



Close reading plan

"Identical Twins' Genes Are Not Identical" by Anne Casselman

Corey Nagle, 2014 Connecticut Dream Team Teacher

What makes this text complex?			
Text and Author	"Identical Twins' Genes Are Not Identical" Anne Casselman	Where to Access Text	http://www.scientificamerican.com/article/identical-twins-genes-are-not-identical/
Text Description			
This text is a non-fiction magazine article that catches students' attention by addressing the genetic basis for similarities in twins. After setting up the traditional belief about the genes (DNA) of identical twins, the article introduces new thinking and evidence that contradicts the commonly held belief that identical twins have identical DNA and offers the new name of "one-egg twins" to replace the traditional "identical twins." This article is useful in relating content about genetics and in demonstrating how models can change over time with new information. The content of this article aligns with the Connecticut Science Frameworks Standard 8.2 on heredity.			
Quantitative			
Lexile and Grade Level	1270 - 8th	Text Length	705 words
Qualitative			
Meaning/Central Ideas		Text Structure/Organization	
The meaning and central idea of the text is stated in the title. The article then supports this idea with reasons for the prior explanations and the causes of changes in thinking around twin DNA. The comparison of old thinking to the new thinking makes this text a good text for teaching compare and contrast. The presentation of possible consequences could also be used to teach cause and effect.		No graphics. The text compares and contrasts a prior understanding with a newer theory or understanding. The article informs the reader about new research and thinking on a particular topic by presenting the original thinking and then presenting the new thinking. After presenting the new theory of understanding, the author includes possible consequences of the new theory.	
Prior Knowledge Demands		Language Features	
Prior knowledge of twins and types of twins is beneficial. Requires some discipline-specific knowledge of genes, DNA, and inheritance. No references to other texts. References prior conceptions regarding the DNA of identical twins.		Conversational introduction. The article includes quotes from researchers. Progresses from prior understandings to new understandings centered on discipline-specific (genetics) content. While the article has a high lexile level for grade 8, the article includes many tier three words that are specific to the content. The conversational tone of the article along with students' prior knowledge of the content words from study in science make this article understandable and usable at the grade 8 level.	
Vocabulary			
Tier Two Words (General academic vocabulary)		Tier Three Words (Domain-specific words)	
<i>"Words that are far more likely to appear in written texts than in speech. [They] often represent subtle or precise ways to say relatively simple things—saunter instead of walk, for example." (CCSS ELA Appendix A)</i>		<i>"[Tier Three words]...are specific to a domain or field of study (lava, carburetor, legislature, circumference, aorta) and key to understanding a new concept within a text." (CCSS ELA Appendix A)</i>	
<ul style="list-style-type: none"> • Derive • Nurture • Nature • Divergence 	<ul style="list-style-type: none"> • Contradicts • Variants • Obscure 	<ul style="list-style-type: none"> • Chromosome • Gene • Ionizing • Carcinogen • Psychologist • DNA 	<ul style="list-style-type: none"> • Genome • Genetic • Radiation • Geneticist • Pathologist
Potential Reader/Task Challenges			
Information is engaging and accessible for grade 8 students, but does require information about genetics and twins. This article addresses the similarities of identical twins, but does not draw comparisons to or reference relationships of fraternal twins. Students should be aware of the differences between identical and fraternal twins in order to understand the information presented.			

Text-dependent questions		
Question	Standard alignment	Page of this document
In the article "Identical Twins' Genes Are Not Identical", what are the two opposing ideas about identical twin DNA?	RI.8.3	4-8
In the article "Identical Twins' Genes Are Not Identical", what central idea or conclusion is the author trying to get the reader to consider when she presents the two opposing ideas about identical twins' genes? How do you know?	RI.8.2 RST.6-8.2	9-13
In the article "Identical Twins' Genes Are Not Identical", what key phrases or vocabulary does the author use to show that scientists have changed their thinking about the genes of identical twins?	RI.8.4 RST.6-8.4	14-16
In the article "Identical Twins' Genes Are Not Identical, what valid evidence or sound reasoning does the author provide to support Frederick Bieber's claim that the description of identical twins should change to "one-egg twins"?	RI.8.8 RST.6-8.8	17-21
Based on evidence from the article "Identical Twins' Genes Are Not Identical", what is the author's purpose of describing the genes of identical twins?	RI.8.6 RST.6-8.6	22-24
Target Standards		
<ul style="list-style-type: none"> • RI.8.2 • RST.6-8.2 • RI.8.3 • RI.8.4 • RST.6-8.4 • RI.8.6 • RST.6-8.6 • RI.8.8 • RST.6-8.8 • CT State Science Framework Standard <ul style="list-style-type: none"> 8.2.a. Heredity is the passage of genetic information from one generation to another. 8.2.b. Some of the characteristics of an organism are inherited and some result from interactions with the environment 		

Question 1

Question #1	In the article "Identical Twins' Genes Are Not Identical", what are the two opposing ideas about identical twin DNA?
Standard(s) covered:	RI.8.3 - Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

