

HUMAN SCIENCE Lesson Plan

Day 1: Genes or Jeans: do they make me look fat?



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
 - 3.a Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and the mode of inheritance (autosomal or x-linked, dominant or recessive).

PREPARE

1. Background Background knowledge to engage the content

What is Huntington's disease?

Huntington's disease (HD) results from genetically programmed degeneration of brain cells, called neurons, in certain areas of the brain. This degeneration causes uncontrolled movements, loss of intellectual faculties, and emotional disturbance. HD is a familial disease, passed from parent to child through a mutation in the normal gene. Each child of an HD parent has a 50-50 chance of inheriting the HD gene. If a child does not inherit the HD gene, he or she will not develop the disease and cannot pass it to subsequent generations. A person who inherits the HD gene will sooner or later develop the disease. Whether one child inherits the gene has no bearing on whether others will or will not inherit the gene.

Some early symptoms of HD are mood swings, depression, irritability or trouble driving, learning new things, remembering a fact, or making a decision. As the disease progresses, concentration on intellectual tasks becomes increasingly difficult and the patient may have difficulty feeding himself or herself and swallowing. The rate of disease progression and the age of onset vary from person to person.

A genetic test, coupled with a complete medical history and neurological and laboratory tests, helps physicians diagnose HD. Presymptomatic testing is available for individuals who are at risk for carrying the HD gene. In 1 to 3 percent of individuals with HD, no family history of HD can be found.

2. Word Wall

vocabulary words to teach and add to the Word Wall.

Degeneration:	Gradual deterioration of specific tissues, cells, or organs with corresponding impairment or loss of function, caused by injury, disease, or aging.
Dominate	A trait that is visible in a heterozygous organism.
Alleles:	One of two or more possible forms of a gene, each affecting the heredity trait somewhat differently.
Recessive:	A term used to describe an alleles or trait that is masked by a dominant allele or trait.
X-linked trait	A trait that is determined by a gene carried on the X Chromosome.
Genotypes:	The genetic make-up of an organism.
Phenotypes:	The expression of a genotype in the appearance or function of a of an organism, the observable trait.
Probability:	The membrane at the boundary of every cell that serves as a selective barrier to the passage of ions and molecules.

READ

3. View

Article:

Go to:	Huntington's Disease Society of America
Search:	Living With Huntington's Disease—Research and Advocacy
Locate:	We've Got the Gene, So What Does it Mean?
Read:	As a class

Article/Video

Go to:	www.pbs.org
Search:	Huntington's Disease
Locate:	Our Gene's Our Choice Making Better Babies: Genetics and Reproduction
Article:	Read and discuss the article as a class
Link:	Located at the bottom of the screen click on the link: Watch Video Highlights

RESPOND

4. Visual Process.

There is no visual process today.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

You Be The Judge Poster

Go to: www.pbs.org

Search: Huntington's Disease

Locate: Our Gene's Our Choice

Making Better Babies: Genetics and Reproduction

- Print the article for your class;
- Put students in groups and have each group choose a case study to respond to then answer the following questions;
 - Should genetic testing be a standard of care when choosing to have a child?
 - What role should genetic testing play in people's lives?
 - What are the positive and negatives of genetic testing in your case study?
 - What ethical dilemmas should doctors and patients face when deciding to undergo genetic testing?
- Have students create a poster that depicts their case study and their findings;
- Once completed have them share their responses with the class.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- Huntington's disease is one of many diseases that can be traced through family history and genetic testing. Should all people with such diseases be tested?
- What are the benefits to an individual or family to have genetic testing?
- What additional stipulations, if any, should be placed on genetic testing?
- Do you think there are any long term negative effects to testing? Explain.

EXTEND

7. Write, Draw or Speak.

Science Journal:

Think of the ethical issues that surround genetic testing. Do you agree or disagree with the ability to do testing on individuals and parents? Write 1-2 paragraphs that support your opinion.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

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Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 2: Genes or Jeans: Do they make me look fat?



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
- 3.a Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and the mode of inheritance (autosomal or x-linked, dominant or recessive).

PREPARE

1. Background Background knowledge to engage the content

How do you determine a person's probability of getting a disease?

Probability is the chance or possibility that a specific event will occur.

