Genetics in Our Lives

Teacher's Guide
Middle School

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A Message from our Company. . .

Dear Educator:

Thank you for your interest in the educational videos produced by the Visual Learning Company. We are a Vermont-based, family owned and operated business specializing in the production of quality educational science videos and materials.

We have a long family tradition of education. Our grandmothers graduated from normal school in the 1920's to become teachers. Brian's mother was an elementary teacher and guidance counselor, and his father was a high school teacher and superintendent. This family tradition inspired Brian to become a science teacher, and to earn a Ph.D. in education, and led Stephanie to work on science educational programs at NASA.

In developing this video, accompanying teacher's guide, and student activities, our goal is to provide educators with the highest quality materials, thus enabling students to be successful. In this era of more demanding standards and assessment requirements, supplementary materials need to be curricular and standards based - this is what we do!

Our videos and accompanying materials focus on the key concepts and vocabulary required by national and state standards and goals. It is our mission to help students meet these goals and standards, while experiencing the joy and thrill of science.

Sincerely,

Brian and Stephanie Jerome

National Standards Correlations

National Science Education Standards
(Content standards: 5-8, National Academy of Sciences, c. 1996)

Life Science - Content Standard C
Reproduction and Heredity

- Every organism requires a set of instructions for specifying its traits. Heredity is the passage of these instructions from one generation to another.
- Hereditary information is contained in genes located in the chromosomes of each cell. Each gene carries a single unit of information. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait. A human cell contains many thousands of different genes.

Benchmarks for Science Literacy
(Project 2061 – AAAS, c. 1993)

Heredity - (5B) Grades 6 through 8

By the end of 8th grade, students should know that:

- In sexual reproduction, a single specialized cell from a female merges with a specialized cell from a male. As the fertilized egg, carrying genetic information from each parent, multiplies to form the complete organism with about a trillion cells, the same genetic information is copied in each cell.
- New varieties of cultivated plants and domestic animals have resulted from selective breeding for particular traits.

Student Learning Objectives

Upon viewing the video and completing the enclosed student activities, students will be able to do the following:

- Describe chromosomes as structures found in the nucleus of cells. Chromosomes are the structures on which genes are located.
- Explain that deoxyribonucleic acid, or DNA, is the genetic material found in chromosomes.
- Understand that DNA is the genetic material that controls traits passed from parents to offspring.
- Create a simple sketch of a DNA molecule.
- Understand that many scientists in the twentieth century contributed to further our understanding of DNA and the science of genetics.
- Explain that sex cells (sperm and egg) contain half the number of chromosomes found in normal body cells. When the sperm and egg combine in the process of fertilization the full complement of chromosomes come together in the new organism.
- Define DNA replication as the process by which DNA reproduces, making exact copies of its structure.
- Describe selective breeding as the process of breeding living things that have desirable traits with the goal of producing offspring with certain desirable traits.
- Compare and contrast inbreeding and outbreeding. Describe the benefits and drawbacks of each.
- Define genome as all the genes possessed by an organism.
- Briefly describe the mission of the Human Genome Project.

Assessment

Preliminary Assessment:

The Preliminary Assessment, provided in the Student Masters section, is an assessment tool designed to gain an understanding of students' pre-existing knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

Video Review:

The Video Review, provided in the Student Masters section, can be used as an assessment tool or as a student activity. There are two main parts. The first part contains questions that can be answered during the video. The second series of ten questions consists of a video quiz to be answered at the conclusion of the video.

Post Assessment:

The Post Assessment, provided in the Student Masters section, can be utilized as an assessment tool following completion of the video and student activities. The results of the Post Assessment can be compared against the results of the Preliminary Assessment to evaluate student progress.

Introducing the Video

Before showing the video program to students, ask them if they have any idea what material inside their cells is responsible for the way they look. Ask them how their bodies know how to repair themselves when injured, or what material dictates how tall they grow. To most students these questions will seem somewhat mysterious.

Explain to students that these questions are very complex questions. For centuries scientists have struggled with these questions. In fact, it wasn't until relatively recently, within the past 50 years, that scientists began to get an inkling of what is genetically responsible for controlling these processes. Explain to students that scientists now know that a compound called deoxyribose nucleic acid, or DNA, is the genetic material responsible for the passing on of hereditary material and also for controlling many of the activities in the human body. Tell students to pay close attention to the video to learn how DNA was discovered, and what are some of the characteristics of this amazing compound.

