1 05 & 1 06 Meiosis

Illustrate and explain the production of male and female gametes by meiosis in animals and plants.

Compare and contrast the function of mitosis to that of meiosis.

Explain the difference between haploid and diploid cells.

Grade 9 Science Review for Test 3

Hormones, Making Female & Male Gametes, Conception to Birth

Date: Bring: Receive:

Outcomes:

1 09 Hormones, Structure of Female & Male, Function of Female & Male

Name the parts of the male and female human reproductive systems.

Describe the function of the parts of the male and female human reproductive systems.

Describe how the male and female reproductive systems are regulated by hormones. (LH, FSH, testosterone, estrogen, progesterone, oxytocin)

1 06 Compare and Contrast Mitosis and Meiosis

Two Possibilities for the Egg Cell

 Menstruation

 Fertilization

1 10 Outline Human Reproduction from Fertilization to Birth

Zygote

Embryo

fetus

1 05 & 1 06 Meiosis

Illustrate and explain the production of male and female gametes by meiosis in animals and plants.

Compare and contrast the function of mitosis to that of meiosis.

Explain the difference between haploid and diploid cells.

1 15 Describe environmental factors and personal lifestyle choices that can affect the developing zygote/embryo/fetus

Format:

Part A: Knowledge

Part B: Short Answer (Diagrams)

Part C: Sentence Answer

Other important info:

**Human Hormones** (1 09) (Science Power 9 page 80)

State where each hormone is made (ie which organ or gland), whether they are male or female hormones or both, and the function for each of each hormone:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Male /Female | Made in |  Function |
| Estrogen |  |  |  |
| Testosterone |  |  |  |
| Progesterone  |  |  |  |
| Follicle stimulating hormone (FSH) |  |  |  |
| Luteinising hormone (LH)  |  |  |  |
| Oxytocin |  |  |  |

**MATCHING**

Match the description in column A with its correct term in column B.

**1 09**

1. \_\_\_\_\_Cervix a) tube that leads from testes to urethra
2. \_\_\_\_\_Eggs b) narrow end of uterus
3. \_\_\_\_\_Ovaries c) pocket of skin that holds the testes
4. \_\_\_\_\_Oviduct d) organ in which an embryo develops
5. \_\_\_\_\_Scrotum e) tube that carries sperm and urine to the outside of the body
6. \_\_\_\_\_Sperm f) long tube between the ovary and the uterus
7. \_\_\_\_\_Testes g) main organs of the male reproductive system (where sperm cells are made)
8. \_\_\_\_\_ Urethra h) female sex cells
9. \_\_\_\_\_ Uterus i) male sex cells
10. \_\_\_\_\_ Vagina j) organs that produce the female sex cells
11. \_\_\_\_\_ Vas deferens k) birth canal

**1 05, 1 06**

**MITOSIS**

|  |  |
| --- | --- |
| **Column A** | **Column B** |
|  |  |
| \_\_\_\_\_\_ Gametes | 1. Interphase
 |
| \_\_\_\_\_\_ DNA makes a copy of itself during this phase. | 1. Cytokinesis
 |
| \_\_\_\_\_\_ Division of the cytoplasm. | 1. Prophase
 |
| \_\_\_\_\_\_ Chromosomes first become visible. | 1. Anaphase
 |
| \_\_\_\_\_\_ Spindle fibres disappear and nuclear membrane reappears. | 1. Telophase
 |
| \_\_\_\_\_\_ Chromosomes begin to separate. | 1. Metaphase
 |
|  | 1. Haploid
 |
|  | 1. Diploid
 |

**MEIOSIS**

|  |  |
| --- | --- |
| **Column A** | **Column B** |
| \_\_\_\_\_\_ In humans, n = 23 | 1. Interphase
 |
| \_\_\_\_\_\_ Homologous chromosomes line up at the middle of the cell. | 1. Prophase II
 |
| \_\_\_\_\_\_ Crossing over occurs. | 1. Anaphase II
 |
| \_\_\_\_\_\_ Sister chromatids line up at the middle of the cell. | 1. Telophase II
 |
| \_\_\_\_\_\_ Homologous chromosomes arrive at opposite poles and cell division begins. | 1. Metaphase II
 |
| 1. Somatic cells
 |
| \_\_\_\_\_\_ Nuclear membrane and nucleolus reforms around the  single stranded haploid nucleus. | 1. Prophase I
2. Anaphase I
 |
|  | 1. Telophase I
 |
|  | 1. Metaphase I
 |
|  |  |
|  |  |
|  |  |

**FILL IN THE BLANKS (**1 09)

Use the word bank to complete the following sentences.