In order to find the probability of a specific genetic traits happening a Punnett Square is used. This is a simple graphical way of discovering all of the potential combinations of genotypes that can occur in children, given the genotypes of their parents. It also shows us the odds of each of the offspring genotypes occurring.

Once you have all of the possible combinations you can determine the likelihood of a child being born with a specific trait. Punnett Squares can be used in farming, to breed stronger disease resistant plants, in breeding of animals to breed in or out certain traits, and to test for the possibility that a person will have a genetic disorder or trait.

2. Word Wall vocabulary words to teach and add to the Word Wall.

There are no new word wall words today. Review the words from Day 1.

Degeneration:	Gradual deterioration of specific tissues, cells, or organs with corresponding impairment or loss of function, caused by injury, disease, or aging.
Dominate	A trait that is visible in a heterozygous organism.
Alleles:	One of two or more possible forms of a gene, each affecting the heredity trait somewhat differently.
Recessive:	A term used to describe an alleles or trait that is masked by a dominant allele or trait.
X-linked trait	A trait that is determined by a gene carried on the X Chromosome.
Genotypes:	The genetic make-up of an organism.
Phenotypes:	The expression of a genotype in the appearance or function of a of an organism, the observable trait.
Probability:	The membrane at the boundary of every cell that serves as a selective barrier to the passage of ions and molecules.

READ

3. View

Interactive Article:

Go to: www.PBS.com

Search: Huntington's Disease

Locate: Bloodlines; Technology Hits Home; Making Precedent: Do you have a duty to warn?

This is an interactive article that you and your students can do together. Or you can have students work through it individually.

RESPOND

4. Visual Process.

Your Duty or Not Your Duty:

- Based on the interactive article have students create a poster or collage depicting their final results. Use pictures, words, and phrases to support their opinion. . .is it their duty to warn or not?

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Probability—what are the odds?

You will need pennies for each student or for each group of students.

- **Probability** - is the chance or possibility that a specific event will occur.

Class discussion:

If you flip a coin it will come up either heads or tails. What are the chances it will come up heads?

Answer: Since there are 2 sides to a coin (heads and tails), there is one chance out of two that the coin will come up heads. We can state this probability as a fraction (1/2) or as a percent (50%) or even as a ratio(50:50).

Activity: Either individually or in groups of two have students complete the following activity. Students should chart their results. And answer the following questions. (table is attached)

- Flip a coin 10 times, keep track of how many heads and tails you get.
- Make sure they add up to 10.
- How close did you get to a 50% chance of heads (5/10) and a 50% chance of tails (5/10)?
- Now try it with 50 tosses of the coin.
- Keep track of the number of heads and tails. Are you closer to a 50:50 ratio of heads:tails?
- Try it one more time with 100 tosses. How does your ratio look now?
- Based on the different number of coin tosses what can you determine about the number of tosses versus the final result? (Answer: *With a larger sample size, we get closer to the most accurate probability. Each individual toss is a separate entity and is not influenced by any earlier tosses.*)

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- What is the probability that a baby will be born male? What about female? Explain?
- If I have five boys do those previous births have any effect on the sex of my next child? Why or why not? (hint: think about today's activity)
- How can determining the probability of an event help determine the genetic traits of a child?
- Based on the results of this activity can you use probability to tell for certain what the final outcome of a birth will be? Why or why not?

EXTEND

7. Write, Draw or Speak.

Science Journal:

How do you think the probability chart can help determine genetic traits? Discuss with your group and list 3-5 items.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

Coin Toss Table (10, 50, 100 Tosses)

Toss Number	Heads	Tails
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2		
3		
4		
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9		
10		
Result		

Toss Number	Heads	Tails
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50 Toss Number	Heads	Tails
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Result		
Toss Number	Heads	Tails
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Result		

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

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Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 3: Genes or Jeans: Do they make me look fat?



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
- 3.a Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and the mode of inheritance (autosomal or x-linked, dominant or recessive).

PREPARE

1. Background Background knowledge to engage the content

What is a Punnett Square?

A Punnett Square is a chart that provides a means of predicting all the possible outcomes for combining genes in a cross between parents whose genes are known.

The results of the Punnett Square can be written as a ratio, fraction, or decimal.