Example response that meets standard	Look-fors
<p>There are two ideas about the genes of identical twins. The old idea is presented in the first two paragraphs and states that identical twins have identical DNA because they come from one fertilized egg that splits and differences only arise due to environmental conditions. The new idea is that identical twins, while being very similar, can have slight differences in certain regions of their DNA. The new idea arose from a study completed by geneticist Carl Bruder. Bruder's idea is summarized when he said, "There are, however, regions in the genome that deviate from that two-copy rule, and that's where you have copy number variants." This means that some traits come from parts of the DNA that do not need two copies of a gene.</p>	<ul style="list-style-type: none"> • Accurately identifies the two opposing ideas: 1) Scientists used to think that identical twins have identical DNA because they come from one fertilized egg that divides, and 2) New evidence has led scientists to believe that identical twins have very similar, but not identical, DNA. • Accurately uses evidence from the text to support the explanation of each idea. • Student answers will vary, but the following quotes could be used to support each idea. The idea of identical twins having identical DNA is supported when the author states, "they derive from just one fertilized egg, which contains one set of genetic instructions, or genome," and, "any differences between twins had largely been attributed to environmental influences." The idea that identical twins have different DNA can be supported when the author states, "in some cases, one twin's DNA differed from the other's at various points on the genome," and, "There are, however, regions in the genome that deviate from that two-copy rule, and that's where you have copy number variants," Bruder explains."

If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:

Objective	In this lesson you will learn to make to distinctions between ideas in a text by identifying and color coding the ideas presented in the text.
Prior knowledge to review	Students should know the definition of opposing or contradictory claims or ideas - ideas that are opposite or contrary to each other. An author uses different viewpoints to make connections between ideas in the text. Students should know how interactions between ideas can influence ideas or events (RI.7.3).
Steps to achieve objective	Think aloud for direct instruction

<p>1) Reread the text to notice the opposing ideas.</p>	<ul style="list-style-type: none"> • Before I start rereading the article, I read the question that I am trying to answer. • As I read the question, I see that the question I am trying to answer asks me to find two opposing ideas. • I am going to read the article again. • As I read the article, I know I should be looking for the two ideas. • I can remember from the first time I read the article that the ideas are identical twins' DNA is identical and identical twins' DNA is similar, but not identical.
<p>2) Ask yourself, "What information is related to each idea?"</p>	<ul style="list-style-type: none"> • Step 2 asks me to find information related to each opposing idea. • I am going to look for information about each idea separately or one at a time. • As I go searching for information, I want to be looking for key words or ideas about the genes of twins being the same. • In the first paragraph, the question at the beginning of the paragraph sets up the first idea. • In the second paragraph, the author says that differences have been "attributed to environmental influences." This makes me think that the DNA must be the same. • I now know information to support the first idea and now I can go searching for information about the opposite idea. • I read in paragraph three that a geneticist Carl Bruder found some differences in the DNA of identical twins. • In paragraph four, Carl Bruder explains that some regions of DNA do not need two genes and can be different. • Paragraphs three and four tell me that identical twins can have different genes that are not because of environmental influences.
<p>3) In different colors, highlight the information that supports each of the opposing ideas.</p>	<ul style="list-style-type: none"> • After I have found information about each idea, I am ready to complete the final step that asks me to highlight the information for each idea with different colors. • I need to take out two different colored highlighters and choose one color for each idea. • Since I found information that supported the first idea in the first and second paragraphs, I am going to highlight this information with one color. • I highlight all of the first paragraph and the second paragraph from the beginning up to the word "nurture." • This highlighting tells me this information supports the idea that the genes for identical twins are the same. • I use the other color to highlight the third, fourth, and sixth paragraphs. • These three paragraphs are information that tells me that the genes of identical twins can have some differences. • The two colors show me the two opposing ideas about identical twins' DNA.

Extension and practice

- If students are having difficulties identifying the supporting information for each idea in the text, have students fold a piece of paper in half or create a T-chart to organize the information. Students can label the top of one column as "DNA the same" and the other column as "DNA not the same." As students read the article, they can record the information in the proper column of the chart. After they complete the reread of the article, students can review the information supporting each idea prior to highlighting in the article.

- If students are identifying or highlighting information that is irrelevant to each idea, start with a class or small group discussion and guide students to identify evidence they think supports or explains each distinct idea using the sentence stems:
 "The author expresses the idea that identical twins have the same DNA by _____ (filling in example from text)." or
 "The author expresses the idea that identical twins have different DNA by _____ (filling in example from text)."
 A graphic organizer, such as a T-chart which students can use to record details about each idea on the different sides, may help.

- If students have mastered the skill of accurately highlighting the opposing or different ideas, then students can be challenged to use evidence from the article to answer interview questions as if he or she was scientist Carl Bruder.
 Students could be given the following directions: Use evidence from the article to answer the following questions as if you are geneticist Carl Bruder.
 Questions could include:
 1. What is your view of identical twins and their DNA?
 2. How did you arrive at your conclusion?
 3. How is this different from previous ideas about twin DNA?
 4. What impacts will your research have on science and on everyday life?

What next?

For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard

See more examples of how to teach analyzing how a text makes connections between individuals, ideas, or events (RI.8.3)

Objective: In this lesson you will learn to make to distinctions between ideas in a text by identifying and color coding the ideas presented in the text.