Video Viewing Suggestions

The student Master "Video Review" is provided for distribution to students. You may choose to have your students complete this Master while viewing the program or to do so upon its conclusion.

The program is approximately twenty minutes in length and includes a ten question video quiz. Answers are not provided to the Video Quiz on the video, but are included in this teacher's guide. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.

Video Script: Genetics in Our Lives

1. The corn plants in this field…
2. …the cows seen grazing in this meadow…
3. …the vaccine being administered to this woman,…
4. …as well as these powerful work horses, are all the result of people working with genetics.
5. Everyday we benefit from many advances made in the genetics field.
6. Whether it be the food we eat,…
7. …products we use,…
8. …or even our family pet, genetics plays an important role in our daily lives.
9. During the next few minutes, we are going to explore some of the advances in genetics that help us,…
10. …as well as some of the potential dangers of genetic practices.
11. We will look at some of the history of genetic discoveries.
12. In essence, we will also discuss some of the more recent advances in genetic research.
13. And, we will see how genetics has a profound effect on our lives.
14. **Graphic Transition – Father of Genetics**
15. Gregor Mendel, an Austrian monk, conducted many important experiments with pea plants in the 1860's.
16. His work was some of the earliest, methodical, scientific, and documented research done on heredity.
17. As you probably already know, heredity is the passing on of traits from parents to offspring.
18. Mendel's early work was so important that he is often referred to as the father of genetics.
19. Genetics is the scientific investigation of the process of heredity.
20. Unfortunately, Mendel's work went largely unnoticed for over 30 years, until the beginning of the 20th century.
21. **Graphic Transition – Chromosome Theory**
22. In 1903, a young graduate student by the name of Walter Sutton, built upon Mendel's ideas to develop a new theory of heredity.
23. Sutton knew from Mendel's work that offspring inherit certain traits from their parents.
24. These traits, referred to as genes, are inherited from each parent.
25. By studying the genetic structures of grasshoppers, Sutton proposed that genes are found on structures called chromosomes.
26. A chromosome contains genetic material made up of many, many genes.

Script (cont.)

27. Another scientist, Theodore Boveri, working independently reached the same conclusion.
28. **You Decide!** Where are chromosomes located?
29. Chromosomes are located in the nucleus of every cell in a living thing.
30. Sutton's chromosome theory proposed that genes are passed from parent to offspring as chromosomes.
31. Today, we know that chromosomes seen here in a human cell, control the traits of an organism.
32. **Graphic Transition – Foundations of Genetics**
33. Shortly after Sutton's and Boveri's findings, genetic research and new discoveries increased.
34. In 1910, Thomas Morgan verified Sutton's work.
35. Working with fruit flies, Morgan found that chromosomes are indeed the site of genes, and that genes found on the same chromosome are inherited together. Morgan was the first scientist to actually locate a specific gene in a specific chromosome
36. In 1944, Oswald Avery, Colin Macleod, and Maclyn McCarty theorized that a substance called deoxyribonucleic acid, or DNA for short, was the actual genetic material found in chromosomes.
37. While DNA was not widely accepted as the genetic material; it was confirmed eight years later by Martha Chase and Alfred Hershey.
38. In 1952, a scientist by the name of Edwin Chargoff, identified the proportions of chemical compounds found in DNA.
39. Also in 1952, Rosalind Franklin and Maurice Wilkins actually photographed DNA using x-rays.
40. Rosalind Franklin showed one of these DNA images to the American scientist James Watson.
41. Watson, along with a British biologist, Francis Crick, worked to develop an actual model of the DNA molecule.
42. After developing several prototypes, they developed a model representing the structure of DNA.
43. In 1962, Watson, Crick and Maurice Wilkins, were awarded the Nobel Prize for their discovery.
44. Rosalind Franklin too would have received the award if she had not unfortunately died.
45. **Graphic Transition – DNA**
46. What exactly is DNA? What does it look like?
47. …and what is it made of?

Script (cont.)

