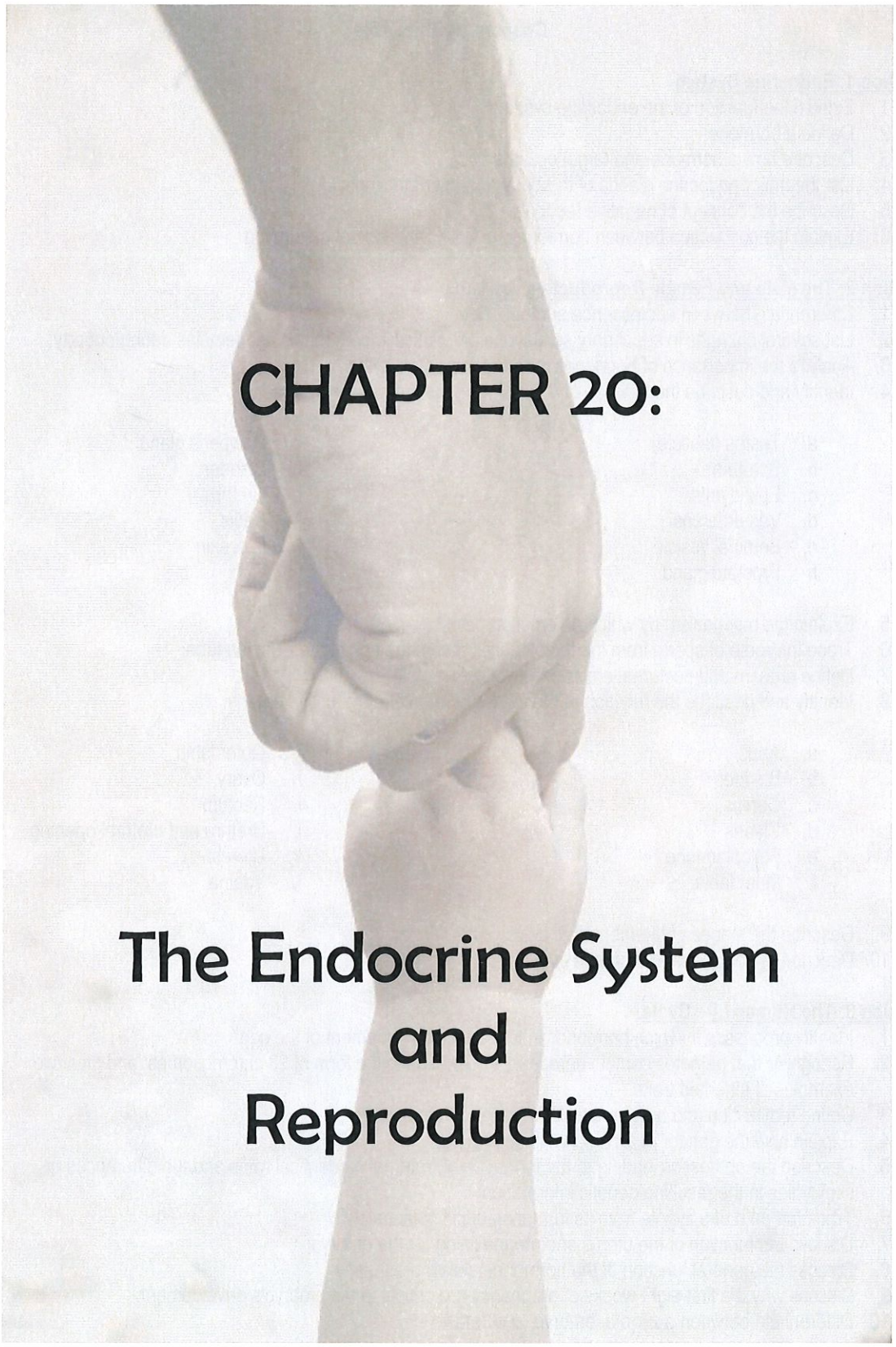


CHAPTER 20:

The Endocrine System and Reproduction

Chapter 20 Objectives

Section 1: Endocrine System

1. Explain the function of the endocrine system
2. Define a hormone
3. Describe how a hormone and target cell interact
4. List the major endocrine glands of the body and their functions
5. Describe the concept of negative feedback
6. Explain the connection between hormones, puberty, and sexual maturation.

Section 2: The Male and Female Reproductive Systems

1. Differentiate between adolescence and puberty;
2. List several changes in secondary sexual characteristics in both males and females during puberty;
3. Analyze the importance of hormones to the reproductive system;
4. Identify and describe the function of the following male reproductive organs;

    a. Testes (testicle)
    b. Scrotum
    c. Epididymis
    d. Vas deferens
    e. Seminal vesicle
    f. Prostate gland
    g. Cowper's gland
    h. Bladder
    i. Urethra
    j. Penis
    k. Foreskin

5. Explain the mechanism by which an erection occurs;
6. Trace the route of sperm from the testes until it meets the egg in the fallopian tube;
7. Define orgasm and nocturnal emissions (wet dreams);
8. Identify and describe the function of the following female reproductive organs:

    a. Anus
    b. Bladder
    c. Cervix
    d. Clitoris
    e. Fallopian tube
    f. Inner labia
    g. Outer labia
    h. Ovary
    i. Rectum
    j. Urethra and urethral opening
    k. Uterus
    l. Vagina

9. Describe the stages of the menstrual cycle;
10. Describe the egg's maturation and ovulation.

Section 3: The Human Life Cycle

1. Identify processes in which hormones influence the development of the egg;
2. Recognize that gametes contain hereditary information in the form of 23 chromosomes, and give two examples of inherited traits;
3. Define fertilization and how genetic information is combined;
4. Explain how the gender of an embryo is determined;
5. Describe the processes leading to the formation of fraternal or identical twins and the differences or similarities in the resulting genetic information;
6. Trace the path of a zygote from its formation until implantation;
7. Discuss the function of the uterus and uterine lining for the embryo;
8. Discuss the general function of the hormones during pregnancy;
9. Discuss why the first eight weeks of pregnancy are critical to the embryo's development;
10. Differentiate between a zygote, embryo, and fetus;

11. List 5 substances harmful to the embryo and describe the importance of avoiding them;
12. Describe the function of the placenta and its formation from tissues of the embryo and mother to provide nourishment and waste removal;
13. Describe the function of amniotic fluid;
14. Discuss 3 problems that may occur in an embryo and options for embryonic screening;
15. Briefly describe the differences in development of the embryo and fetus during the three trimesters of pregnancy;
16. Describe a normal birth position and a breech position;
17. Identify and briefly explain the three main stages of childbirth;
18. Define caesarean section and possible reasons for one at childbirth;
19. Recognize the purpose of the fontanel during passage through the birth canal;
20. Define abstinence as a lifestyle choice;
21. Recognize the value in choosing abstinence over sexual activity during adolescence;
22. Explain the difference between "love" and "like" and their relevance to adolescent relationships;
23. Recognize effects of alcohol and/or drug use in making decisions about sexual activity.
24. Define sexually transmitted infection (STI);
25. List examples of bacterial STIs and viral STIs and treatments for each.