1. Reread the text to notice the opposing ideas.
2. Ask yourself, "What information is related to each idea?"
3. In different colors, highlight the information that supports each of the opposing ideas

Analyze the interaction between ideas in a text
 (<http://learnzillion.com/lessons/1974-analyze-the-interaction-between-ideas-in-a-text>)

DNA is the Same

DNA is Different

DNA is the Same

- Identical twins are identical (paragraph 1)
- Identical twins are from one fertilized egg (paragraph 1)
- Identical twins are formed from the same chromosomes of the mother and father (paragraph 1)
- One fertilized egg means one set of genes from the DNA (paragraph 1)
- Identical twins are used to study environmental influences on traits (paragraphs 2 and 5)

DNA is Different

- In Carl Bruder's study of identical twins, one twin had different genes than the other twin (paragraph 3)
- Differences in DNA and genes are called copy number variants (paragraph 3)
- Some parts of DNA vary and carry between zero and fourteen copies of a gene (paragraph 4)
- One twin had a gene for leukemia, but the other twin did not (paragraph 6)

Question 2

Question #2	In the article "Identical Twins' Genes Are Not Identical", what central idea or conclusion is the author trying to get the reader to consider when she presents the two opposing ideas about identical twins' genes? How do you know?
Standard(s) covered:	RI.8.2 - Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. RST.6-8.2 - Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

Example response that meets standard	Look-fors
<p>The author gives two opposing ideas about identical twin DNA. In the article, the author states that identical twins were believed to have "one set of genetic instructions" and that "any differences between twins had largely been attributed to environmental influences." The author also reveals that new research by Carl Bruder contradicts that view. Bruder's research discovered that there are "regions in the genome that deviate from that two-copy rule, and that's where you have copy number variants" and genetic differences. By presenting two opposing ideas, the author wants the reader to consider the central idea that there has been a change in what scientists think about the DNA of identical twins and that this change will impact other areas of science and life. This is supported in the article when the author states that the new findings will be responsible for "a new way to study the genetic and environmental roots of disease" (paragraph 5).</p>	<ul style="list-style-type: none"> • Accurately uses the big ideas of identical twin DNA being identical versus similar, not identical, to support the central idea. • Accurately identifies and summarizes the author's central idea that scientists have changed their thinking about identical twin DNA and that this change will have consequences in science and life. • Accurately uses evidence from the text in the summary. Student answers will vary, but textual evidence may include that identical twins have "one set of genetic instructions" and that "any differences between twins had largely been attributed to environmental influences" (paragraphs 1 and 2), that Carl Bruder's research shows "regions in the genome that deviate from that two-copy rule, and that's where you have copy number variants" (paragraph 4), and that this research will lead to "a new way to study the genetic and environmental roots of disease" (paragraph 5).

If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:

Objective	In this lesson you will learn how to determine the central idea of a text by determining the topic and asking what the author says about it.
Prior knowledge to review	Central Ideas - Students should know how to determine two or more central ideas in a text and the development of these ideas throughout the text (RI.7.2).
Steps to achieve objective	Think aloud for direct instruction

<p>1) Reread the text and list the big ideas presented in the text.</p>	<ul style="list-style-type: none"> • Before I reread the article, I read the question that I am trying to answer. • As I read the question, I see that that I am looking for the central idea or conclusion of the article. • I am going to read the article again. • To help me find the central idea or conclusion, I want to start by finding the big ideas from the article. • As I read the article, I know I should be looking for the ideas that seem important. • I can remember from the first time I read the article that some ideas are identical twins' DNA is identical and identical twins' DNA is similar, but not identical. • As I read the article again I list some ideas that are important and relate to twins' DNA: <ul style="list-style-type: none"> - In paragraphs 1 and 2 the author states that identical twins have "one set of genetic instructions" and that any differences are usually "attributed to environmental influences." This is the idea that identical twins have identical DNA. - In paragraphs 3 I learn that Carl Bruder has been comparing and researching identical twin DNA. This is important because in paragraph 4 Carl Bruder says that some regions of DNA can have variations in copies of genes. - Paragraph 5 states that the new research will change the way scientists "study genetic and environmental roots of disease." This is important because it shows that a change in scientists thinking is creating new ways to study genetic and environmental influences. - Paragraphs 6 - 11 are examples of the changes in thinking about and studying genetic and environmental influences.
<p>2) Ask yourself, "How are these big ideas connected into one central idea?"</p>	<ul style="list-style-type: none"> • Step 2 asks me to connect these big ideas. • I am going to look at each idea separately or one at a time, then I am going to look for connections between the ideas. • I reread each idea on my list and look for words that are similar in each big idea. • As I reread the list of big ideas, I see that paragraphs 1 and 2 and paragraphs 3 and 4 all talk about the DNA and genes of identical twins. • Even though paragraphs 1 through 4 all talk about DNA and genes of identical twins, there are two opposing ideas discussed (paragraphs 1 and 2 say identical twins have identical DNA and paragraphs 3 and 4 say that twins have similar, but not identical, DNA) • I know that in order for there to be a change in the way scientists are studying, there has to be a new idea or reason that causes the change. • Paragraphs 3 and 4 introduce a new idea and the cause of this new idea. From the list of big ideas, I know that is a change from the ideas in paragraphs 1 and 2. • I see that paragraph 5 introduces the idea that there will be a change in the way genetic and environmental influences are studied, which relates to the examples in paragraphs 6 through 11. • When I read paragraph 5, I see that it shows the results of changing thinking from identical twins have identical genes (paragraphs 1 and 2) to identical twins have similar, but not identical, genes (paragraphs 3 and 4). • Based on what I have read in paragraph 5, I think that the change in studying relates how the old idea is opposed by a new idea I think that the author is saying that new research has changed scientists' ideas about identical twin DNA and is causing changes in studying genetic and environmental factors, which is supported by examples in paragraphs 6 through 11.

