomes less wrinkled and more smooth.

### 34 Weeks

The baby is now about 17 inches long, weighs 4½ pounds and continues to grow and mature. By this stage of development, the eyes are wide open, and if a light were shone into them, the pupils would constrict. The head is covered in hair, the fingernails have reached the tips of the fingers, and the toenails are close behind. The lungs are still developing, so if born at this stage, the baby will probably need some assistance breathing.

### 40 Weeks

The baby is now around 20 inches long and may weigh 7 to 8 pounds. He or she has a plump body and a firm grasp. Typically, the baby is head-down in the mother's pelvis and awaiting birth.

Fetal photo used with permission of GE Healthcare



*Be patient—only  
4% of babies are born  
on their due date!*





# your JOURNEY

It's normal to have questions and concerns about your pregnancy. The single most important thing to do right away is schedule an appointment with a medical professional who takes care of pregnant women—an obstetrician, family doctor or certified nurse-midwife—so that you can get the answers you need.

These caregivers can also help you understand how to make healthy, nutritional choices, and recommend exercise that will keep you feeling fit during your pregnancy and after your baby is born. Scheduling regular prenatal appointments can give you confidence to know that you are taking good care of yourself and your baby.

Of course, babies set their own timetables, and every pregnancy is different, but isn't it amazing to consider the incredible development that happens in the first 9 months of life?



FACTS ABOUT FETAL DEVELOPMENT WERE TAKEN FROM THE FOLLOWING SOURCES:

#### Publications:

- Moore and Persaud. *The Developing Human: Clinically Oriented Embryology*, 7<sup>th</sup> Edition.
- Elsevier Health Services, 2000. Pennsylvania: Saunders, © 2001
- Larson, William J. *Essentials of Human Embryology*. Elsevier Health Services, 1997. New York: Churchill Livingstone, 1998
- Tallack, Peter. *In The Womb*. Washington, D.C.: National Geographic 2006
- Campbell, Stuart M.D. *Watch Me Grow!* St. Martin's Press, 2004

#### Web sources:

- Mayo Foundation for Medical Education and Research. "Fetal development: What happens during the first (second, third) trimester?" [www.mayoclinic.com/health/prenatal-care/PR00112](http://www.mayoclinic.com/health/prenatal-care/PR00112) (as well as /PR00113 & /PR00114)
- LaRossa, Maureen Mulligan, R.N., and Sheena L. Carter, Ph.D. "Understanding How the Brain Develops." [www.pediatrics.emory.edu/divisions/neonatology/dpc/brain.html](http://www.pediatrics.emory.edu/divisions/neonatology/dpc/brain.html).

#### Other:

- Image of female reproductive system from the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. [http://en.wikipedia.org/wiki/File:Scheme\\_female\\_reproductive\\_system-en.svg](http://en.wikipedia.org/wiki/File:Scheme_female_reproductive_system-en.svg)
- Anand, Kanwaljeet, M.B.B.S., D. Phil. "Expert Report of Kanwaljeet S. Anand, M.B.B.S., D. Phil." Expert testimony before the U.S. Department of Justice describing the capacity of the fetus to feel pain.
- The photos of the embryo and fetus credited to the Zrodlo Foundation, Krakow, Poland, are © 1998 and used by permission, for non-profit use. The embryo and fetal photos are used with permission of GE Healthcare.

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