48. You Observe! Describe the shape of a DNA molecule.
49. A close look at DNA reveals that it looks kind of like a ladder that has been twisted.
50. Some describe its appearance as similar to a spiral staircase.
51. Scientists call the shape of the DNA molecule a double helix.
52. A close inspection shows that the rungs on the double helix are formed by pairs of substances called nitrogen bases. The DNA ladder may contain hundreds of millions of pairs of nitrogen bases.
53. There are four different types of nitrogen bases in DNA. These bases combine in specific ways.
54. It is the order or sequence of nitrogen bases on a DNA molecule that determine the particular genes on a chromosome.
55. And, it is this sequence that determines the genetic code.
56. Today, scientists are working hard to unravel the mysteries of the genetic code, hoping to understand the cause of many diseases, and the origins of hereditary traits.
57. Graphic Transition – Passing on the Genetic Code
58. As we just mentioned, the genetic code passes on genetic information from one generation to the next.
59. But, how is this genetic information passed on to offspring.
60. This involves one of life's most amazing processes.
61. A sex cell, called sperm from the male parent fertilizes the egg, which is the sex cell from the female parent. This process called fertilization is the event in which a new organism is created.
62. The sperm and egg contain half the number of chromosomes found in normal body cells.
63. You Compute! When the sperm and egg combine, does the new organism have the full number of chromosomes or half?
64. When a sperm and egg combine, the full complement of chromosomes comes together in the new organism.
65. Therefore, you can see how a new organism contains genetic information from each parent.
66. The cells in our bodies are continually reproducing.
67. This is necessary for us to grow,…
68. …repair damaged cells,…
69. …and to carry out normal body functions.
70. The process by which DNA is copied or reproduced is called DNA replication.
71. DNA replication ensures that each new cell in the body receives the same amount and kind of DNA as the original parent cell.

Script (cont.)

72. **Graphic Transition – Selective Breeding**
73. For centuries people have tried to produce desired traits in living things.
74. Selective breeding is the process of breeding living things that have desirable traits with the goal of producing offspring with desirable traits.
75. One method of selective breeding involves crossing animals or plants that have similar traits. In this process, offspring are created with genes that are very similar to the genes of their parents.
76. Labrador retrievers, for example, are selectively bred from parents that have the traits of being strong swimmers enabling them to retrieve game in cold water.
77. Whereas, setters are bred to hunt and point out birds on land.
78. Dairy cows such as these, are often bred to maximize milk production.
79. Outbreeding or hybridization, another selective breeding technique, crosses two genetically different but related species of living things.
80. A hybrid, is a living thing that has two different genes for a particular trait.
81. **You Predict!** What happens when you cross a horse and a donkey?
82. Mules are the result of a cross between a female horse and a male donkey.
83. In some cases, as with mules, hybridization produces healthier, stronger organisms referred to as hybrid vigor.`
84. **Graphic Transition – Genetic Engineering**
85. One of the fastest growing branches of science is genetic engineering.
86. Through genetic engineering scientists are using different methods to actually change the nature of DNA in an organism.
87. There are many benefits of genetic engineering including the production of large volumes of medicine,…
88. … and the creation of beneficial crops. Genetic engineering also poses potential dangers.
89. There are many different techniques utilized in genetic engineering to produce a variety of outcomes.
90. Making recombinant DNA is one such technique.
91. Recombinant DNA is created by inserting a DNA segment, or a gene, from one organism into another organism, such as a bacterium.
92. In creating recombinant DNA, the DNA is usually transferred from a complex organism to a simple organism such as a bacterium or yeast cell.
93. The new piece of combined DNA is called recombinant DNA.
94. Recombinant DNA is used in the production of many medicines including insulin used by diabetics.
95. **Graphic Transition – Aspects of Genetic Engineering**
96. One of the biggest benefits of genetic engineering involves the production of certain vaccines.

Script (cont.)

