Seventh Grade "Cell Division and Genetics" Assessment

1a. Living things grow and reproduce through _____
   a. cell division
   b. cell subtraction

1b. Living things reproduce and grow through the process of cell _____.

1c. The basic process that takes care of both growth and reproduction in living things is called _____ _____.

2a. The two types of cell division are m_____ and m_____.

2b. State the two types of cell division: _____and _____.

2c. State the two types of cell division, and tell the difference between the two.
_____
_____
_____
_____

3a. Mitosis is the type of cell division involved in:
   a. asexual reproduction
   b. sexual reproduction

3b. Mitosis is the type of cell division involved in:
   a. sexual reproduction
   b. paper product reproduction
   c. asexual reproduction
   d. production of proteins

3c. Which type of reproduction is mitosis involved in?
_____

4a. The end result of Mitosis is cells which contain a normal number of chromosomes. What is this condition called?
   a. complete
   b. diploid

4b. The end result of Mitosis is cells which contain a normal number of chromosomes. What is this condition called?
   a. haploid
   b. diploid

4c. The end result of mitosis is cells which contain _____ as many chromosomes as the parent cells. This condition is called _____.

5a. Amoebas reproduce through the process of _____ reproduction.

5b. Amoebas reproduce through the process of _____ reproduction, which is the same as _____. Choose two answers and write them in the blanks.

a. Sexual
b. Mitosis
c. Meiosis
d. Asexual

5c. Amoebas reproduce using which type of cell division? Tell two more facts about this type of reproduction.

_____
_____
_____
_____

6a. What is the other name for sexual reproduction with cells?

a. meiosis
b. diploid

6b. What is the other name for sexual reproduction?

a. meiosis
b. mitosis

6c. Sexual reproduction involves which type of cell division?

_____

7a. Since _____ involves the mixing of chromosomes from two haploid cells, it is responsible for the combining of traits of two parent organisms.

a. budding
b. meiosis

7b. The type of cell division called _____ involves the mixing of chromosomes from two haploid cells, so it is responsible for the combining of traits of two parent organisms.

7c. Which type of cell division is responsible for new combinations of traits? How does this combination happen?

_____
_____
_____
_____

8a. There are two reasons that new generations of organisms are different from their parents. One is that during sexual reproduction, the chromosomes from the two parents mix up in new ways. The other is _____, where genes are mixed up on the chromosomes themselves.
a. mitosis
b. mutation

8b. There are two reasons that new generations of organisms are different from their parents. One is that during sexual reproduction, the chromosomes from the two parents mix up in new ways. The other is _____, where genes are mixed up on the chromosomes themselves.

8c. Explain the two reasons why the offspring that result from meiosis are different than their parents.
_____
_____
_____
_____

9a. What kinds of traits are not passed on to offspring?
a. acquired
b. inherited

9b. What kinds of traits are not passed on to offspring?
a. acquired
b. height
c. genetic
d. hair color

9c. Describe an example of a trait that would not be passed on to offspring. Explain why.
_____
_____
_____
_____

10a. Mendel experimented on _____ plants because they were easy to grow.
a. pea
b. petunia

10b. Who worked with pea plants to come up with the basics of genetics?
_____

10c. Who is known as the "father of genetics"? Give two details of his experiments.
_____
_____
_____
_____

11a. A(n) _____ organism will “breed true”.
a. heterogeneous
b. purebred

11b. Which type of organism will “breed true”?
a. purebred
b. hybrid

11c. Give a minimum of two differences between purebred and hybrid organisms.
_____
_____
_____
_____

12a. What is the name we give to certain genes that “cover up” or “overpower” recessive genes? _____

12b. Name the two main types of genes when we deal with simple crosses.
_____ and _____.

12c. Name the two main types of genes involved in simple genetic crosses and tell how they interact with each other.
_____
_____
_____
_____

13a. What is the basic unit of heredity that controls inheritance?
a. hybrid
b. genes

13b. Name the basic unit of heredity:
_____

13c. What is the basic unit of heredity, and where is it located?
_____
_____

14a. What are chromosomes made of?
a. DNA
b. liposomes

14b. What molecule makes up chromosomes?
_____

14c. Sketch, label and explain the parts of a DNA molecule.