<p>3) Use evidence from the big ideas to write the central idea of the text.</p>	<ul style="list-style-type: none"> • I know that I somehow have to put all of the information together into a logical central idea. • Based on my reading, I know that scientists used to think that identical twins had identical genes (paragraphs 1 and 2). • My reading also told me that scientists now think that identical twins have similar, but not identical, genes (paragraphs 3 and 4). • I have connected these two ideas because I know that research has caused scientists to change their thinking (paragraph 4) and this change in thinking means that scientists will change the way they study genetic and environmental factors (paragraph 5). • I need to support that scientists change their thinking and way of studying because research gave them a new idea about identical twins' genes. • Since I think the central idea is how scientists are changing their thinking, I will use the evidence of the old and new ideas to start my paragraph. • I will then say how their changing thinking is the central idea.
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Extension and practice

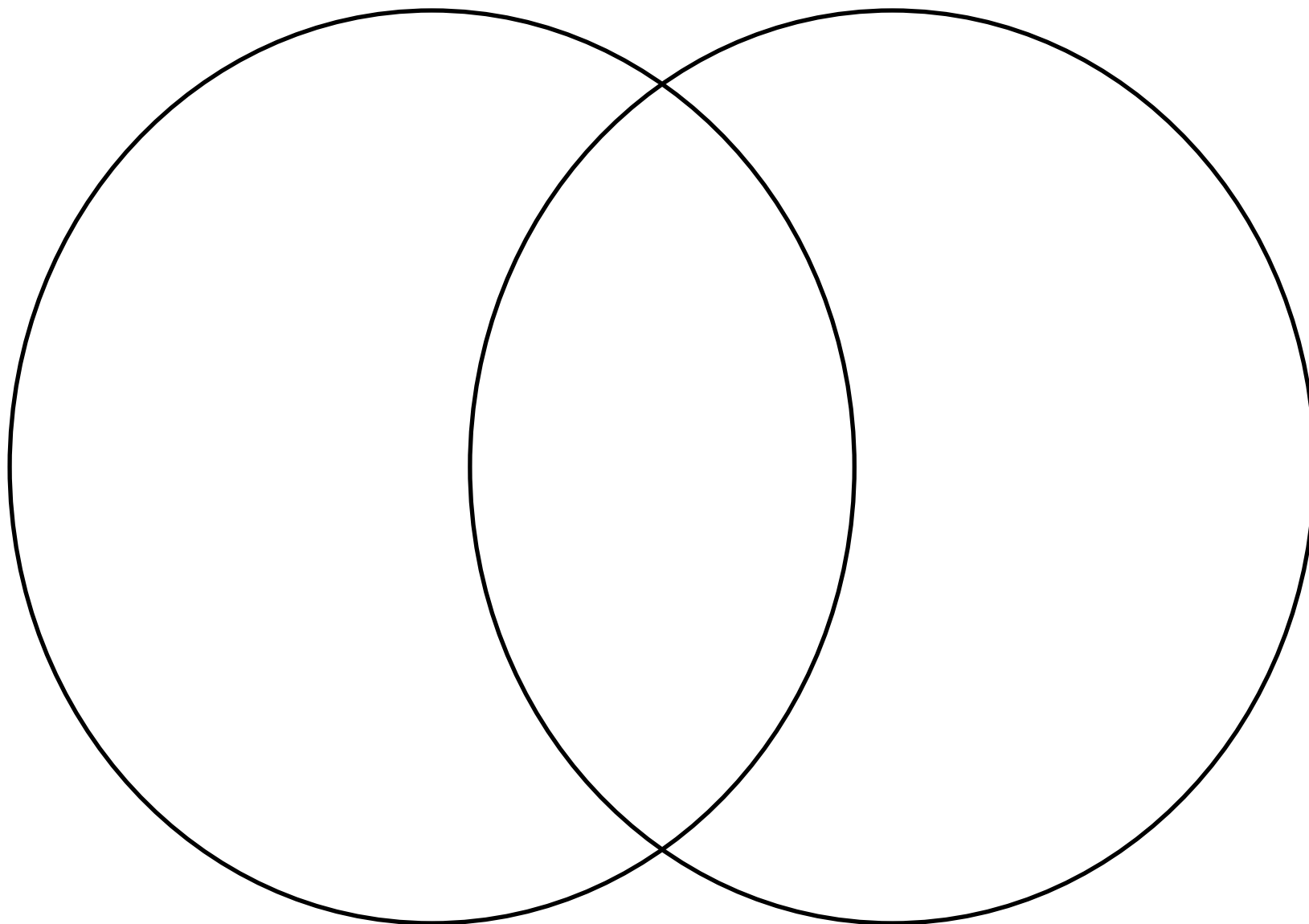
- If students are having difficulties connecting the big ideas in the text, have students create a Venn diagram that relates differences and similarities. Students could identify the two opposing ideas (identical twins have identical genes and identical twins have similar, but not identical, genes) in the outer circles. As students read the article, they can fill in information that fits with each idea. During reading students can put connections for the ideas in the overlapping section. Students can also look for connections after they have completed reading the article.
- If students have mastered the skill of identifying the central idea, then ask these students to take on the role of a doctor, crime scene investigator, or historian. Ask students to write a response to the article based on their roles. Have students evaluate the central idea of their writing from the perspective of a doctor, crime scene investigator, or historian.