97. A great deal of genetic engineering research is also being conducted in agriculture.
98. New genetic engineering techniques can make certain plants we depend on for food more resistant to disease,…
99. … or make crops better suited for storage and shipping.
100. Plants that have been altered by adding a gene from a different species are called transgenic organisms.
101. Some types of livestock have been altered as well to produce more meat or better resist certain diseases.
102. In some cases, transgenic microorganisms are used to process sewage, and clean up oil spills.
103. Never before have humans been able to actually alter the genetic code of living things.
104. Many are concerned about the long- term effects on people and the environment that these new genetically altered organisms could have.
105. Graphic Transition – Human Genome
106. You Decide! What is a genome?
107. A genome is all the genes possessed by an organism.
108. It is estimated that the human genome consists of 20,000 to 50,000 genes and more than three billion bases.
109. In 1988, a worldwide effort called the Human Genome Project began the process of sequencing or mapping the entire human genome.
110. To date, a great deal of valuable information has been amassed including identification of specific genes responsible for causing diseases.
111. Scientists are hoping that by sequencing the entire human genetic code, we will be better able to detect, prevent, and treat numerous health problems.
112. Graphic Transition – Summing Up
113. During the past few minutes, we have taken a mere glimpse at some of the fascinating ways genetics effects our lives.
114. We briefly looked at some of the historic milestones in genetic research including…
115. …one of the most important – the development of the DNA model.
116. The basic structure of DNA was discussed, and …
117. …we explored the important process of DNA replication.
118. Some of the different aspects of selective breeding were covered …
119. …and hybridization.
120. A few of the incredible contributions of genetic engineering were highlighted.
121. And, the potential risks of genetic engineering were also mentioned.
122. So, the next time you pet a dog,…
123. …look at a mule,…

Script (cont.)

124. …or hear about new advances in genetic research,…
125. …think about some of the ways genetics effects our lives,…
126. You just might look at your world a little differently.

Fill in the correct word to complete the sentence. Good luck and let us get started.

1. _____is the study of the process of heredity.
2. _____ are rod-shaped structures which contain genetic material.
3. _____ is the genetic material in chromosomes.
4. DNA controls _____ passed from parents to offspring.
5. The shape of DNA is a double _____.
6. A new organism contains genetic material from _____ parents.
7. _____ breeding is the process of breeding things to produce certain traits.
8. A _____ organism has two genetically different genes for a particular trait.
9. _____ DNA is the result of inserting a DNA segment from one organism into another.
10. A _____ is all the genes in an organism.

Answers can be found on page 17.

Student Assessments and Activities

Assessment Masters:

- Preliminary Assessment
- Video Review
- Post Assessment

Student Activity Masters:

- Chromosome Puzzle
- The Double Helix
- Vocabulary of *Genetics in Our Lives*

Answers to Student Assessments

Preliminary Assessment (pgs. 20-21)

1. traits
2. genetics
3. chromosomes
4. DNA
5. helix
6. replication
7. inbred
8. outbreeding
9. transgenic
10. genome
11. true
12. false
13. true
14. false
15. false
16. true
17. true
18. true
19. false
20. false

Video Review (pg. 22)

1. Chromosomes are located in the nucleus of every cell in a living thing.
2. A DNA molecule looks kind of like a ladder that has been twisted. Scientists call it a double helix.
3. When the sperm and egg combine, the full complement of chromosomes come together in the new organism.
4. Mules are the result of a cross between a female horse and a male donkey.
5. A genome is all the genes possessed by an organism.

Video Quiz (p. 22)

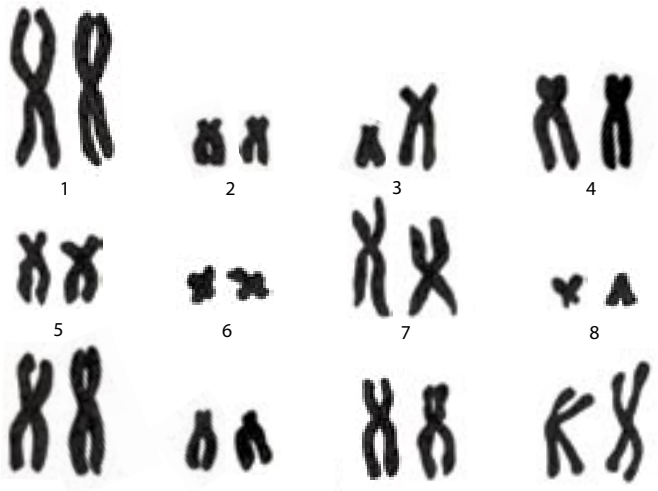
1. genetics
2. chromosomes
3. DNA
4. traits
5. helix
6. both
7. selective
8. hybrid
9. recombinant
10. genome

Post Assessment (pgs. 23-24)