15a. The shape of DNA is called the "Double _____".
a. Loop
b. Helix
c. Twist

15b. The shape of DNA has a nickname. What is it?
_____

15c. State the common name for the shape of the DNA molecule and explain why it is called that.
_____
_____
_____
_____

16a. DNA copies itself during the process of DNA r_____tion.

16b. The process by which DNA makes copies of itself is called DNA _____.

16c. Name and give three steps in the process by which DNA copies itself.
_____
_____
_____
_____

17a. Before DNA can begin to replicate itself, it must first come apart, or _____.

17b. What is the first step in DNA replication?
_____

17c. Which actual parts of the DNA molecule disconnect from each other when the DNA molecule "unzips" during replication?
_____

18a. How many nitrogen base pairs make up one gene "word"?
_____

18b. A gene contains how many nitrogen base pairs?
_____

18c. What is a gene made up of?

_____

19a. When DNA is making proteins, how many protein molecules does each gene make?

_____

19b. While DNA is synthesizing proteins, each gene codes for _____ protein(s).

19c. During Protein Synthesis, how does the DNA decide which protein to make?

_____
_____
_____
_____

20a. Proteins are made out of _____ acids

a. glycolic
b. amino
c. fruit

20b. Proteins are made of _____ acids

20c. What are proteins made out of?

_____

21a. When people change the genetic makeup of organisms to try to make improvements, it is called G_____ E_____.

21b. What is the basic thing we do when practicing genetic engineering?

_____

21c. Give two examples of genetic engineering:

_____
_____
_____
_____

22a. Who won the Nobel Prize in Medicine for finally discovering the actual shape of DNA?

a. Newton and Galileo
b. Einstein
c. Pascal and Joule
d. Watson, Crick and Wilkins

22b. Three people; Watson, _____ and Wilkins, finally discovered the complete structure of the double- helix _____ molecule.

22c. What three people received the Nobel Prize in Medicine in 1962 for discovering the complete structure of the DNA molecule?
1. _____
2. _____
3. _____

23a. Severo _____ won the Nobel Prize in 1959 for discovering how DNA and RNA are synthesized.

23b. Severo Ochoa was awarded the Nobel Prize in 1959 for discovering how DNA and RNA are _____.

23c. What did Severo Ochoa win the Nobel Prize in 1959 for discovering?
_____

24a. The first American woman to win an unshared Nobel Prize, Barbara _____, discovered that genes can move between chromosomes.

24b. Barbara McClintock won the first unshared Nobel Prize awarded to an American woman for her finding the genes can _____, or jump between chromosomes.

24c. Give three details about Barbara McClintock and her Nobel Prize award.
1. _____
2. _____
3. _____

The following Colorado Model Content Standards are covered in this assessment by the questions indicated:

Questions 10a, 10b, 10c: Standard 1. Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

Questions 1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b, 3c, 4a, 4b, 4c, 5a, 5b, 5c, 6a, 6b, 6c, 7a, 7b, 7c, 8a, 8b, 8c: Standard 2. Physical Science: Students know and understand common properties, forms, and changes in matter and energy.

All Questions: Standard 3. Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.

Questions 10a, 10b, 10c, 21a, 21b, 21c: Standard 5. Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.

Questions 14a, 14b, 14c, 20a, 20b, 20c: Standard 6. Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.

Answer Key

1a. a. cell division
1b. division
1c. cell division

2a. mitosis and meiosis
2b. mitosis and meiosis
2c. Acceptable answers could include:
-mitosis and meiosis
-mitosis is involved in growth and asexual reproduction
-meiosis is involved in sexual reproduction

3a. a. asexual reproduction
3b. c. asexual reproduction
3c. Asexual

4a. b. diploid
4b. b. diploid
4c. First Blank: just, exactly (synonym). Second blank: Diploid.