What next?

<p>For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard)</p>	<p>See more examples of how to teach (name skill and standard)</p>
<p>In this lesson you will learn how to determine the central idea of a text by determining the topic and asking what the author says about it.</p> <ol style="list-style-type: none"> 1. Reread the text and list the big ideas presented in the text. 2. Ask yourself, "How are these big ideas connected into one central idea?" 3. Use evidence from the big ideas to write the central idea of the text. 	<p>Determine the central idea of a text by paying attention to main events (http://learnzillion.com/lessons/2024)</p> <p>Determine the central idea of a nonfiction article (http://learnzillion.com/lessons/1900)</p>

Identical twins have identical genes.

Identical twins have similar, but not identical, genes.



Identical twins have identical genes.

Identical twins have similar, but not identical, genes.

- Identical twins are identical (paragraph 1)
- Identical twins are from one fertilized egg (paragraph 1)
- Identical twins are formed from the same chromosomes of the mother and father (paragraph 1)
- One fertilized egg means one set of genes from the DNA (paragraph 1)
- Identical twins are used to study environmental influences on traits (paragraphs 2 and 5)

- Carl Bruder's research has revealed new evidence about identical twin DNA and genes (paragraph 3)
- Scientists are changing their thinking from identical twins being identical to identical twins being similar, but not identical (paragraph 5)

- In Carl Bruder's study of identical twins, one twin had different genes than the other twin (paragraph 3)
- Differences in DNA and genes are called copy number variants (paragraph 3)
- Some parts of DNA vary and carry between zero and fourteen copies of a gene (paragraph 4)
- One twin had a gene for leukemia, but the other twin did not (paragraph 6)

Question 3

Question #3	In the article "Identical Twins' Genes Are Not Identical", what key phrases or vocabulary does the author use to show that scientists have changed their thinking about the genes of identical twins?	
Standard(s) covered:	RI.8.4 - Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts. RST.6-8.4 - Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.	
	Example response that meets standard	Look-fors
	In the article "Identical Twins' Genes Are Not Identical", the author states two views of identical twins' genes. The author uses several key words and phrases to show that scientists' understanding of these genes is shifting from one theory to another theory. One key word that the author uses is the word contradicts. The author lets the reader know that scientific thinking is changing when she states that, "a recent study contradicts that belief [identical twins' genes are identical]." The author also uses the term new to signify a more up to date theory of genetics. The author includes the sentence, "But Bruder's findings suggest a new way to study the genetic and environmental roots of disease." This sentence also shows a change from an older way of thinking to a new way of thinking. The author also uses phrases about the consequences of the change in thinking to elaborate how the thinking has changed. The author says that the new study could "call into question the many findings of previous twin studies" and, as Kerry Jang is quoted, we will have to "adjust our models to take [genetic differences] into account."	<ul style="list-style-type: none"> • Accurately uses the big ideas of identical twin DNA being identical versus similar, not identical, to show an old theory transitioning to a newer theory. • Accurately identifies and summarizes the key words and phrases that show how the author represents this change in genetic theory. • Accurately uses evidence from the text in the summary. Student answers will vary, but textual evidence may include that "a recent study contradicts that belief" (paragraph 2), that "Bruder's findings suggest a new way to study the genetic and environmental roots of disease" (paragraph 5), that "the result might also call into question the many findings of previous twin studies" (paragraph 8), and that "we can adjust our models to take [genetic differences] into account" (paragraph 8).
If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:		
Objective	In this lesson you will learn to analyze the how word choice impacts the author's meaning by paying attention to the words the author uses to show the relationships between two ideas.	
Prior knowledge to review	Meaning of Phrases and Words - Students should know how to determine key words or phrases in the text. Students should have a basic understanding of how words and phrases can influence meaning and tone of the article (RI.7.4).	
Steps to achieve objective	Think aloud for direct instruction	