Reginald C. Punnett, a British mathematician/biologist who worked at the University of Cambridge during the last century, designed the Punnett Square. During his time as a geneticist, Punnett focused much of his work on sex linkage and sexual determination via phenotypic observation. Simply stated, R.C. Punnett worked towards determining if certain observable characteristics originated from sex chromosomes.

2. Word Wall vocabulary words to teach and add to the Word Wall.

There are no new word wall words today. Review the words from Day 1 and 2.

Degeneration:	Gradual deterioration of specific tissues, cells, or organs with corresponding impairment or loss of function, caused by injury, disease, or aging.
Dominate	A trait that is visible in a heterozygous organism.
Alleles:	One of two or more possible forms of a gene, each affecting the heredity trait somewhat differently.
Recessive:	A term used to describe an alleles or trait that is masked by a dominant allele or trait.
X-linked trait	A trait that is determined by a gene carried on the X Chromosome.
Genotypes:	The genetic make-up of an organism.
Phenotypes:	The expression of a genotype in the appearance or function of a of an organism, the observable trait.
Probability:	The membrane at the boundary of every cell that serves as a selective barrier to the passage of ions and molecules.

READ

3. View

Video

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Punnett Square

Locate: Gregor Mendel's Rules of Heredity: Using Punnett Squares (approximate run time 5:04)

There is additional video support on Punnett Squares you may wish to choose from.

RESPOND

4. Visual Process.

There is no visual process for today.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Punnett Square: (see attached)

Have students create Punnett Squares. If you need additional support material visit:

http://anthro.palomar.edu/mendel/mendel_2.htm

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- How can Punnett Squares help determine traits in a child? How is this information beneficial to the parents?
- What other disciplines can benefit from the use of Punnett Squares? Why?
- If you wanted to “breed out” a specific trait how can you use the Punnett Square to assist you?

EXTEND

7. Write, Draw or Speak.

Group Discussion:

With your group discuss the benefits and drawbacks of using Punnett Squares.

Create a small collage that lists the different disciplines Punnett Squares can aid in.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

Punnett Square Practice:

Answer the following questions by filling in the Punnett Square. Give reasons for your answers. The first one has been done for you.

- One cat carries heterozygous, long-haired traits (Ss), and its mate carries homozygous short-haired traits (ss). Use a Punnett square to determine the probability of one of their offspring having long hair.

	S	s
s	Ss	ss
s	Ss	ss

Answer: 50% the gene for a long hair is dominant 2 of the 4 squares show the S gene as the dominant gene.

- One cat carries homozygous, short-haired traits (ss), and its mate carries homozygous short-haired traits (ss). Use a Punnett square to determine the probability of one of their offspring having long hair.

(Explanation)

- One flower is heterozygous red (Rr) and it is crossed with a homozygous white (rr) plant. Use a Punnett square to determine the probability of one of their offspring having a white color.

(Explanation)

- One parent is heterozygous Brown eye (Bb) and it is crossed with a homozygous Blue eye (bb) mate. Use a Punnett square to determine the probability of one of their offspring having brown eyes? Explain. What is the probability of their offspring having blue eyes? Explain.

(Explanation)

(Explanation)

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

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Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 1: Law of Segregation



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
- 3.b Students know the genetic basis for Mendel's laws of segregation and independent assortment.

PREPARE

1. Background Background knowledge to engage the content

Who is Mendel? What was his contribution to science?

Gregor Johann Mendel (July 20, 1822 – January 6, 1884) was an [Austrian monk](#) whose studies of the inheritance of traits in [pea](#) plants helped to lay the foundation for the later development of the field of genetics. He is often called the "father of genetics." His studies showed that there was particulate inheritance of traits according to basic laws of inheritance.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Characteristic:	A feature that helps to identify, tell apart, or describe recognizably; a distinguishing mark or trait
Dominate:	A trait that is visible in a heterozygous organism
Recessive:	A term used to describe an allele or trait that is masked by a dominant allele or trait
Allele:	One of two or more possible forms of a gene, each affecting the heredity trait somewhat differently.
Segregate:	To separate

READ

3. View

Article

Go to: www.PBS.org

Search: Mendel

Locate: What Darwin Didn't Know: Gregor Mendel and the Mechanism of Heredity

Read: As a class

Video

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Mendel

Locate: Understanding Genetics (View segments 1, 2, 6—approximate run time 13:00)

Segment 1—Background of the Science of Genetics (02:25)

Segment 2—The Genetic Work of Gregor Mendel (04:31)

Segment 3—Chromosomes and the Work of Gregor Mendel (06:06)

RESPOND

4. Visual Process.

Animal and Plant Traits:

Think about traits that would be beneficial for plants and animals to have (example—being disease resistant.) Create a three column chart.