Pituitary Glands Hormones Ovaries Puberty Testes Thyroid

1. Hormones are released from \_\_\_\_\_\_\_\_\_\_\_
2. Chemicals that bring messages to every part of the body are called \_\_\_\_\_\_\_\_\_\_\_\_
3. Stage between childhood and adulthood is \_\_\_\_\_\_\_\_\_\_\_
4. The male sex organs are \_\_\_\_\_\_\_\_\_
5. The female sex organs are \_\_\_\_\_\_\_\_\_\_\_
6. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are two glands that squeeze out chemicals called hormones into our blood so they can bring messages to every part of the body.

**TRUE or FALSE**

1. \_\_\_\_\_\_Egg cells are needed for a zygote to develop.
2. \_\_\_\_\_ Only 1 egg cell leaves an ovary every month.
3. \_\_\_\_\_ A baby can grow inside a uterus.
4. \_\_\_\_\_ Hormones are what make a girl develop differently than a boy.

**MULTIPLE CHOICE (1 09)**

1. A woman will generally have an egg cell and the blood from the uterus lining flow out of her vagina….
2. about once a month
3. about once a day
4. only if the egg did not meet a sperm cell
5. two of the above
6. The tissues of the uterus lining fill with blood every month
7. to prepare for a fertilized egg
8. to deliver nutrients to the mother
9. to keep the egg safe
10. two of the above
11. To make a zygote, you need to have
12. a sperm cell and an egg cell
13. a sperm cell and a male gamete
14. an egg cell and a female gamete
15. 3 gametes

**MULTIPLE CHOICE (1 05, 1 06)**

4) 90% of the cell cycle, a cell spends in :

a) Cytokinesis b) Cell division c) Mitosis d) Interphase

1. In which phase do spindle fibres disappear?

a) Prophase b) Metaphase c) Anaphase d) Telophase

1. In mitosis, which phase are two new nuclei visible?

a) Prophase b) Metaphase c) Anaphase d) Telophase

1. The chromosome number is reduced to half during:

a) interphase b) the end of mitosis c) the end of meiosis I d) the end of meiosis II

1. During which of the following phases are ***homologous pairs*** of chromosomes lined up at the center of the cell?

a) Metaphase b) Metaphase I c) Metaphase II d) Metaphase I and Metaphase II

1. A cell with 10 chromosomes undergoes mitosis. How many daughter cells are created? \_\_\_

 Each daughter cell has \_\_\_ chromosomes?

a) 2, 10 b) 4, 5 c) 4, 10 d) 2, 5

1. What is the structure labeled "X" on the picture?

 a) Spindle fibres b) Centrioles
 c) Centromere d) Chromatids

1. Examine the picture of the cell. What phase is the cell in?

a) Prophase b) Metaphase c) Anaphase d) Telophase

12) If an organism’s haploid cell is 24, how many chromosomes will be found in the zygote?

a) 12 b) 24 c) 48 d) 96

13) What structure is responsible for moving the chromosomes during mitosis?

a) Nucleolus b) Nuclear Membrane c) Spindle fibres d) Centromere

14) During which stage of mitosis does the nuclear membrane disappear?

a) Prophase b) Metaphase c) Anaphase d) Telophase

15) Which phase occurs directly after metaphase?

a) Interphase b) Telophase c) Prophase d) Anaphase

16) After replication each chromosome consists of 2 \_\_\_\_\_.

 a) Chromosomes b) Chromatids c) Centrioles d) Centromeres

**SHORT ANSWER**

**Male Reproductive System**

1. When do males start making sperm? Be specific. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why does a sperm cell need a tail? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. How does the sperm get energy to swim? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. List the order of the structures sperm travel through starting from the testes to the urethra.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. The fluid leaving the urethra is semen not sperm. Why is sperm the incorrect name?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*Be sure you can label all of the parts of the male reproductive system (SEE YOUR HANDOUTS).

**Female Reproductive System**

6. Where is an ovum released from? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. List the order of the structures an egg cell would travel through starting from the ovaries to the vagina. You can assume that the egg cell was not fertilized.

8. The uterus is very muscular. Why do you think this is important? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. How does the egg move (since it cannot swim?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. List 3 events, in proper order, that may happen to an egg after it is fertilized.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\*Be sure you can label all of the parts of the male reproductive system (SEE YOUR HANDOUTS).**

Mitosis/Meiosis

11. Where exactly does mitosis occur in the human body? (Give one example) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. Where exactly does meiosis occur in the human body? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Long Answer**

1. What is crossing over and why is it so important?

2. Explain three ways in which mitosis and meiosis are the similar. Explain, using proper vocabulary, AT

 LEAST three ways in which mitosis and meiosis are different. BE SURE TO KNOW **SEVERAL** DIFFERENCES &

 SIMILARITIES.