<p>1) Reread the text to notice the opposing ideas presented by the author.</p>	<ul style="list-style-type: none"> • I start by rereading the question that I am trying to answer. • The question asks me to use evidence from the text to support how scientists have changed their thinking about identical twins' genes. • I know from earlier readings that the author presents two different views of identical twins' DNA. • I am going to reread the article to see if these two ideas are related by the author in a way that could show how scientists change their thinking.
<p>2) Ask yourself, "What words or phrases relate these two ideas?"</p>	<ul style="list-style-type: none"> • In the second paragraph, the author states that Bruder's study contradicts scientists' beliefs. • The word contradicts means an opposite idea. • This tells me that Carl Bruder's conclusion is different from how scientists thought before his study. • I notice that scientists used to think that identical twins had identical DNA. I also notice that a scientist named Carl Bruder did research that shows identical twins have similar, but not identical, DNA. • Later in paragraph five, the author says that Bruder's research gives a "new way to study" genetics and the environment. When the author is saying that this is new, she is saying it is different from some other way or the old way. • I think that this shows a "before" and "after" way of thinking. The thinking before Bruder's research results is the old way of thinking and the thinking after Bruder's research is the new way of thinking. • In paragraph eight, I see that the new research is questioning findings from previous studies and that scientists will have to adjust their models of genetics. The idea of adjusting tells me that the scientists are changing how they think about and explain genetics.
<p>3) Explain how the words or phrases illustrate the relationship between ideas.</p>	<ul style="list-style-type: none"> • I know that I have to use my evidence to show that scientific thinking has changed. • Since I have identified an old way of thinking and a new way of thinking, I can use that to start my explanation, but I also need evidence from the article. • Looking back at the article, I see that paragraph two tells me about the contradiction. I can explain the change in thinking by saying that scientists thought identical twins had identical genes until Carl Bruder's research results contradicted their idea. • I can also say that Bruder's research has given scientists a new way to study genetics (paragraph 5), because this shows that scientists are changing what they are doing in order to learn more about genetics. • Finally, I can use paragraph eight to support changes in the theory because it says that previous or older results are being questioned and that scientists will have to change their model.

Extension and practice

- If students are having trouble making evidence-supported connections for the changing ideas, conduct a mini "investigation." Explain that readers are like detectives, as they read, they put together clues from the text to understand new ideas, people, stories, or causes and effects. Consider reading aloud a familiar or easier text that may use text and illustrations to show ideas changing over time or cause and effect. As a group, list the things that students did to make connections between changing ideas. Students can then go back to the article "Identical Twins' Genes Are Not Identical" and work in pairs to show changing ideas.
- Have students extend their practice by making inferences about other impacts that the change in thinking could have on the field of genetics or on other aspects of life related to genes or DNA. The class could be divided into groups and asked to come up with impacts on different areas of study based on the examples in disease research and criminal investigations from the article.

What next?

For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard

See more examples of how to teach determining the meaning of words or phrases in a text (RI.8.4, RST.6-8.4)

Objective: In this lesson you will learn to analyze the how word choice impacts the author's meaning by paying attention to the words the author uses to show the relationships between two ideas.

1. Reread the text to notice the two ideas presented by the author.
2. Ask yourself, "What words or phrases relate these two ideas?"
3. Explain how the words or phrases develop the change in ideas.

Find the meaning of technical words
(<https://learnzillion.com/lessons/1499-find-the-meaning-of-technical-words>)

Evaluate an author's word choice to anticipate tone
(<https://learnzillion.com/lessons/1988-evaluate-an-authors-word-choice-to-anticipate-tone>)

Determine the tone of a text by analyzing word choice
(<https://learnzillion.com/lessons/1925-determine-the-tone-of-a-text-by-analyzing-word-choice>)

Question 4

Question #4	In the article "Identical Twins' Genes Are Not Identical, what valid evidence (sound reasoning) does the author provide to support Frederick Bieber's claim that the description of identical twins should change to "one-egg twins"?
Standard(s) covered:	RI.8.8 - Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced. RST.6-8.8 - Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
Example response that meets standard	
<p>The author concludes the article with a quote from Frederick Bieber that says, "Maybe we shouldn't call them identical twins. We should call them 'one-egg twins.'" This is because identical twins do not have identical genes. The research of Carl Bruder supports Bieber because Bruder says that DNA has regions where the genome can vary, even between identical twins, giving "a genetic state called copy number variants." The author also gives an example from Bruder's work of identical twins where one has the gene for leukemia and the other twin does not have the gene. This shows that even though the twins are considered "identical", they do have differences in their genes. The new name of "one-egg twins" is a more accurate name because identical twins "derive from just one fertilized egg", even though they do not have identical genes they come from one egg.</p>	<p align="center">Look-fors</p> <ul style="list-style-type: none"> • Accurately use the big ideas of identical twin DNA being identical versus similar, not identical, to show why identical twins should be called "one-egg twins." • Accurately identify and summarize the key words and phrases that show how the author represents this change in genetic theory. • Accurately uses evidence from the text in the summary. Student answers will vary, but textual evidence may include that "they derive from just one fertilized egg" (paragraph 1), that there are differences resulting in "a genetic state called copy number variants" (paragraph 3), and that twins that have been called identical could have different genes for diseases such as leukemia as described in paragraph six.
If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:	
Objective	In this lesson you will learn how to delineate an argument by using specific claims and reasoning from the text to support a stated argument.
Prior knowledge to review	Delineate and Evaluate Arguments - Students should have a basic understanding of how an author can present an argument in a text. Students should be able to state a basic assessment of the validity of the information used to support an argument (RI.7.8).
Steps to achieve objective	Think aloud for direct instruction