"Mom, did I come preassembled or did you and dad have to put me together?"

ENDOCRINE SYSTEM FUNCTIONS

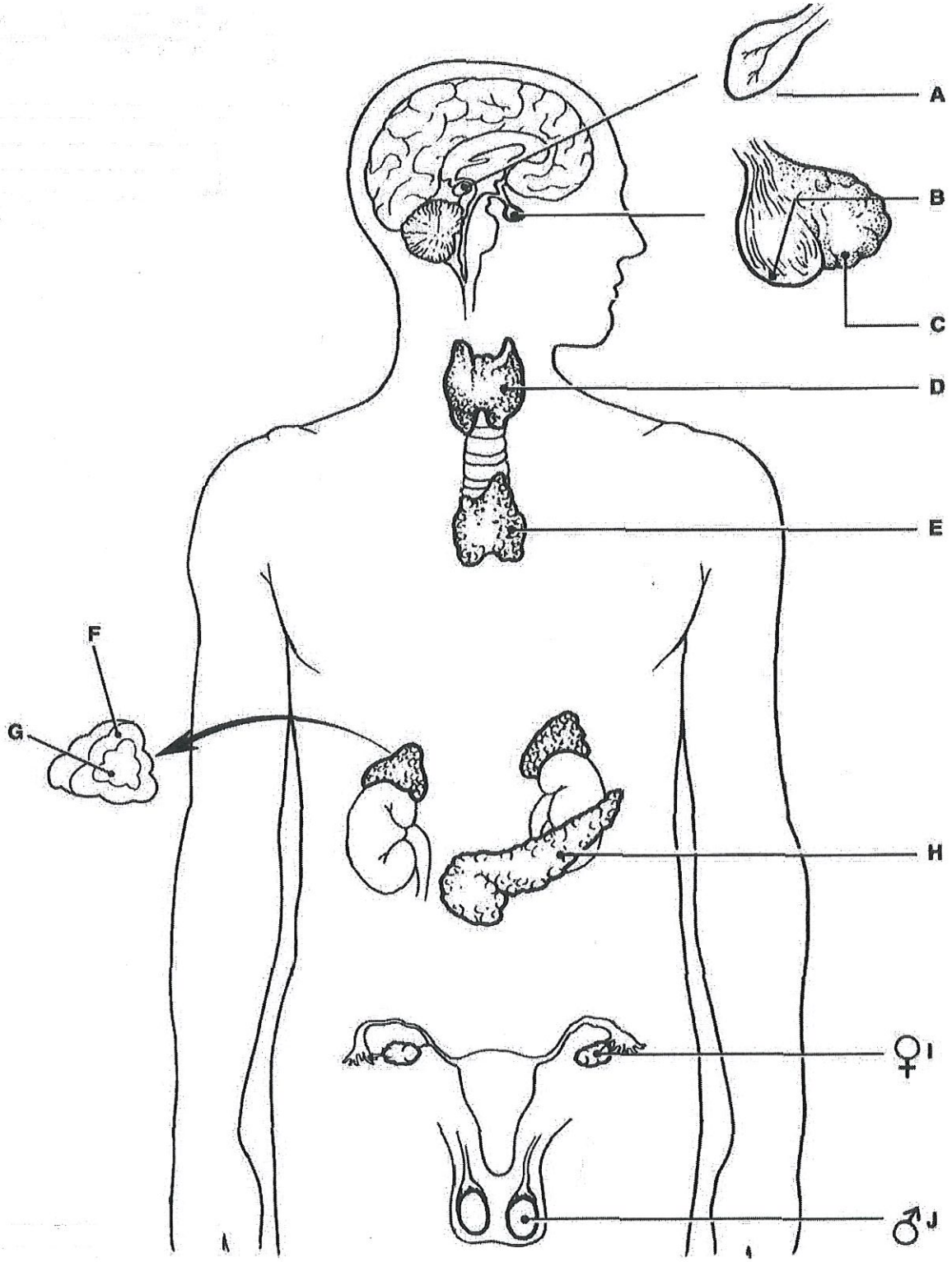
DIRECTIONS: Fill in the following table

GLAND	FUNCTION
Thyroid	
Parathyroid	
Pancreas	
Ovaries	
Hypothalamus	
Pituitary	
Thymus	
Adrenals	
Testes	

4. Figure 9—2 is a diagram of the various endocrine organs of the body. Next to each letter on the diagram, write the name of the endocrine-producing organ (or area). Then select different colors for each and color the corresponding organs in the illustration. To complete your identification of the hormone-producing organs, name the organs (not illustrated) described in items K and L.

   K. Small glands that ride "horseback" on the thyroid

   L. Endocrine producing organ only present in women.



PRE-TEST: Vocabulary Challenge

Directions: Place the correct letter in the blank to the left. Letters are used only once.

1. _____ testosterone
2. _____ fetus
3. _____ semen
4. _____ fertilization
5. _____ erection
6. _____ prostate gland
7. _____ ovaries
8. _____ egg cells
9. _____ cervix
10. _____ seminal vesicles
11. _____ testes
12. _____ vas deferens
13. _____ ejaculation
14. _____ puberty
15. _____ scrotum
16. _____ vagina
17. _____ fallopian tubes
18. _____ embryo
19. _____ estrogen
20. _____ uterus
21. _____ labia
22. _____ epididymis
23. _____ urethra
24. _____ clitoris
25. _____ sperm cells
26. _____ placenta

A. brings urine and semen out of body through the penis
B. adds a chemical fluid to the semen
C. when the penis becomes engorged with blood & hard
D. where fertilization occurs
E. glands that produce the egg cells and hormones
F. first two months of development in the uterus
G. organ that nourishes the fetus
H. stores sperm cells
I. female organ of intercourse; birth canal
J. female erectile tissue between labia
K. houses the fetus during pregnancy
L. adds a sugary fluid to semen
M. folds of skin outside the vagina
N. a hormone produced in the ovaries
O. cells produced in the ovaries
P. cells produces in the tests
Q. entrance to the uterus
R. when the semen leaves the penis
S. fluid ejaculated from the penis
T. organ that produces sperm
U. male hormone
V. begins at about age 12 or 13
W. last 7 months of prenatal development
X. tube that carries sperm from testes
Y. sperm cell joins egg cell
Z. sac that regulates the temperature of the testes

Mass vs. Age / Height vs. Age

Problem: How do the growth rates of males and females compare?

Adolescence is a time of rapid growth for both males and females. Are their growth rates the same? If not, how do they differ? On the following page, plot the data for mass on one graph and the data for height on another graph. Use a different color for males than females. Then answer the questions that follow.