- Create a chart or list of traits and the reasons those traits would be beneficial. (column one and two)
- For each trait what are the negative consequences of breeding that specific trait? (column three)

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Activity Name:

There is no activity in today's lesson.

6. Discussion

Ask discussion questions that engage at many levels

Key Questions

- If a gene has a dominant trait will that trait automatically present itself? Explain.
- How is/was mathematics important in Mendel's experiments and the explanation of his results.
- How does Mendel's law of segregation apply to a cell in meiosis?
- How did Mendel's work contribute to the field of science?

EXTEND

7. Write, Draw or Speak.

Science Journal

Think of Gregor Mendel and the things he contributed to science. How would your life be different today if he did not make the discovery's he made. Think about your food supply and the ability to predict genetic outcomes as you answer.

8. Close

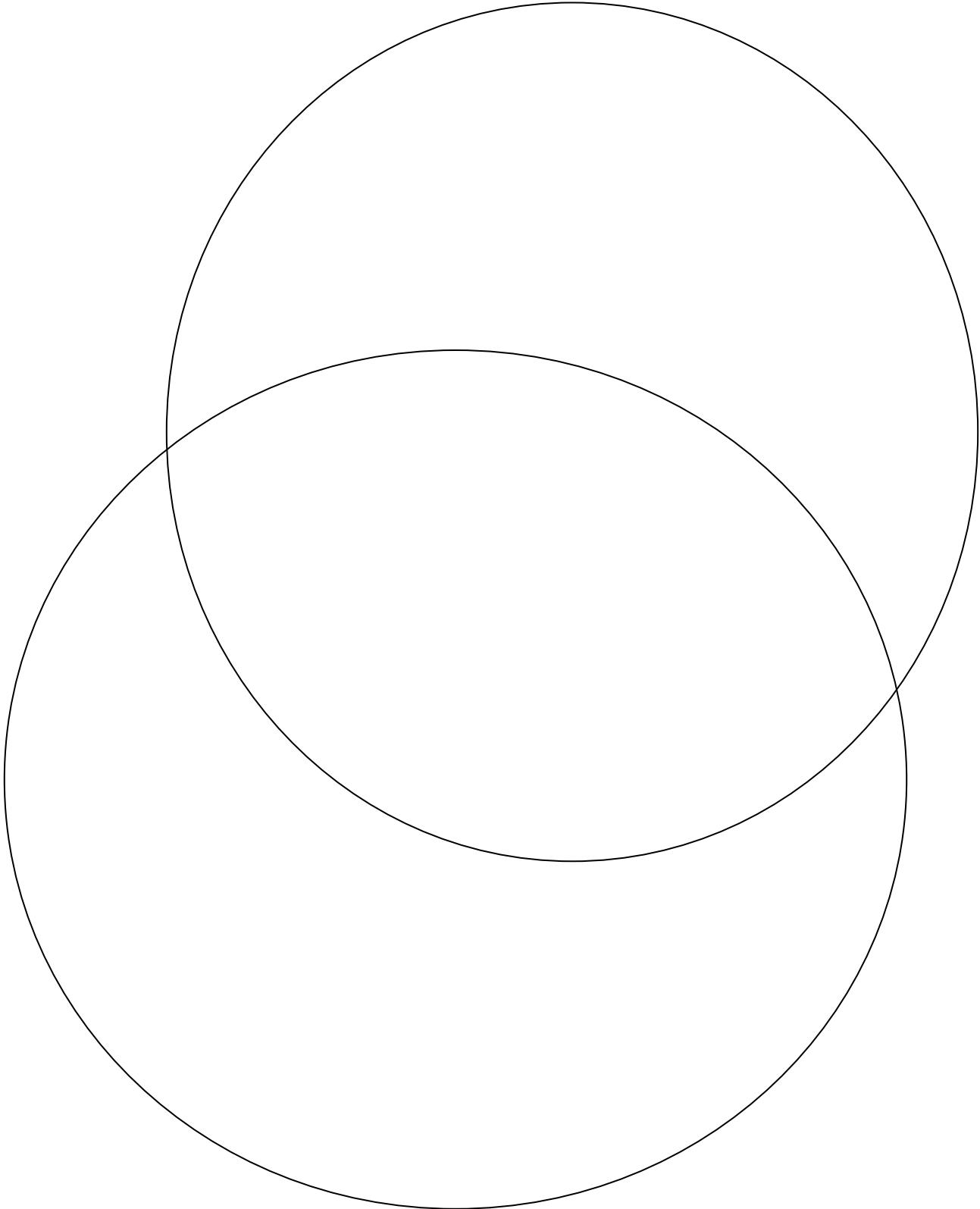
Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