1. chromosomes
2. inbred
3. helix
4. genome
5. traits
6. outbreeding
7. DNA
8. transgenic
9. replication
10. genetics
11. false
12. false
13. true
14. false
15. false
16. true
17. false
18. true
19. true
20. true

Answers to Student Activities

Chromosome Puzzle (pgs. 25-27)

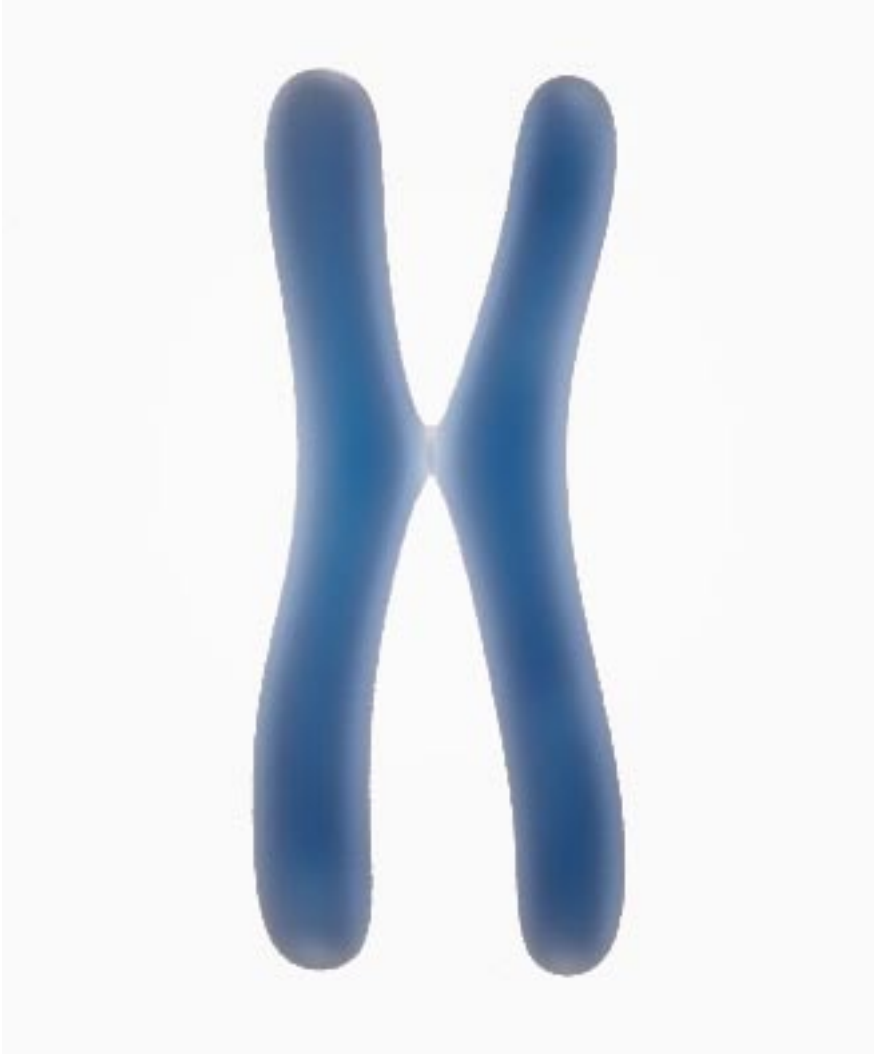


1. There are 46 chromosomes in human body cells.
2. A sex chromosome determines the gender of an individual.
3. There were 24 chromosomes, or 12 pairs of chromosomes.
4. A karyotype is a chart of chromosomes of an organism.
5. Karyotypes are often used to diagnose genetic diseases and abnormalities.
6. The karyotype is a male because it has an x and a y chromosome.
7. A body cell has 46 chromosomes. A sex cell only has 23 chromosomes, half the amount of a body cell.

Vocabulary of *Genetics in Our Lives* (p. 30)

1. h - gene
2. d - chromosone
3. a - deoxyribonucleic acid
4. b - DNA replication
5. j - double helix
6. c - outbreeding
7. e - recombinant DNA
8. f - transgenic
9. i - genetic engineering
10. g - genome

Assessment and Student Activity Masters



Preliminary Assessment

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. Heredity is the passing on of _____ from parents to offspring.