Average Mass Growth in Females and Males (kg)		
AGE	FEMALE	MALE
8	25	25
9	28	28
10	31	31
11	35	37
12	40	38
13	47	43
14	50	50
15	54	57
16	57	62
17	58	65
18	58	68

Average Height Growth in Females and Males (cm)		
AGE	FEMALE	MALE
8	123	124
9	129	130
10	135	135
11	140	140
12	147	145
13	155	152
14	159	161
15	160	167
16	163	172
17	163	174
18	163	178

Questions:

1. Between what ages do females increase most in height?

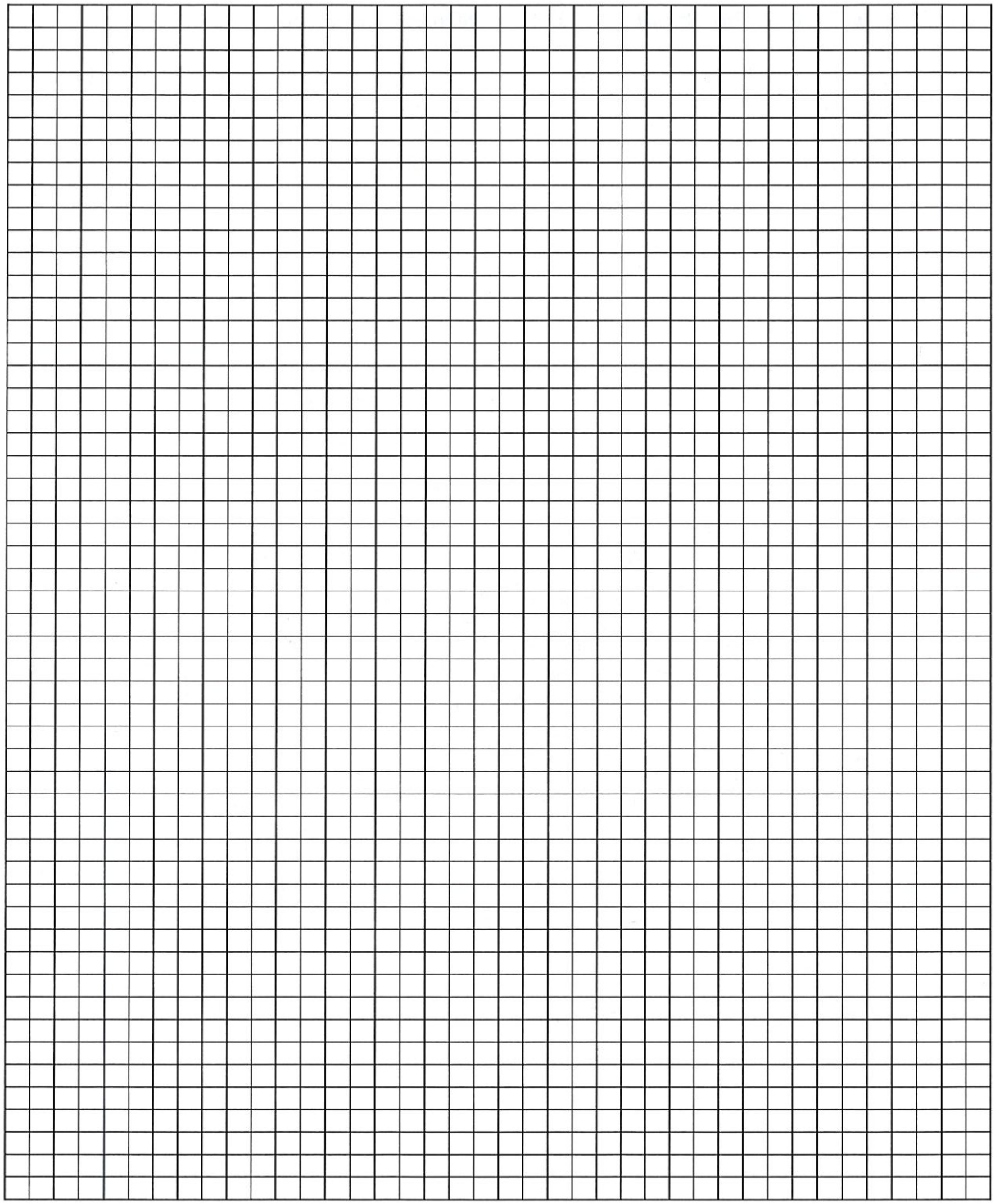
2. During what age do males increase in height?