5a. Asexual
5b. b. Mitosis, d. Asexual
5c. Acceptable answers could include:
-Mitosis.
-Choose any two of the following facts:
-it is the same as Asexual reproduction
-the single celled amoeba undergoes Mitosis all by itself and produces almost an exact duplicate of itself
-the amoeba does not need another amoeba to reproduce, etc.

6a. a. meiosis
6b. a. meiosis
6c. Meiosis

7a. b. meiosis
7b. Meiosis
7c. Acceptable answers could include:
-Meiosis
-Cells divide by Meiosis to produce daughter cells with half the normal number of chromosomes (haploid number). Two of these haploid cells join during sexual reproduction.

8a. b. mutation
8b. Mutation

8c. Acceptable answers could include:
-Mutation, in which the genes on chromosomes become mixed up, and the process of sexual reproduction itself, since during the process, the chromosomes of two organisms become mixed.

9a. a. acquired
9b. a. acquired
9c. Acceptable answers could include:
-plausible examples of acquired characteristics and include an explanation that acquired characteristics do not change a person's genetic makeup and therefore cannot be passed on

10a. b. petunia
10b. Mendeleev
10c. Acceptable answers could include:
-Mendeleev
-heorganized his table by ascending atomic mass
-modern tables are organized by ascending atomic number

11a. b. purebred
11b. a. purebred
11c. Acceptable answers could include:
-Chemical reactivity, phase, Mass, and element type all happen in patterns

12a. Shells
12b. Energy, electron shells
12c. Acceptable answers could include:
-1st shell- two electrons, 2nd shell- 8 electrons, 3rd shell- 18
-The closer to the nucleus a shell is, the less energy it has.

13a. b. genes
13b. Protons, electrons
13c. Acceptable answers could include:
-The atomic number tells the number of protons the atom has.
-If the atom has no net charge, the number of electrons must be equal to the number of protons to balance charges.

14a. a. DNA
14b. DNA
14c. Acceptable answers could include:
-Sketches will vary but must include the ladder structure with the sugars on the outside labeled and the Nitrogenous bases labeled on the rungs.

15a. b. Helix
15b. Double Helix

15c. Acceptable answers could include:
-Double Helix
-it is named this because of the double strands of Phosphate and sugars twisted around each other, kind of like a twisted ladder

16a. (R)eplica(tion)
16b. Replication
16c. Acceptable answers could include:
-DNA Replication
-Steps (any three):
-The two halves of the DNA "ladder" unzip from each other
-Nitrogen Bases from the surrounding area are picked up and plugged into the unzipped halves
-The two new complete DNA strands separate from each other
-(other steps may be added or these may be expanded upon, depending on the student's classroom experience)

17a. unzip
17b. The DNA must unzip
17c. Acceptable answers could include:
-The Nitrogen base pairs that make up the rungs of the ladder must separate from each other.

18a. three
18b. three
18c. Three Nitrogen base pairs

19a. one
19b. one
19c. Acceptable answers could include:
-Each group of three Base pairs (a gene) codes for, or gives the directions for, the synthesis of a different protein.
-Each combination of three base pairs codes for a different protein.

20a. b. amino
20b. amino
20c. amino acids

21a. (G)enetic (E)ngineering
21b. Humans change the genetic makeup of organisms to suit specific purposes.
21c. Acceptable answers could include:
-various examples, depending on each specific class
-could include selective breeding, gene manipulation, etc.

22a. d. Watson, Crick and Wilkins
22b. Crick

22c. Watson, Crick and Wilkins

23a. Ochoa
23b. synthesized
23c. Acceptable answers could include:
-He discovered how RNA and DNA are synthesized.

24a. McClintock
24b. transpose
24c. Acceptable answers could include any three of the following details:
-first American woman to get unshared prize
-worked with Maize
-discovered transposition or “jumping genes”
-won in 1983- long after her discoveries
-other geneticists discounted her discoveries for many years, etc.