2. _____ is the scientific investigation of the process of heredity.

3. Genes are found on structures called _____.

4. _____ is the abbreviation for deoxyribonucleic acid.

5. The shape of DNA is in the form of a double _____.

6. The process by which DNA is reproduced is called DNA _____.

7. _____ organisms have genes that are very similar to their parents.

8. Crossing a horse and a donkey is an example of _____.

9. A _____ organism has been altered by adding a gene from a different species.

10. A _____ is all the genes possessed by an organism.

transgenic	genome
genetics	traits
replication	inbred
DNA	chromosome
outbreeding	helix

Preliminary Assessment

Directions: Decide whether the statement is true (T) or false (F).

11. Chromosomes are located in the cells of living things. T F

12. Genes are located on the cell membrane. T F

13. DNA is the genetic material that controls traits passed from parent to offspring. T F

14. The shape of DNA is similar to that of a square cube. T F

15. Offspring tend to have only half the number of chromosomes as those in their parents. T F

16. Inbreeding involves crossing plants or animals that have similar traits. T F

17. A drawback of inbreeding is that organisms may be more susceptible to certain diseases or physical problems. T F

18. Recombinant DNA is created by inserting a DNA segment from one organism into another organism. T F

19. Genetically altered organisms are always beneficial. T F

20. The human genome possesses about 200 genes. T F

Video Review

Directions: During the course of the program, answer the questions as they are presented in the video. At the end of the video, answer the Video Quiz questions.

You Decide!

1. Where are chromosomes located?

You Observe!

2. Describe the shape of a DNA molecule.

You Compute!

3. When the sperm and egg combine, does the new organism have the full number of chromosomes or half?

You Predict!

4. What happens when you cross a horse and a donkey?

You Decide!

5. What is a genome?

Video Quiz:

1. _____ is the study of the process of heredity.
2. _____ are rod-shaped structures which contain genetic material.
3. _____ is the genetic material in chromosomes.
4. DNA controls _____ passed from parents to offspring.
5. The shape of DNA is a double _____.
6. A new organism contains genetic material from _____ parents.
7. _____ breeding is the process of breeding things to produce certain traits.
8. A _____ organism has two genetically different genes for a particular trait.
9. _____ DNA is the result of inserting a DNA segment from one organism into another.
10. A _____ is all the genes in an organism.

Post Assessment

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. Genes are found on structures called _____.

2. _____ organisms have genes that are very similar to their parents.

3. The shape of DNA is in the form of a double _____.

4. A _____ is all the genes possessed by an organism.

5. Heredity is the passing on of _____ from parents to offspring.

6. Crossing a horse and a donkey is an example of _____.

7. _____ is the abbreviation for deoxyribonucleic acid.

8. A _____ organism has been altered by adding a gene from a different species.

9. The process by which DNA is reproduced is called DNA _____.

10. _____ is the scientific investigation of the process of heredity.

genome
DNA
traits
inbred
helix

genetic
chromosomes
replication
outbreeding
transgenic

Post Assessment

Directions: Decide whether the statement is true (T) or false (F).

11. The human genome possesses about 200 genes. T F

12. Offspring tend to have only half the number of chromosomes as those in their parents. T F

13. A drawback of inbreeding is that organisms may be more susceptible to certain diseases or physical problems. T F

14. Genetically altered organisms are always beneficial. T F

15. Genes are located on the cell membrane. T F

16. Recombinant DNA is created by inserting a DNA segment from one organism into another organism. T F

17. The shape of DNA is similar to that of a square cube. T F

18. DNA is the genetic material that controls traits passed from parent to offspring. T F

19. Inbreeding involves crossing plants or animals that have similar traits. T F

20. Chromosomes are located in the cells of living things. T F

Chromosome Puzzle

Background: The cells in your skin, bones, and muscles all have the same number of chromosomes. Do you know what that number is? We have 46 chromosomes. Each chromosome has a "twin", making for 23 pairs of chromosomes. They consist of 22 pairs of autosomes and one pair of sex chromosomes. The sex chromosomes determine gender - male or female. A male has an x chromosome and a y chromosome. A female has two x chromosomes. As you probably already know, chromosomes contain genes which in turn are made up of the genetic material DNA.