3. When does the mass of the female change the most?

4. How can you explain the differences in growth between males and females?

5. Is average growth the same in males and females? Explain your answer.

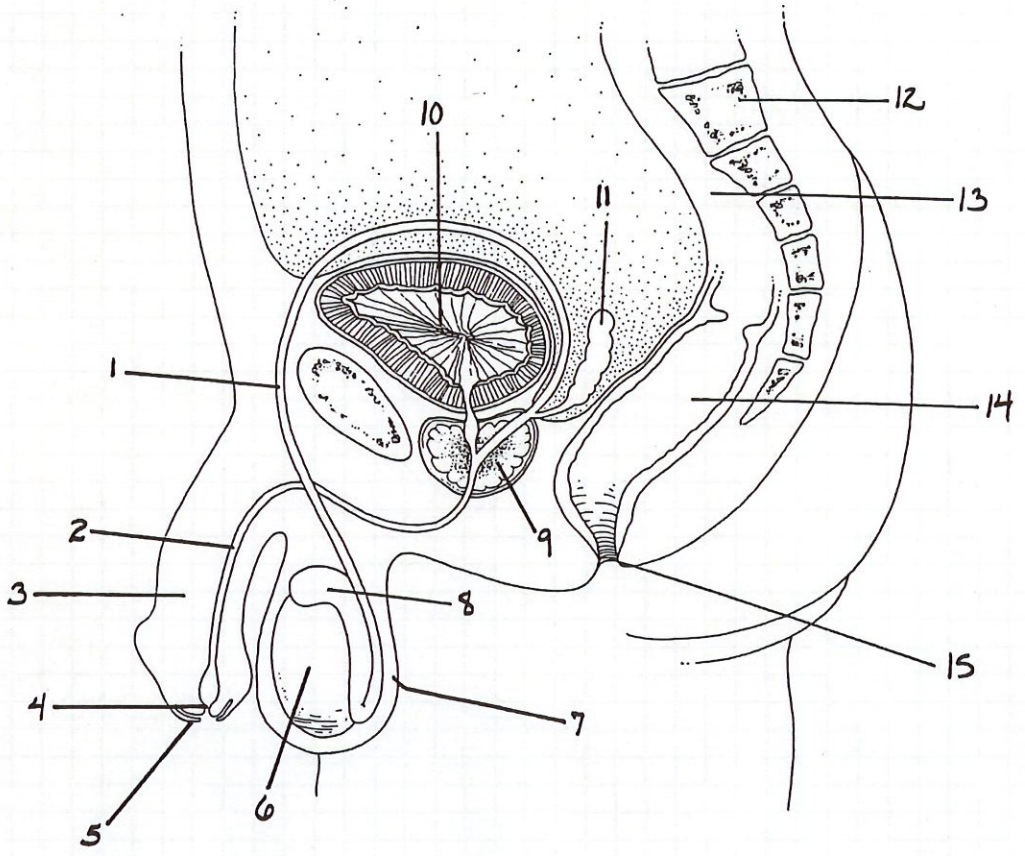
Mass vs. Age / Height vs. Age



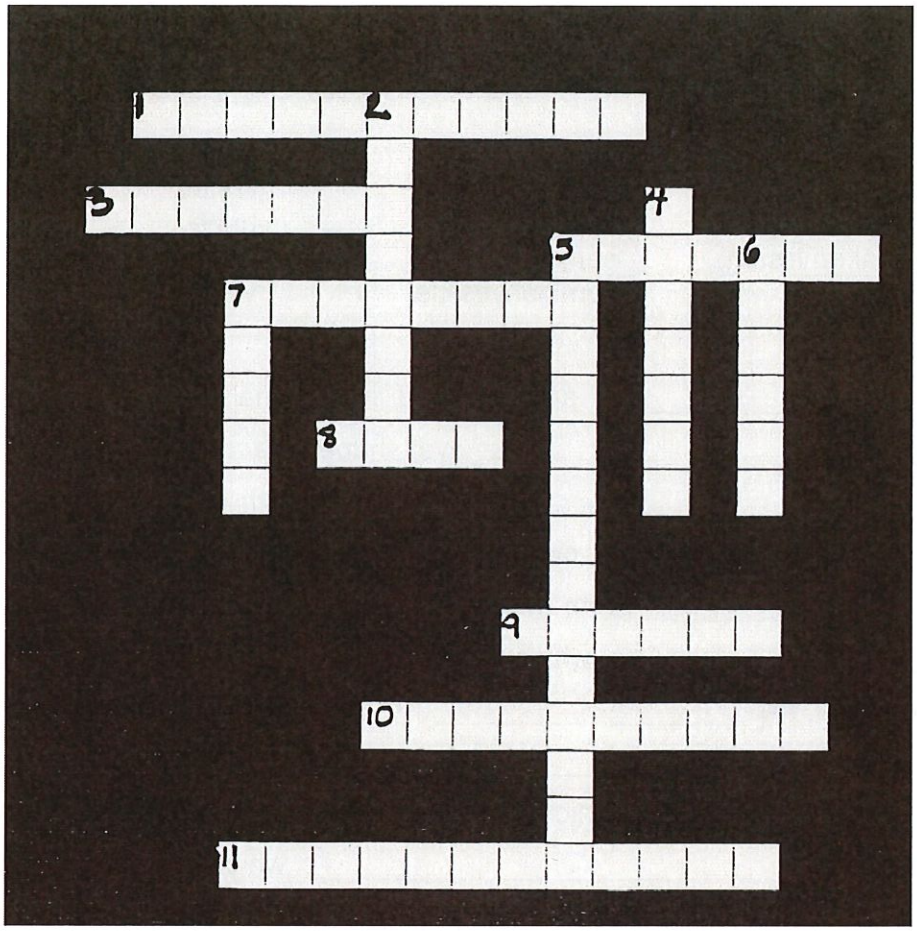
Internal Male Anatomy

Label each of the following structures on the side view diagram below.

anus	foreskin	prostate	seminal vesicle	urethral opening
bladder	intestine	rectum	testis	vas deferens
epididymis	penis	scrotum	urethra	vertebrae
pubic bone	ureter	Cowper's	erectile tissue	



MALE ANATOMY CROSSWORD



ACROSS:
1. tube leading from testes to urethra
3. stores urine
5. sac that holds testes; regulates temperature of testes
7. gland located at junction of vas deferens & urethra; closes off bladder for ejaculation
8. opening for evacuation of feces
9. last part of large intestine; processes wastes producing feces
10. storage area for sperm at top of testes
11. male hormone responsible for sexual maturity

DOWN:
2. flap of skin covering the end of the penis; often removed by circumcision
4. tube leading out through penis for removal of urine and sperm
5. small gland located between bladder and rectom; makes fluid & nourishes sperm
6. glands that produce sperm and testosterone
7. organ that engorges with blood so that intercourse may occur

The Male Reproductive System

Directions: Using the fifteen words provided, fill in the blanks to make this explanation of the male reproductive system correct. Each word will be used only once.

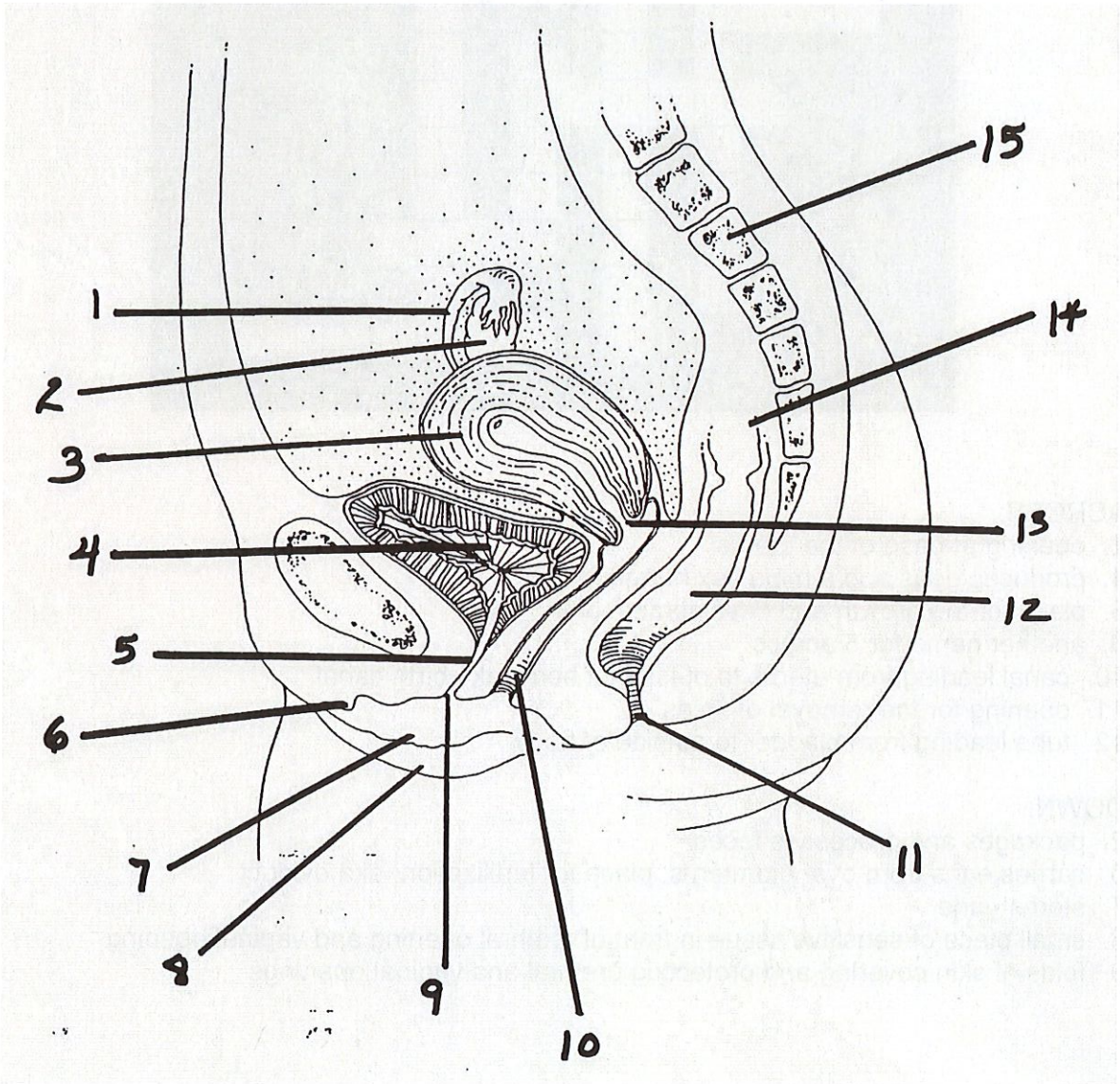
Cowper's Gland	penis	sperm
epididymis	prostate	testes
erection	scrotum	urine
nocturnal emissions	semen	urethra
orgasm	seminal vesicle	vas deferens