6g6 Venn Diagram Chart



HUMAN SCIENCE Video Notes



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Note taking tips: (Cornell Notes)

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HUMAN SCIENCE Lesson Plan

Day 2: To segregate, or not segregate, that is the question



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
 - 3.b Students know the genetic basis for Mendel's laws of segregation and independent assortment.

PREPARE

1. Background Background knowledge to engage the content

What is random segregation or the law of segregation?

When an egg is fertilized the sperm and the egg each carry one trait or factor for each inherited trait. (example: the father gives one trait for eye color and the mother gives one trait for eye color.)

The separation of traits from the parent cell is random and Mendel referred to it as random segregation or the law of separation.

What is Mendel's Law of Independent Assortment?

- Every pair of factors separates independently. (this is a random process and no one factor's separation has an impact on the other.)
- All possible combinations of factors can occur in gametes. (every possible combination should be considered.)

2. Word Wall vocabulary words to teach and add to the Word Wall.

Inherit: To receive (a characteristic) from one's parents by genetic transmission

READ

3. View

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Independent Assortment

Locate: Biologix: Chromosomal Basis of Inheritance
(approximate run time 29:00)

RESPOND

4. Visual Process.

There will be no visual process in today's lesson.

EXPLORE

5. Activity Explore more deeply with a visual or oral language activity.

Mendel's Laws

Mendel's laws are the basis for understanding genetics and how chromosomes function in real life. Gregor Mendel was the son of a farming couple. Most of Mendel's observations were done on plants, as were his experiments. Mendel's observations and experiments are the foundation for some of the laws that applied to genetics today. One of those laws is called the Law of Independent Assortment. Mendel discovered this law through his [work](#) on pea pods and cross breeding.

The Law of Independent Assortment States that:

- Every pair of factors separates independently. (this is a random process and no one factor's separation has an impact on the other.)
- All possible combinations of factors can occur in gametes. (every possible combination should be considered.)

Activity:

- Discuss the Law of Independent Assortment with your students.
- Make sure that they understand what it means and how it applies.

Students Should Have:

- A blank piece of paper and a pencil.
- Draw a circle at the top of the paper.
- Draw two circles below the first one. Place an arrow going from the top circle to each of the ones below it.
- Repeat this action for both of the circles that they just drew and again for those.
- Students should have a total of 15 circles in a pyramid style pattern.
- Ask students to consider one of Mendel's experiments, the combination of a green pod with yellow seeds and a yellow pod with green seeds.
- Instruct students to draw and label homologues as Green pod GG, Yellow seed YY, Yellow pod gg and Green seed yy. You can refer to: www.discoveryeducation.com (**Subscription Based Website**)
Search: Mendel's Experiment on Pea Plants
View: Gregor Mendel's Research (powerpoint)

--Or

Gregor Mendel's Research on Pea Plants and his Development of Theory (approximate run time 08:23)

- Tell students to map out all the possible results using the circles they have drawn.
- Discuss the results of the paper with your students
- Remind your students that the capital letters show dominant traits and ask students to decide what the most likely outcome of this combination is if all the plants were created using true breeding.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- How did Gregor Mendel's background help his experiments?
- What affects, if any, do you think Mendel's work had on farming during his time and do you think he is still having an impact today?
- In what way can you apply his research to your family?
- What value does the study of genetics have on your life and the community around you? Why?
- What changes can you make in your life based on knowing your families genetic history? Why is this important?
- Is there an ethical standard that should be met when researching genetics? What do you think it should be? Why?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Based on today's activity determine all of the possible outcomes using the traits they were given. Explain your results.