Geneticists, physicians, and other scientists sometimes create a chart called a karyotype to study the chromosomal makeup of an organism. This tool is sometimes used to identify genetic diseases, or other genetic abnormalities. In this activity you will construct part of a human karyotype. To do this, you will need to match up pairs of homologous chromosomes. Make sure to answer the questions after you are done completing the task.

Materials: scissors, glue, chromosome puzzle, piece of paper

Directions:

1. The following page titled "Chromosome Puzzle" is a diagram which contains over half of the chromosomes found in a human body cell. A human body cell contains 46 chromosomes, or 23 pairs of chromosomes.

2. Obtain a pair of scissors from your teacher. Cut a square shape or rectangular shape around each chromosome. Leave a margin about the width of a pencil around each one.

3. Once you have cut out the chromosomes, try to match up similar chromosome pairs. Remember that body cells have pairs of chromosomes. While pairs may not look exactly alike, group them based on size and length.

4. After you have matched chromosome pairs, you are ready to glue them to the piece of paper. Starting with the largest chromosomes, glue each pair to the paper. You have just created a partial human karyotype.

5. Answer the following questions using the karyotype and your knowledge of genetics.

Name _____

Chromosome Puzzle Cont.

Chromosome Puzzle Cont.

Directions: Answer the following questions.

1. How many chromosomes are found in human body cells?

2. What is a sex chromosome?

3. In the karyotype you worked with, how many chromosomes were there?

4. What is a karyotype?

5. Why might a geneticist or physician use a karyotype?

6. Does the karyotype you worked with belong to a male or female, and how do you know?

7. What is the difference between a body cell and a sex cell in terms of number of chromosomes?

The Double Helix

Background: Many regard the discovery of DNA (deoxyribonucleic acid) as one of the most important biological discoveries of the twentieth century. Many scientists over several decades contributed to the understanding of the composition and structure of DNA. In the early 1950's Rosalind Franklin and Maurice Wilkins took an x-ray image of DNA. This image prompted James Watson and Francis Crick to develop the actual model of the DNA molecule.

DNA is the compound responsible for carrying the hereditary information. A close-up of DNA has the appearance of a twisted ladder. This shape is called a double helix. A molecule of DNA may contain as many as 200,000 nucleotides. A nucleotide is made up of molecules of the sugar deoxyribose, as well as a phosphate group, and nitrogen bases. In this activity you will work with these components to make your own DNA double helix model.

Materials: templates of DNA components, colored pencils, tape, string, one piece construction paper, and scissors.

1. The sides of the molecule of the double helix are composed of alternating units of deoxyribose sugar and phosphate. The internal building blocks of the molecule form the "rungs of the ladder" and are attached to the sides. These "rungs" are made from different types of bases: adenine, thymine, guanine, and cytosine. These are symbolized by the letters A, T, G, and C.

2. Obtain a pair of scissors from you teacher. Carefully cut out the templates of all the nucleotides on the following page.