First, _____ are produced in the small seminiferous tubules of the _____. These oval-shaped glands are protected by a sac called the _____. After the sperm cells are produced, they are stored in a large coiled tube on the outer surface of each testicle called the _____. From this tube the sperm go into a larger tube called the _____, which eventually carries them to the external male reproductive organ, the _____. Along the way, sperm is nourished by a sugary fluid from _____, a chemical fluid from the _____, which is the most common site of cancer in men, and fluid from the _____, which are two small glands located near the bladder. These fluids plus the sperm cells combine to form _____, the fluid ejaculated from the penis during _____. Before a male can ejaculate, the spongy tissue surrounding the penis becomes engorged with blood causing the penis to become stiff and hard. This is known as an _____. The tube that carries the semen from the body is the _____. This tube also carries _____ from the bladder. Males can also have uncontrolled ejaculation during sleep, which are called _____.

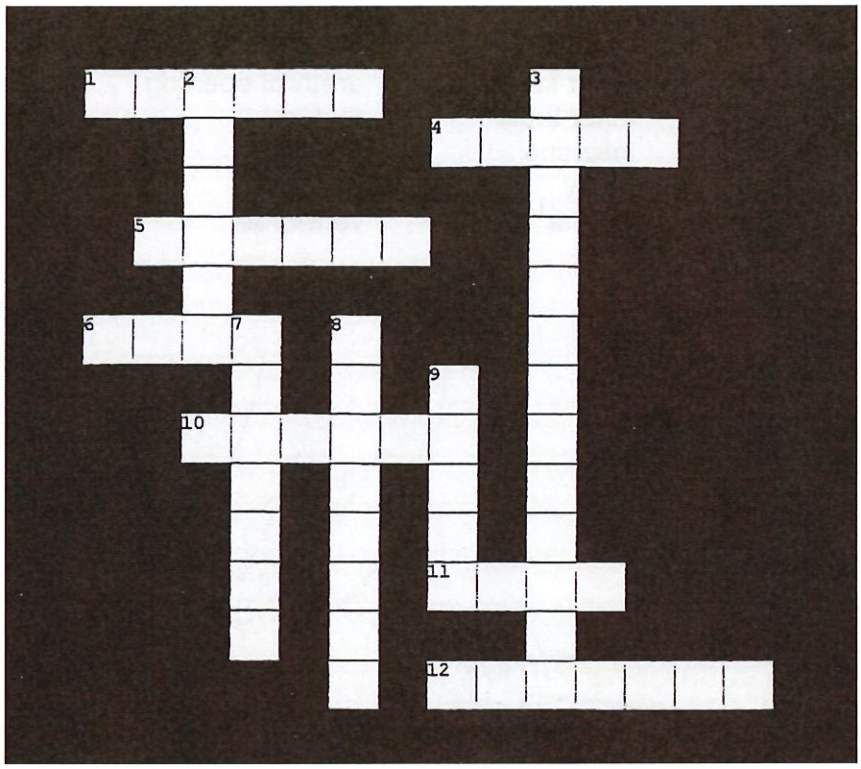
Internal Female Anatomy

Label each of the following structures on the side view diagram below.

anus	outer labia	urethral opening
bladder	inner labia	rectum
cervix	intestine	urethra
clitoris	ovary	uterus
fallopian tube	vagina	vertebrae