Draw the possible outcomes in your journal.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day.

They should fill in the chart with one change and one habit per day.

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<i>Change I can make</i>	
<i>Habit I can build</i>	

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Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 1: Are you a mutt?



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
 - 3.c. Students know how to predict the probable mode of inheritance from a pedigree diagram showing phenotypes.

PREPARE

1. Background Background knowledge to engage the content

What does pedigree mean? How is a pedigree chart used in determining inheritance?

Pedigree is a chart used to determine a person's lineage. It can be used to trace your country of origin or used in genetics to analyze inheritance of certain traits, especially diseases that may be hereditary.

A pedigree chart is a diagram that shows the occurrence and appearance or phenotypes of a particular gene or organism and its ancestors from one generation to the next, it is most commonly used for humans, show dogs, and race horses. To determine the strengths and potential illnesses (health issues) a person or animal may have.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Pedigree:	The ability to determine a person's, plant, or animals lineage—used to study the inheritance of certain traits.
Characteristic:	A feature that helps to identify, tell apart, or describe recognizably; a distinguishing mark or trait
Dominant:	A trait that is visible in a heterozygous organism
Recessive:	A term used to describe an allele or trait that is masked by a dominant allele or trait
Allele:	One of two or more possible forms of a gene, each affecting the heredity trait somewhat differently.
Segregate:	To separate
Phenotype:	The expression of a genotype in the appearance or function of an organism.
Predict:	To declare or tell in advance; prophesy; foretell.

READ

3. View

Article:

Go to: www.discoveryeducation.com (Subscription Based Website)

Search: Pedigree Chart

Locate: Encyclopedia Article; Genealogy

Read: As a class

Video:

Go to: www.dicovereducation.com (Subscription Based Website)

Search: Pedigree Charts

Locate: Biologix: Sex Linked Inheritance (approximate run time 29:00)

You can show the entire film to your students to support the standard or show segment: 7 and 8 (approximate run time 08:00)

RESPOND

4. Visual Process.

No visual process in today's lesson.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Family Pedigree:

- Have students research their family history—**this is a private activity and should not be shared with the class.**
- You are to research and construct a family tree that records medical background.
- Determining which medical conditions are hereditary in your family, make a code for each condition. (e.g. 1=heart disease, 2=diabetes, etc.)
- Keep this code on a separate sheet of paper.
- Construct a family pedigree.
- On a separate sheet of paper, make a chart summarizing your findings.
- Include in this chart, average age at death and major causes of death (using codes) for both your maternal and paternal sides of the family.
- For the four most common health issues in your family, determine the inheritance pattern for each one.
- Support your decision as to type of inheritance. From this medical history, draw any conclusions that you can on how this might affect your life span and quality of health.

When Milk Makes You Sick:

Go to: www.PBS.org

Search: Pedigree Chart

Locate: Evolution: When Milk Makes You Sick

This is an on-line web lab/activity. This can be done as a class or as an individual project for a student.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- Based on the findings from your family pedigree what can you do now to prevent certain traits from occurring?
- Does this information help you make better informed decisions about your health and your personal choices? Why or why not?
- Can you control certain outcomes based on your pedigree chart? What? How?
- What resources are available to you to gather more information based on your findings?
- What kind of action can you take now that will benefit you, your family, or your siblings in regard to this information?

EXTEND

7. Write, Draw or Speak.

Note What You Have Learned:

In your science journal note the following:

- Today's topic;
- Draw the main idea, key words, or questions you may have;
- Write three things you learned?

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

- *Change I can make = decreasing bad habits and bad choices;*
- *Habit I can build = Increasing healthy habits and choices*

<i>Change I can make</i>	
Habit I can build	

HUMAN SCIENCE Video Notes



Name:

Part I:

Note taking tips: (Cornell Notes)

- Write important details from the video, segment, article, or passage in the second column;
- After you write your notes, return to the first column and add phrases, words and questions related to the details. A sketch or picture may also be helpful.