<p>1) Reread the text to understand the claim supported by the author.</p>	<ul style="list-style-type: none"> • When I reread the article I see that the author quotes scientist Frederick Bieber as the concluding paragraph of the article. • Since the author uses the quote as a concluding paragraph. I know that conclusions are important to an article because the conclusion usually restates or summarizes a main idea. • Since the quote is the concluding paragraph, I think that means the quote is important to the article. • To help me understand the importance of this quote, I need to understand what the quote is saying. • I can ask myself, "What does the quote mean?" or "What is Frederick Bieber trying to say?" • I see that Bieber says we shouldn't call identical twins identical. Based on what I've read in the article, I know that ideas about identical twins' genes being identical have changed. • Since the idea about identical genes has changed, I don't think the name "identical twins" is accurate. • Frederick Bieber proposes the new name of calling identical twins "one-egg twins."
<p>2) Ask yourself, "What evidence supports this idea?"</p>	<ul style="list-style-type: none"> • Now I need to find evidence that supports not calling identical twins identical. • I read in paragraph three that identical twins' genes can be different. This is described as "a genetic state called copy number variants." • I remember seeing an example of twins that have different risk factors for leukemia. This example is in paragraph six. If the twins have different genes for leukemia, then they are not identical. • These two ideas or examples support not calling identical twins identical, but why should they be called "one-egg twins"? • In the introduction, I read that identical twins "derive from just one fertilized egg." • Since these twins come from one fertilized egg, they can be called "one-egg twins" without the inaccuracy of them having identical genes.
<p>3) Explain how the author supports the idea.</p>	<ul style="list-style-type: none"> • I need to be able to explain how the author supports Bieber's new name for identical twins. • I first explain why the twins should not be called identical twins using the evidence from paragraphs three and six about copy number variants and the example of twins with different genes for leukemia. • Next I can explain why there is support for calling the twins "one-egg twins", using the evidence from the first paragraph that identical twins come from one fertilized egg.

Extension and practice

- If students are identifying details that are irrelevant to the given quote ("Maybe we shouldn't call them identical twins. We should call them 'one-egg twins.'"), start with a class or small group discussion and guide students to identify evidence they think supports the quote using the sentence stems: "Identical twins should not be called identical because _____." or "Identical twins should be called 'one-egg twins' because _____."
A graphic organizer such as a t-chart may help students organize their ideas. One side of the chart could list reasons for not calling identical twins identical and the other side could be reasons to support calling identical twins "one-egg twins."
- Students can extend their practice by developing a new, more accurate name for identical twins (other than "one-egg twins") and support this new name with evidence from the article. Students can develop a written or oral argument for why their new name is more accurate and should be used to describe what were known as identical twins.

What next?

For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard)

See more examples of how to teach delineated, distinguishing, and evaluating arguments and specific claims (RI.8.8, RST.6-8.8)

Objective: In this lesson you will learn how to delineate an argument by using specific claims and reasoning from the text to support a stated argument.

1. Reread the text to understand the statement quoted by the author.
2. Ask yourself, "What evidence supports this idea?"
3. Explain how the author supports the idea.

Delineate an author's argument in a text
(<https://learnzillion.com/lessons/2070-delineate-an-authors-argument-in-a-text>)

Evaluate an argument in a text
(<https://learnzillion.com/lessons/2074-evaluate-an-argument-in-a-text>)

Evaluate an argument by assessing the author's claims and evidence
(<https://learnzillion.com/lessons/1978-evaluate-an-argument-by-assessing-the-authors-claims-and-evidence>)

Should be called "identical twins"

Should be called "one-egg twins" and not "identical twins"

Should be called "identical twins"

- Identical twins are identical (paragraph 1)
- Differences in identical twins could be due to the environment (paragraphs 2, 12, 13, and 15)

Should be called "one-egg twins" and not "identical twins"

- In Carl Bruder's study of identical twins, one twin had different genes than the other twin (paragraph 3), which means the identical twins are not identical
- One twin had a gene for leukemia, but the other twin did not (paragraph 6), so the twins are not exactly alike (not identical)
- Even though the twins come from one fertilized egg (paragraph 1), they are not identical