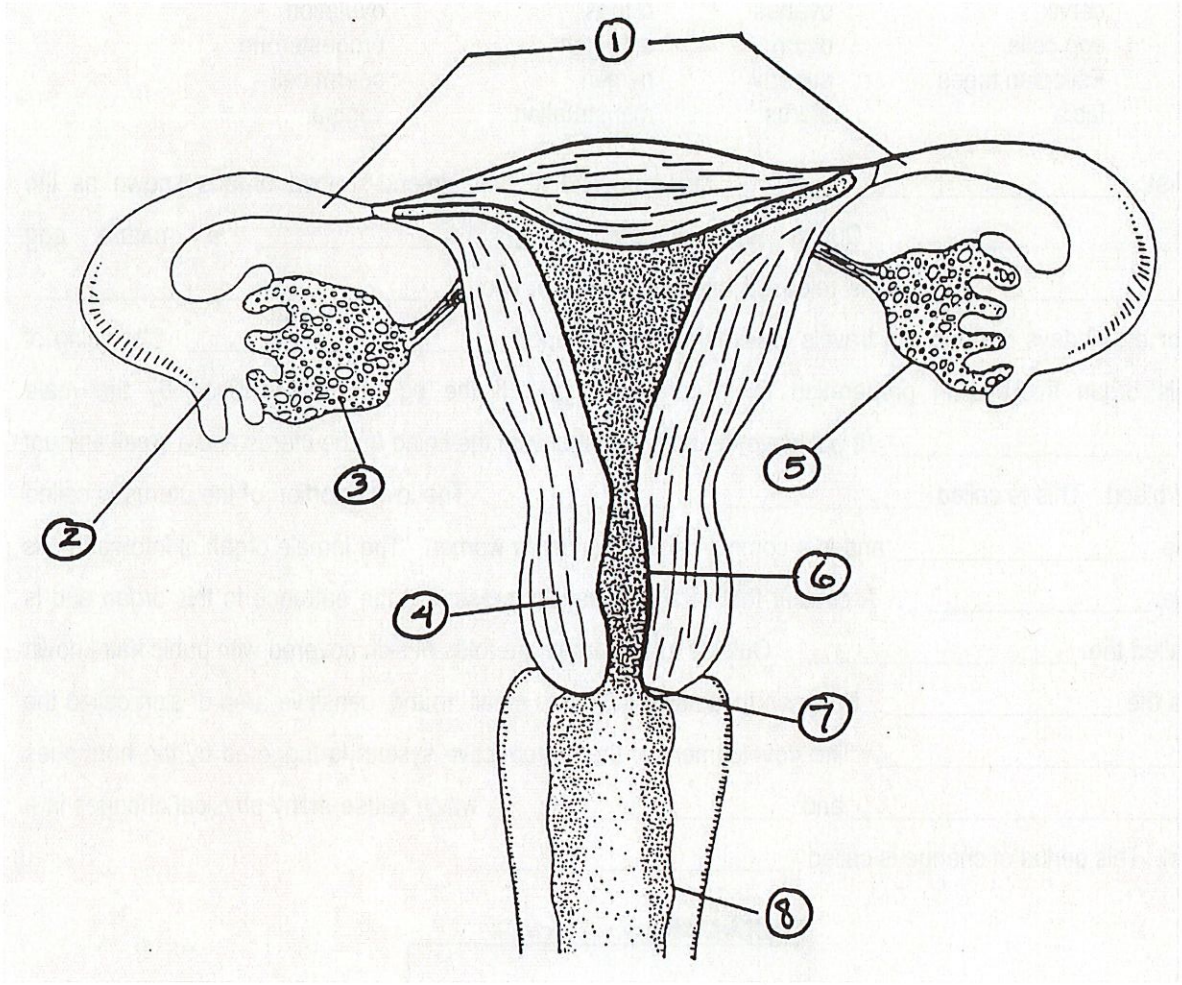
FEMALE ANATOMY CROSSWORD



ACROSS:
1. opening at base of the uterus
4. produces eggs and female sex hormones
5. place for the growth and development of the baby
6. another name for 5 across
10. canal leading from uterus to outside of body; aka birth canal
11. opening for the removal of feces
12. tube leading from bladder to outside of body

DOWN:
2. packages and processes feces
3. carries eggs from ovary to uterus; place for fertilization; aka oviduct
7. stores urine
8. small piece of sensitive tissue in front of urethral opening and vaginal opening
9. folds of skin covering and protecting urethral and vaginal openings

FEMALE REPRODUCTIVE SYSTEM DIAGRAM



DIRECTIONS: Using the words below, label the parts of the female reproductive system.

CERVIX	UTERUS	OVUM	FALLOPIAN TUBE
FIMBRIA	OVARY	VAGINA	UTERINE LINING

THE FEMALE REPRODUCTIVE SYSTEM

Directions: Using the sixteen words provided, fill in the blanks to make this explanation of the female reproductive system correct. Each word will be used only once.

cervix	ovaries	clitoris	ovulation
egg cells	ovum	estrogen	progesterone
Fallopian tubes	puberty	hymen	sperm cell
labia	uterus	menstruation	vagina

First, _____ are produced in two almond-shaped organs known as the _____. During the process of _____, a mature egg (_____) is released and enters one of two _____. For a few days the egg cell travels towards the pear-shaped _____. The lining of this organ thickens in preparation for a fertilized egg. If the egg is not fertilized by the male _____, it will leave the body together with the lining of the uterus and a small amount of blood. This is called _____. The lower portion of the uterus is called the _____ and is a common site of cancer in women. The female organ of intercourse is the _____. A circular fold of skin is usually present at the entrance to this organ and is called the _____. Outside of this organ are folds of skin covered with pubic hair known as the _____. Between these skin folds is a small, round, sensitive area of skin called the _____. The development of the reproductive system is triggered by the hormones _____ and _____, which cause many physical changes in a girl. This period of change is called _____.

"If your parents want you excused from tomorrow's film on pollination, you'll need a note from home."

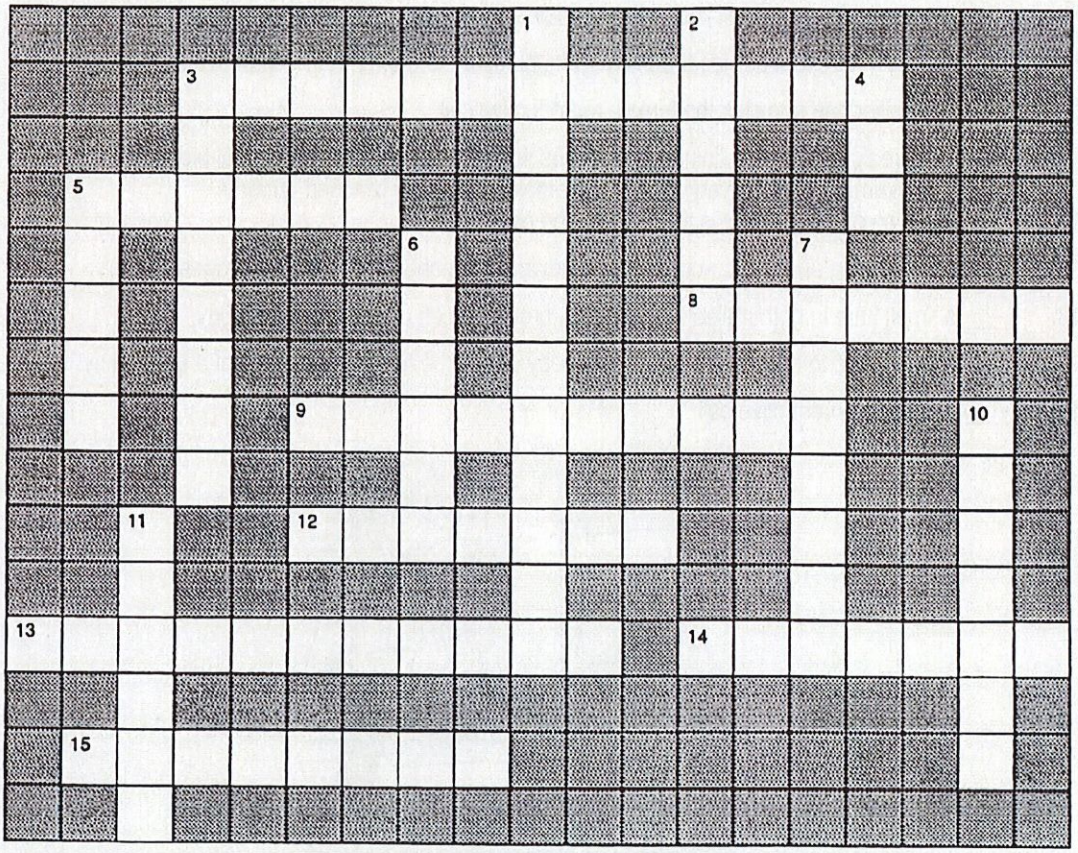
The Reproductive System

Across

3. The egg passes through the ____ ____ on the way to the uterus.
5. the lower part of the uterus that extends into the vagina
8. a sac around the testes
9. a tube where sperm mature
12. They produce eggs.
13. a tube that connects the epididymis and the urethra
14. a tube that carries urine out of the body
15. a term for the external reproductive structures

Down

1. the surgical removal of the foreskin
2. where a baby grows and develops
3. a sheath of skin at the end of the penis
4. the female reproductive cell
5. They help move an egg through the fallopian tube.
6. a tube that is sometimes called the birth canal
7. one of the glands that produces the fluid in semen
10. a time of development between childhood and adulthood
11. They produce sperm.

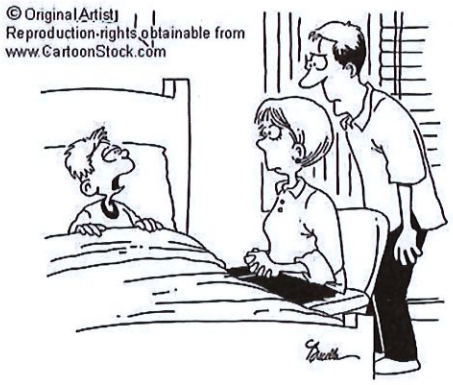


Reproductive Anatomy

Match each of the following words with the correct definition.