Title:

Date:

Column 1: Phrases, words, questions or a sketch related to the details in column 2.	Column 2: Important Details

Part II:

Note taking tips: (Cornell Notes)

- Summarize the video, article, or passage in the space below. Use your own words.

HUMAN SCIENCE Lesson Plan

Day 1: Mutant Ninja Genes



Outcomes for Today

3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:
- 3.d Students know how to use data on frequency of recombination at meiosis to estimate genetic distance between loci and to interpret genetic maps of chromosomes.

PREPARE

1. Background Background knowledge to engage the content

What is melanoma?

Melanoma is a form of cancer that begins in melanocytes (cells that make the pigment melanin). It may begin in a mole (skin melanoma), but can also begin in other pigmented tissues, such as in the eye or in the intestines.

There are two types of tumors benign or malignant.

Benign tumors are not cancer; they are rarely life threatening, and be removed, and do not spread to other parts of the body.

Malignant tumors are cancer. They are more serious and can be life threatening. They can normally be removed but often can and will grow back. Cells from malignant tumors can invade and damage nearby tissues and organs. They can travel to other parts of the body through the bloodstream.

Melanoma and other cancers begin in the cells. Cells are the building blocks that make up tissue. Tissue make up the organs in the body. Normally, cells grow and divide to form new cells as the body needs them. When cells grow old, they die, and a new cell takes their place.

If something in the cells division process goes wrong new cells can form when the body does not need them or old cells do not die when they should. These extra cells can form a mass called a growth or tumor. Not all tumors are cancer.

2. Word Wall vocabulary words to teach and add to the Word Wall.

Mutation:	A chemical change in a gene, resulting in a new allele; a change in the portion of a chromosome that regulates the gene. A change in heredity.
Crossing Over:	The breakage and exchange of corresponding segments of chromosome pairs at one or more sites along their length, resulting in genetic recombination.
Heredity:	The transmission of such qualities from ancestor to descendant through the genes

READ

3. View

Video

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Crossing over
Locate: Biologix: Meiosis and Gamete Formation
View: Segment 6; Non Disjunction (3:03)
Segment 8; Increasing the Genetic Variability (2:19)
Segment 9; Producing Variations in the Genetic Material Within a Population (2:01)

Video:

Go to: www.discoveryeducation.com (Subscription Based Website)
Search: Crossing over
Locate: Morgan's Discovery's About Gene Linkage (6:51)

Images:

Go to: <http://www.cancer.gov/cancertopics/wyntk/melanoma/page8>
Search: Melanoma
Locate: Signs and symptoms. This page not only gives descriptions of melanoma it gives visual images so students can see what they look like.

RESPOND

4. Visual Process.

Venn Diagram:

Compare and contrast the differences between normal cell division (meiosis) and a cell that has genes cross over.

EXPLORE

5. Activity

Explore more deeply with a visual or oral language activity.

Recombination

Have students diagram, sketch, or use whatever medium you choose to depict a chromosome as cells cross over. Once you have the steps completed describe each step in 1-2 sentences.

6. Discussion Ask discussion questions that engage at many levels

Key Questions

- What are some advantages of sexual reproduction?
- What is natural selection? How does it help a species?
- Why is variability important in crossing over?
- What happens if a cell does not cross over correctly?
- What are some factors that increase the risk factors of a chromosome disorder? What are some ways they can be prevented?
- How is the crossing over stage of meiosis linked to things like cancer and other genetic disorders?
- Some genetic disorders can be tested when a fetus is in the womb. There is a possibility that the test may give you a false positive. Do you think family's should make decisions for their child based on a possibility of a genetic disorder when the test may be wrong?

EXTEND

7. Write, Draw or Speak.

Science Journal:

Based on today's lesson write 2-3 reasons recombination is necessary to a species during crossing over. What are the benefits to the population? What are potential negatives? Be as specific as possible.

8. Close Close by extending today's lesson to what you can do in your life and the world.

Students should complete the chart below based on their learning from the day. They should fill in the chart with one change and one habit per day.

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6g6 Venn Diagram Chart

