Fertilization and Development
Objectives

• Describe the process of fertilization
• Identify where organisms receive their genetic information from
Fertilization

• The process of a sperm (haploid; 1N) joining an egg (haploid; 1N) is called fertilization

• Usually occurs in a Fallopian tube

• The fertilized egg is called a zygote
  – The zygote (diploid; 2N) receives half of its genetic information from the father and half of its genetic information from the mother
Early Development

• In the Fallopian tube, the zygote begins mitosis

• After 4 days, the embryo is a solid ball of about 64 cells called a morula

• Stages of Early Development:
  – Implantation
  – Gastrulation
  – Neurulation
Early Development

- **Implantation** is the process where the blastocyst (morula transformed into a structure with a hollow inner cavity) attaches itself to the wall of the uterus.

- The cells of the blastocyst then begin the process of specialization, called **differentiation**.
Early Development

- **Gastrulation** is the process where the inner cell mass of the blastocyst sorts itself into three cell layers
  - Ectoderm
  - Mesoderm
  - Endoderm
- The 3 cell layers are referred to as primary germ layers because all organs and tissues are formed from them
Early Development

- Ectoderm develops into the skin and nervous system
- Endoderm forms the lining of the digestive system and many digestive organs
- Mesoderm form many of the body’s internal tissues and organs
Early Development

• **Neurulation** is the development of the nervous system
Early Development

- The **placenta** is an organ that connects the mother and the developing embryo.
- Nutrients and oxygen diffuse into the developing embryo and carbon dioxide and wastes diffuse out.
- The mother’s blood and the embryo’s blood never mix, but pass by each other.
  - Separated by the placenta.
Later Development

• Months 4, 5, & 6
  – Heart becomes large enough to be heard with stethoscope
  – Bones replaces cartilage to form skeleton
  – Soft hair grows over fetus’ skin

• Months 7, 8, & 9
  – Fetus doubles in mass
  – Lungs and other organs undergo changes to prepare for life outside the uterus
  – Fetus can regulate its body temp.
  – Central nervous system and lungs complete development
Notes Review

• Describe the process of fertilization.
  – Fertilization is the process where a sperm joins an egg. It usually occurs in the Fallopian tube. The fertilized egg is then called a zygote.

• Identify where organisms receive their genetic information from
  – Organisms receive half of their genetic information from their mother and half of their genetic information from their father.