A.	Fetus	I.	Ovary
B.	Embryo	J.	Circumcision
C.	Fallopian Tube	K.	Semen
D.	Fertilization	L.	Sperm
E.	Vagina	M.	Testicles
F.	Menstruation	N.	Urethra
G.	Ovulation	O.	Uterus
H.	Ovum		

1. _____ birth canal; place where the sperm are released.
2. _____ the removal of the foreskin from the penis.
3. _____ the organ in a woman's body that holds the developing baby during pregnancy.
4. _____ the male sex glands where sperm cells are made.
5. _____ a fluid that carries sperm outside the male's body.
6. _____ a word used to describe the developing baby during the last six months of a pregnancy.
7. _____ when a male sperm cell joins with a female egg cell and a fertile egg is created.
8. _____ a narrow tube that carries the ovum from the ovary to uterus; fertilization takes place here.
9. _____ also called the egg cell; the female reproductive cell.
10. _____ the breaking up of the lining of the uterus that results in a small amount of blood flow approximately once every 28 days in females who have reached puberty.
11. _____ when an ovum (or egg) is released by the ovary.
12. _____ female sex glands that produce the ovum and hormones estrogen and progesterone.
13. _____ a small tube in both males and females through which urine leaves the body.
14. _____ a word used to describe a developing baby during the first three months of a pregnancy.
15. _____ the male reproductive cell.



"Why should I believe you about the Birds and the Bees? You lied to me about the Tooth Fairy."

Fetal Development and Childbirth

Directions: Read the information on fetal development in the table below and review the diagrams on the next page. Then use the information to answer the questions that follow.

Age*	Fetal Size	Characteristics (present by the end of the time period)
1 week	a speck	Embryo grows from single cell to hollow sphere; travels down fallopian tube and embeds in uterus; does not look at all like a baby.
2 – 4 weeks	½ cm	Spinal cord, brain, and heart have started to form; blood begins to circulate; spots for ears and eyes are barely visible; flipperlike arms and bumps for legs; appears to have a tail.
5 – 8 weeks (2nd month)	4 cm (5 g)	All internal organs present but not well-formed; eyes present and open; ears look low; vague mouth; arms and legs recognizable; abdomen still open somewhat at umbilical cord; head looks very large because of rapid brain growth.
9 – 12 weeks (3rd month)	9 cm (200 g)	Sex can be identified; head makes up half the size of the fetus; face is broad; eyes are wide-spaced; eyelids closed; upper limbs reach proportionate length; fingernails start to appear.
13 – 16 weeks (4th month)	14 cm (200 g)	Very rapid growth; bones start to ossify so can be seen on x-ray; head looks small compared to 12-week fetus; eyes still closed; ears stand out from head.
17 – 20 weeks (5th month)	19 cm (460 g)	Digestive muscles working so fetus swallows amniotic fluid; mother feels movement; lower limbs reach final proportion; toenails appearing; head and body are visible; skin is "greased."
21 – 24 weeks (6th month)	23 cm (820 g)	Organs well-developed but respiratory system still too immature to support life; substantial weight gain; body better proportioned; skinny; wrinkled skin; definite fingernails.
*It is unusual for a baby who weighs less then 1000 grams or is less than 26 weeks into development to survive.		
25 – 29 weeks (7 months)	27 cm (1500 g)	Eyelids separate so eyes can reopen; eyelashes present; more head hair; skin less wrinkled and appears somewhat red; face looks more like a baby.
30 – 38 weeks (8 – 9 months)	36 cm (3400 g)	Testes in scrotum; toenails well-formed; more body fat so baby looks plump; skin is smooth and its pink color light – even in dark-skinned races; head turns down in uterus. It's a full-term baby!
*Note that the fetus develops from "head to toe." Look at the limbs as an example: the arms and hands are formed before the legs and feet.		

*Time is measured from the moment of fertilization.

Fetal Development and Childbirth

Directions: Number the following stages of fetal development in order.

_____

_____

_____

_____

_____

_____

_____

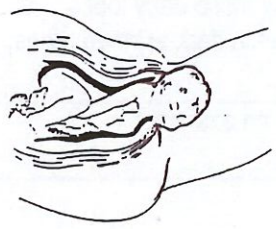
_____

_____

_____

_____

Directions: Put the following stages of childbirth in order.



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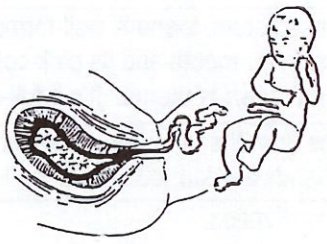

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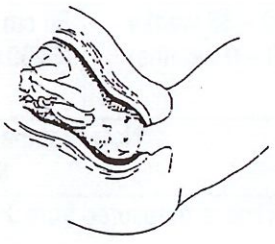
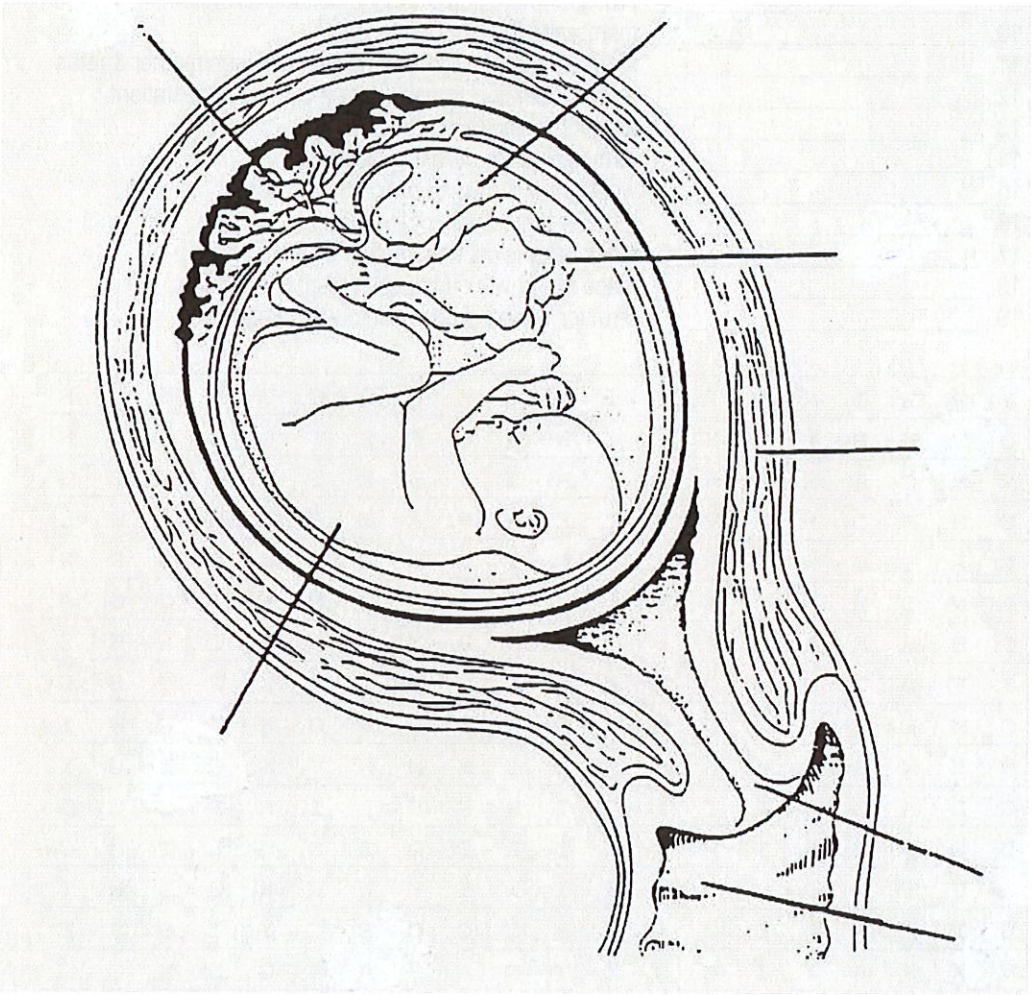