3. Humans reproduce offspring through sexual reproduction; however asexual reproduction does occur in the

 human body. Explain how this is possible.

**Review – Answer Key**

**Matching**

1)b 2) h 3) j 4) f 5) c 6) I 7) g 8) e 9) d 10) k 11) a

**Mitosis** G A B A E D

**Meiosis** K (K. haploid (please add this to the list) J G A H D

**Fill in the Blanks**

1. glands 2) hormones 3) puberty 4) testes 5) ovaires 6) pituitary, thyroid

**True or False**

1. F (it takes only ONE egg cell) 2) T 3) T 4) T

**Multiple Choice**

1D 2 A 3 A 4D 5 D 6 D 7 C 8 B 9 A 10 B 11 C 12 C 13 C 14 A 15 D 16 B

**Short Answer**

**Male Reproductive System** (your book calls this anatomy)

1. Males start making sperm when FSH stimulates the testes to make testosterone. The sperm then mature in the epididymis
2. A sperm needs a tail to swim to the egg cell (ovum)
3. The sperm gets energy from the seminal vesicle which provides seminal fluid (mostly glucose which is a sugar)
4. epididymus – vas deferens – seminal vesicle – urethra
5. Semen is the combination of sperm and seminal fluid

**Female Reproductive System** (your book calls this anatomy)

1. The ovum are released from the ovary
2. Ovary – oviduct – uterus – cervix-vagina
3. The uterus must push the baby through the vagina to the outside world.
4. This requires strength which muscle tissue has.
5. The egg is pushed by tiny hairs called cilia which line the oviduct
6. 3 events that would happen after an egg is fertilised are

\*implantation – the fertilized egg (now called a zygote) attaches to the uterus lining

 (only now do we say that the female is pregnant

\*the egg cell produces a chemical so that no other sperm can fertilize it

\*zygote does mitosis to become larger

1. Mitosis is done in every body cell (skin, liver, heart, lungs)
2. Meiosis happens in the ovaries (in females) and testes (in males)

**Meiosis Project Summary – USE THE BLUE SHEETS (1 05)**

Below the steps of **meiosis** are described in random order. Beside each description is a letter.

**Draw** each phase in the appropriate box. You should start your drawings with **three homologous pairs**

(ie 6 double stranded chromosomes).

FIRST **Match** each description with the appropriate phase of meiosis on your blue sheet. Write the letter of the description in the second column of your blue sheet

When you are drawing the phases, make sure you have the right number of chromosomes and cells.

**Descriptions**

1. Cell splits into two separate cells. Each cell has one of the “matching pairs” of double-stranded chromosomes.
2. Chromatin **replicates** and turn into double stranded chromosomes.
3. Chromatin **replicates** and turn into double stranded chromosomes.
4. The cells divide to form a total of **four** new cells.
5. Nuclear membrane disappears and spindle fibres attach to double-stranded chromosomes of a diploid cell.
6. Double-stranded chromosomes are pulled apart at their centre and move to opposite poles.
7. Nuclear membrane disappears and spindle fibres attach to double-stranded chromosomes of a haploid cell.
8. Double-stranded chromosomes line-up at the centre of the cell, but are not in pairs. They line up “single file”.
9. **“Matching pairs”** of double-stranded chromosome pairs are pulled to opposite poles of the cell by the spindle fibres.
10. Nuclear membrane begins to form around **single-stranded chromosomes** and spindle fibres disappear.
11. Double-stranded chromosomes form a line across the middle of the cell with the **“matching pairs”** opposite each other.
12. Nuclear membrane begins to form around **double-stranded chromosomes** and spindle fibres disappear.

|  |  |
| --- | --- |
| **Meiosis I** | **Meiosis II** |
| **Phase** | **Letter of the description** | **Drawing** | **Phase** | **Letter of the description** | **Drawing** |
| **Interphase**  |  |  |  |  |  |
| **Prophase I** |  |  | **Prophase II** |  |  |
| **Metaphase I** |  |  | **Metaphase II** |  |  |
| **Anaphase I** |  |  | **Anaphase II** |  |  |
| **Telophase I** |  |  | **Telophase II** |  |  |
| **Cytoplasm Division I** |  |  | **Cytoplasm Division II** |  |  |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ attempt

The following organism contains 4 chromosomes. Draw what is happening in each stage.

(**1 01, 1 02) /15**

 Label the structures labelled with a \* on each diagram as requested.

Interphase

Label \*chromatin \*double stranded chromosomes \*centromere /3

Before replication After replication /2

During mitosis Label \*prophase /4

\*metaphase

\*anaphase

\*telophase

\*centriole \*spindle fiber /2

Cytoplasmic Division \*chromatin /2

Is this cell a plant cell or an animal cell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ How do you know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/2