

# LESSON 5 How Do Mammals Reproduce? =====

## Objectives

When students have completed this lesson, they will be able to:

- describe some characteristics of the class of vertebrates known as mammals;
- describe fertilization, the development of the embryo, and birth in mammals - particularly, in humans.

## Exploring Science / Historical Steps

The correct term for so-called test-tube fertilization is “in vitro” (or “within glass”) fertilization (commonly abbreviated as IVF). Even before they have read the main lesson, students may recall how a chicken’s egg cell is fertilized inside of the egg tube by a sperm that, during mating, swims inside the mother chicken’s body into the tube. Although the other parts of a female mammal’s reproductive organs are intact and functioning properly, if the egg tube (often called Fallopian tubes in humans) are blocked, sperm cannot meet the egg, and fertilization cannot occur.

In answer to the inference question, students might guess that science may someday create an artificial uterus.

## How Mammals Reproduce

This lesson’s coverage of the human reproductive system offers basic scientific information; it should not be considered to be an entire course in sex education. Prior to the school year, science teachers should, of course, discuss with their administration how issues such as sexual behavior and contraception are to be dealt with.

One point that likely should be made during this lesson (but is not included in the reading) is that menstrual cycles vary considerably - particularly during adolescence.

Have students review the orders of mammals illustrated in Unit 2, Lesson 7, (pages 57-8). The feature that separates the egg-layers and the pouched mammals from all the other mammals is the absence of a placenta in those two orders. Without the ability to produce the placenta (a temporary structure that is expelled as the “afterbirth”), the egg-laying mammals’ eggs function similarly to reptiles and birds, storing food in the egg for the young. The pouched animals (marsupials) give birth to extremely immature embryos that resume development

inside of the pouch, while attached to the mammary glands.

Although the mother’s blood does not flow through the developing embryo’s body, dissolved materials can pass through the placenta into the baby’s bloodstream. This process is essential to the nutrition of the infant and is also the way in which it gets oxygen. If the mother does not eat a balanced diet, with extra amounts of certain nutrients (such as calcium) during pregnancy, the infant may be underweight or have health problems. Pregnant women must totally avoid alcohol; otherwise the fetus could have significant birth defects due to fetal alcohol syndrome. Smoking during pregnancy can also adversely affect the baby. So, too, can the intake of drugs - even some prescription medication. Part of every lesson on human reproduction should be a discussion of the need for expert medical care from the very beginning of pregnancy - and even before.

You might want to add that not all babies are born via the birth canal. Globally, about 20% of babies are born via C-section. In the United States the rate is higher - approximately 30%.

## Review

*Please note: I have not made the answers available online, on the small chance that a student might discover them. Of course, the answers to these questions will be included in the version of the Teacher’s Guide provided to teachers who purchase the text.*

## Reinforce / Enrich

The 0:38 to the 2:05 mark of this brief video (with a puzzling “10” in its name) provides a very good MS or HS level overview of 7 key traits of mammals.

- [MooMooMath and Science / 10 Traits of Mammals](#) [2:05]

As its title indicates, the following video describes the three subgroups of mammals - based on their reproductive strategies.

When referring to marsupials, the term “bifurcated reproductive system” is used, but not defined; teachers (particularly at the MS level) may opt to ignore this. Essentially, this is a term used to describe a rather complex arrangement of two “lateral” uteri, each connected to a vagina, and a third “medial” vagina through which the offspring pass during birth. In males, the penis has

two shafts; this enables sperm to be delivered to both of the lateral vaginas at once.

The term gestation is also introduced, but not defined. Gestation simply means development prior to birth. However, in marsupials this is often divided into “gestation in the uterus” and “gestation in the pouch.”

Most students are likely aware that marsupial offspring are quite small, are delivered early in their development, and then crawl into a pouch that contains nipples. Once attached to a nipple, the offspring finish development.

Details regarding the joey (the baby kangaroo) are fascinating. As the article following the video explains, kangaroos are able - at the same time - to raise three offspring of different ages: one outside the pouch; one attached to a nipple inside the pouch; and one inside of a uterus. A report on this organism would make a fascinating enrichment assignment.

- [Curious Prodigy / Classification of Mammal: Monotremes, Marsupials, and Placentals](#) [2:58]
- [Blackpool Zoo / Discover all about the kangaroo birthing cycle](#) March, 2021

It is quite challenging to locate a video of human reproduction that is acceptable to a wide range of communities. The following video’s terminology and illustrations match closely with those used in this textbook.

With so much detail to cover, it is not surprising that some details deserve clarification. Prior to starting the video, teachers may want to point out the following: 1) to make it visible in the diagram, the penis length is exaggerated in the “shadow” image that shows a female on the left and a male on the right; 2) the animation of sperm movement makes it appear that their final destination is an ovary - despite the narrator’s comment that the sperm fertilizes an egg *in the fallopian tube*; 3) at the 1:14 mark, in the dual close up view of the female structures, it would be helpful to point out that the illustration at the right displays a person facing to the left (unlike the comparable image on page 303 of this textbook, where the person is facing to the right); 4) the British spelling is used for fertilization (fertilisation) and fetus (foetus).

- [Fuse School / Sexual reproduction: Humans](#) [4:13]