_____

Baby in Uterus

Directions: Label the following terms.

placenta
fetus
umbilical cord
vagina
cervix
uterus
amniotic fluid

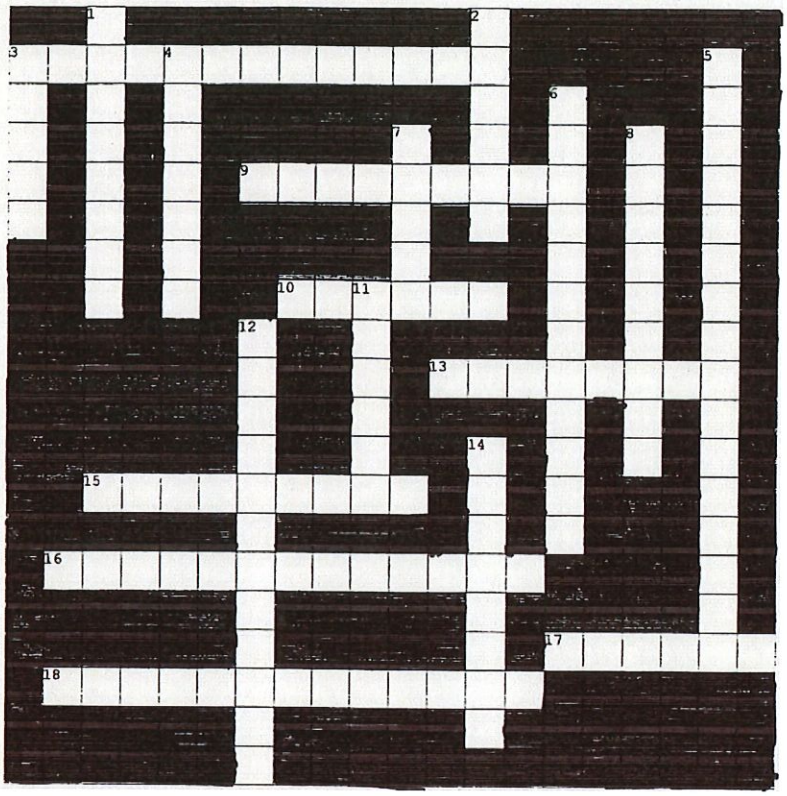


Childbirth Word Search

1. _____ liquid that surrounds developing fetus
2. _____ tube containing blood vessels that nourish fetus
3. _____ joining of an egg and a sperm
4. _____ place where fertilization takes place
5. _____ another name for #4
6. _____ process where egg is released from an ovary
7. _____ term for a fertilized egg
8. _____ term for unborn baby in first 2 months of gestation
9. _____ process where penis is inserted into the vagina
10. _____ membrane that surrounds fetus
11. _____ structure that provides connection between mother & fetus
12. _____ term for developing baby after 2 months of gestation
13. _____ term for the first stage of childbirth
14. _____ term for uterine muscles squeezing
15. _____ when baby is pushed out of the mother
16. _____ term for the delivery of the placenta
17. _____ when baby is cut from mother's stomach
18. _____ place for growth and development of the fetus
19. _____ term for when egg grows into wall of uterus

Y	P	Z	I	N	G	I	T	I	N	T	E	R	C	O	U	R	S	E	E
O	V	H	B	Y	O	H	S	C	W	A	O	F	E	T	U	S	Q	F	K
V	R	C	A	E	S	A	R	E	A	N	Y	S	X	I	T	A	N	G	G
U	H	B	D	F	X	V	G	T	E	M	B	R	Y	O	P	M	C	W	E
L	A	C	O	N	T	R	A	C	T	I	O	N	D	B	U	N	S	R	W
A	N	I	M	P	L	A	N	T	A	T	I	O	N	N	K	I	C	O	J
T	B	V	N	A	C	I	Z	O	T	J	B	Y	A	M	G	O	X	W	Z
I	F	D	U	U	M	U	F	A	L	L	O	P	I	A	N	T	U	B	E
O	M	E	E	R	M	N	M	F	O	Z	E	D	V	O	H	I	C	W	Z
N	K	W	R	L	X	B	I	B	L	Y	M	N	H	V	N	C	T	U	Y
G	L	A	O	T	I	T	I	O	I	N	K	S	L	I	H	F	S	C	G
U	D	F	X	W	I	V	W	L	T	L	D	O	Z	D	G	L	T	M	O
B	U	T	W	P	Q	L	E	W	I	I	I	F	W	U	R	U	Z	K	T
U	T	E	N	Z	L	C	I	R	B	C	C	C	E	C	Y	I	S	S	E
V	E	R	H	Y	I	A	O	Z	Y	C	A	S	A	T	G	D	X	G	J
T	R	B	P	X	L	B	C	M	A	S	T	L	A	L	K	G	S	B	U
N	U	I	A	D	A	Y	G	E	N	T	U	S	C	C	C	Z	K	B	H
F	S	R	D	L	E	L	U	S	N	R	I	R	B	O	D	O	Y	F	P
J	Y	T	O	U	C	A	X	I	D	T	G	O	I	Z	R	Y	R	W	M
S	J	H	X	O	B	R	F	K	R	T	A	O	N	V	C	D	R	D	H

Fetal Development Crossword



Across:

3. where fertilization takes place
9. pregnancy
10. place for growth and development of a baby
13. when cervix and vagina expand to 10 cm
15. when egg is released from ovary
16. liquid surrounding the fetus
17. birth canal
18. connection between fetus and placenta

Down:

1. structure which baby gets food and O2 from mother
2. opening into the uterus
3. term for baby after 2 months of development
4. another name for fallopian tube
5. when baby is delivered by cutting open the uterus
6. process that occurs monthly when fertilization does not occur
7. series of contractions that pushes baby out of mother
8. when fetus is pushed out of mother
11. term for baby from conception to 8 weeks
12. when embryo grows into the wall of the uterus
14. when baby is born