3. With your colored pencils, color all the phosphate groups the same color.

4. Next, color all the deoxyribose sugar groups the same color as each other.

5. Choose a different color for each of the four different bases, and color all of them.

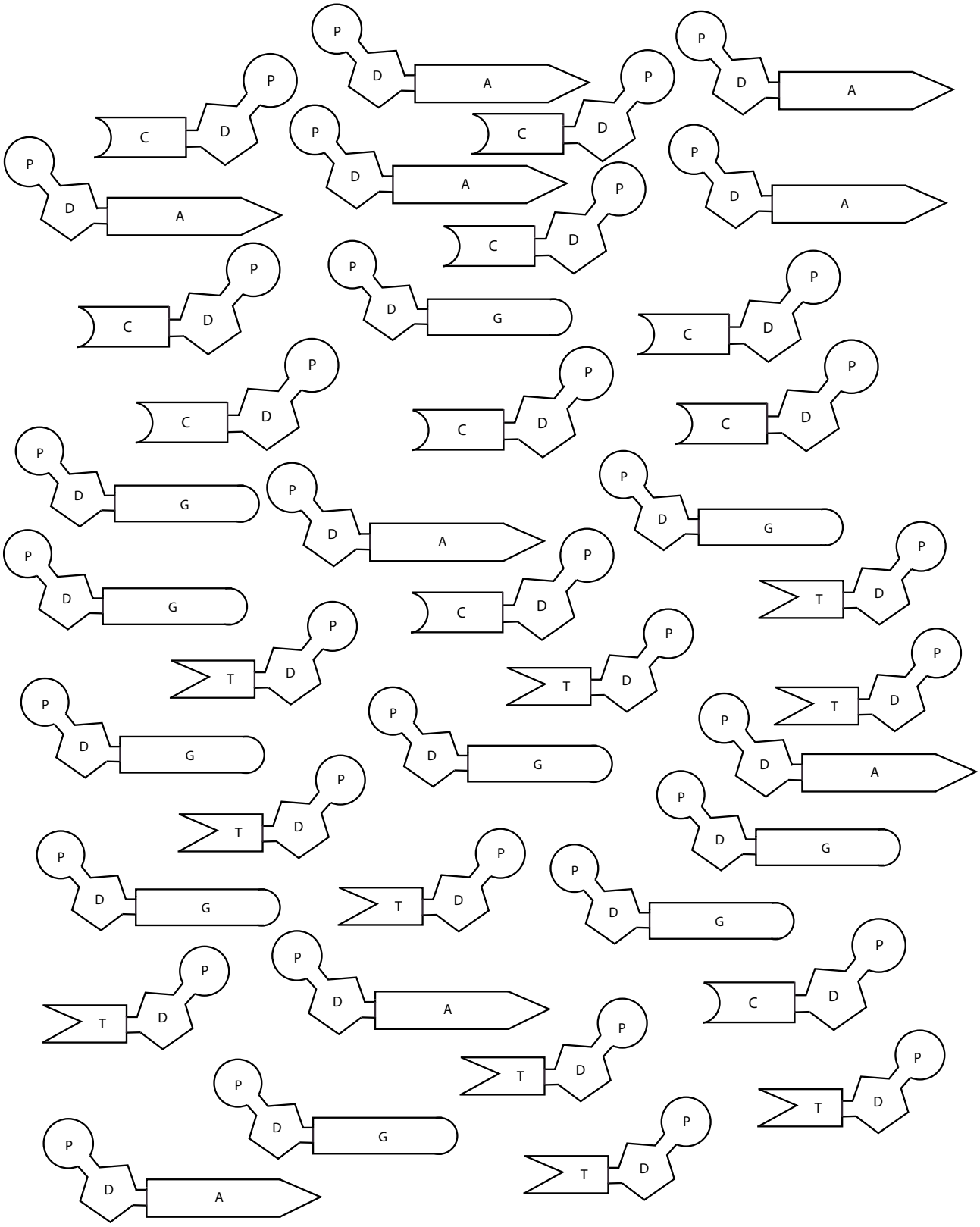
6. Now it is time to start putting the pieces of the DNA molecule together. In doing this you must keep some simple rules in mind. Adenine and thymine can only bond together. Guanine and cytosine can only bond together. Using clear tape begin putting your bases together.

7. After you have assembled all your bases, you are now ready to connect the rungs on the ladder with tape. Tape a phosphate group to the deoxyribose sugar on the adjacent nucleotide.

8. To complete your DNA model, give it a slight twist to give it the form of a double helix. If you want to suspend it, tie a string to the top and hang it from the ceiling.

Name _____

The Double Helix Cont.



Name _____

Vocabulary of Genetics in Our Lives

Directions: Unscramble the vocabulary words in the first column. Match the words to the definitions in the second column.

____ 1. eeng _____

____ 2. rmcosemooh _____

____ 3. oxueoynldrbcciie daic _____ _____

____ 4. AND ieianprtocl _____ _____

____ 5. bdloeu xhiel _____ _____

____ 6. terogeidnbu _____

____ 7. toeiarcmbnn NDA _____ _____

____ 8. sctgreainn _____

____ 9. eeicgtn ggieienenrn _____ _____

____ 10. meoeng _____

a. The genetic material that controls traits passed from parents to offspring.

b. The process by which DNA is reproduced or copied.

c. Involves crossing two genetically different but related species.

d. Structures located in cells containing genes.

e. DNA created by inserting a DNA segment from one organism into another.

f. A living thing that has been altered by adding a gene from a different species.

g. All the genes possessed by an organism.

h. The basic unit of heredity.

i. The science of using different methods to change the nature of DNA in organisms.

j. General shape of a DNA molecule.