Question 5

Question #5	Based on evidence from the article "Identical Twins' Genes Are Not Identical", what is the author's purpose of describing the genes of identical twins?	
Standard(s) covered:	RI.8.6 - Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints. RST.6-8.6 - Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	
Example response that meets standard		Look-fors
<p>The author has two purposes or reasons for writing this article. The main or primary purpose of the article is to inform the reader about new ideas or developments in the field of genetics. The author's secondary purpose is to persuade the reader that this is a shift in thinking that will have impacts or consequences for previous and future studies of genetics.</p> <p>The author informs the reader that new research has contradicted the previous understanding that identical twins' have identical genes. The author uses the results of a study by Carl Bruder to inform the reader about "a new way to study the genetic and environmental roots of disease." The author also uses this research to outline changes in thinking about the previous model of genetics. Kerry Jang says that scientists "can adjust our models to take [genetic differences] into account." The new results will also impact research in the areas of criminal investigations and disease research.</p> <p>The author also presents the consequences to changing models based on Bruder's research, which persuades the reader of the importance of the discovery. The author states that "the discovery of this genetic variation gives hope for an obscure but pressing issue in the case of a criminal suspect who is an identical twin." Bruder also states that he believes "the differences in identical twins can be used to identify specific genetic regions that coincide with specific diseases," which can help scientists. When the author says these areas give hope to researchers, she is persuading the reader that this topic and the change in thinking are important.</p>		<ul style="list-style-type: none"> • Accurately identifies primary (to inform) and secondary (to persuade) author purposes for writing the article. • Accurately summarizes text evidence to support the purposes. • Accurately uses evidence from the text in the summary. Student answers will vary, but textual evidence may include that Bruder's research is "a new way to study the genetic and environmental roots of disease" (paragraph 5), that scientists "can adjust our models to take [genetic differences] into account" (paragraph 8), that " the discovery of this genetic variation gives hope for an obscure but pressing issue in the case of a criminal suspect who is an identical twin," and that "the differences in identical twins can be used to identify specific genetic regions that coincide with specific diseases."
If students are struggling to answer the text-dependent question, use this follow-up plan for modeling and practice:		
Objective	In this lesson you will learn to determine the author's point of view and purpose in a text by analyzing the author's explanations and responses to different viewpoints or data.	

Prior knowledge to review	Author's Point of View - Students should know the main reasons or purposes for author's writing (to entertain, to inform, or to persuade). Students should have a basic understanding of how to determine an author's point of view or purpose in writing a text. Students should be able to determine how the author's viewpoint differs from other viewpoints (RI.7.6).
Steps to achieve objective	Think aloud for direct instruction
1) Reread the text and note the author's intentions.	<ul style="list-style-type: none"> • The first thing that I need to do is reread the article and think about the author's intent or purpose for writing the article. • As I read the first part of the article, I see that the author is giving us a lot of information about scientists' thinking about identical twins and their genes. • Later in the article, the author outlines some benefits and consequences to new research and ideas about identical twins' genes.
2) Ask yourself, "What do the facts and examples reveal about the author's intentions?"	<ul style="list-style-type: none"> • When the author is stating information, I think that the main purpose for the author writing is to explain what scientists think about identical twin genes. • For example, the first paragraph explains how identical twins form. The second paragraph tells about how scientists explain the differences in identical twins, but paragraphs three and four give new research and new information about identical twins. • Starting in paragraph 5, the article tells about the consequences and hopes of this new understanding. • Paragraph 5 starts to tell how the new thinking has consequences, such as changing research of some diseases. • The author uses paragraph 6 to show that this new way of thinking will affect past and future research. Because of these consequences, the author wants me to see the importance of this new idea. • I think that the author is using these consequences and benefits as a way to convince the reader that the new research is important because it will affect how scientists understand and explain genetics. • Convincing the reader of something is similar to persuading the reader. I wonder if this could be a purpose for writing the article.
3) Use the information from the article to explain why the author wrote the article.	<ul style="list-style-type: none"> • Based on my analysis of the article, I think there are two purposes for writing the article. • I think the first purpose is to explain about identical twins' genes (paragraphs 1 through 4), so the main or primary purpose is to inform the reader about genetic research on identical twins. • I think the second purpose is to persuade or convince the reader that this research is important because it has consequences and benefits to research on disease, like the author tells in paragraph 5, and for criminal investigations, like the author tells in paragraph 7.

Extension and practice

- If students are struggling to identify the author's purpose, start with a class or small group discussion and guide students to remembering the different purposes for writing and the idea that an author may have more than one purpose for writing. Ask students to identify examples of each purpose for writing from previous articles. Have students work with a partner or in a small group to gather evidence from the article that to support the purposes for writing. These ideas can be organized on a chart to help students see the evidence.
- Students that have mastered the task of identifying the author's purpose can write a letter to the editor of *Scientific American* and defend the claim that this was not a worthy subject for the magazine and why that might be true. Even if students do not think that the subject is not worthy, ask them to play "devil's advocate" for the position of an unworthy subject for the magazine.

What next?

For additional practice, with students or for students' independent work, apply this learning objective and set of steps to (name type of text and skill/standard)

See more examples of how to teach (name skill and standard)

Objective: In this lesson you will learn to determine the author's point of view and purpose in a text by analyzing the author's explanations and responses to different viewpoints or data.

1. Reread the text and note the author's intentions.
2. Ask yourself, "What do the facts and examples reveal about the author's intentions?"
3. Use the information from the article to explain why the author wrote the article.

Determine an author's point of view
(<https://learnzillion.com/lessons/2022-determine-an-authors-point-of-view>)

Determine author's purpose using text evidence
(<https://learnzillion.com/lessons/1948-determine-authors-purpose-using-text-evidence>)