

Strategies to Improve Third Grade Comprehension of Non-Fiction Text

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Abstract

The purpose of this study was to determine whether the use of the text annotation strategy would positively affect the reading comprehension of a selected group of third grade students. The measurement tool was an online assessment from the website Newsela.com. The study involved a pretest/posttest design. The hypothesis of this study was supported and there was a significant difference in the pre and posttest results (mean difference= -1.176, $t=-3.213$, $p <.005$). The results of this brief intervention suggested explicitly teaching text annotation can improve comprehension of non-fiction texts. Study of further applications is warranted since comprehension of non-fiction texts can impact learning in many subject areas.

CHAPTER I

INTRODUCTION

Overview

From a young age, most children are surrounded by stories. Children become familiar with narrative texts that contain story elements such as characters, setting, problem and solution. As children get older, the complexity of the texts they read may increase, but the basics remain the same. Generally, plots involve a character or characters who experience some sort of challenge or problem and eventually work to resolve it. However, many young children are not exposed nonfiction text as frequently as fictional stories, and therefore do not develop the same comfort level they experience with fictional stories. Understanding nonfiction text requires specific strategies and skills, without which readers' comprehension suffers.

Third grade is a pivotal year for young readers in which students begin to make the transition from learning to read to reading to learn. The researcher noticed that her third-grade students lacked the strategies and skills needed to comprehend nonfiction texts. Students had difficulty grasping key concepts in nonfiction, finding main ideas, and using strategies to define unknown vocabulary.

The researcher became interested in finding and implementing a reading strategy that would help students comprehend nonfiction text. A review of literature suggested that the use of text annotation could improve the comprehension of nonfiction texts in third grade students. The researcher was interested in finding out if the use of simple text annotations, such as highlighting and making notes in the margins, would improve the comprehension of her students when reading nonfiction text.

Statement of the Problem

The purpose of this study was to examine the impact of text annotation instruction on the reading comprehension of third graders.

Hypothesis

It was hypothesized that students would perform better on a reading comprehension quiz about a grade-level nonfiction text after receiving text annotation instruction than they did prior to such instruction. The null hypothesis tested follows:

ho: Mean post-intervention reading comprehension scores = Mean pre-intervention reading comprehension scores

Operational Definitions

The dependent variable for this study was reading comprehension and was assessed using Newsela quizzes that assessed participants' understanding of non-fiction texts they read. A pretest and posttest of comparable difficulty were used to assess the students' ability to comprehend a non-fiction text by correctly answering comprehension questions in the form of multiple choice and written responses. These were given before and after the text annotation strategies were taught.

The independent variable was the instruction on how to use **text annotation strategies**. Annotation strategies taught included the highlighting and underlining of key concepts and vocabulary in non-fiction text. Students were also instructed on how and when to take notes in the margin to keep track of their thinking during reading.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Reading comprehension is dependent on the relationship of three dimensions; the reader, the text, and the activity (Shimmel & Ness, 2017). The reader approaches text with skills, cognitive capacities, knowledge, and motivations. The text dimension includes the words (printed or electronic), genre and features of the text. The purpose or activity creates the third dimension. Learning to read encompasses more than being able to pronounce the words on the page. It is the interaction between all three dimensions: reader, text, and activity. “When taken as a whole, reading comprehension can be understood not only as a goal for reading but as the complete interaction of dynamic factors, all contributing to the complex and demanding process involved in comprehension of text” (Shimmel & Ness, 2017, p. 391).

The instruction of comprehension strategies has been shown to improve reading comprehension. When students are taught to apply strategies to text, they are better able to understand what they have read. However, recent research suggests that “comprehension strategies are a means to an end, not an end themselves”, the end goal being construction of meaning. (Pomerantz & Pierce, 2019). Strategy teaching is difficult, as what works for one student may not work for all. Effective teachers use a combination of strategies and a variety of materials and texts to differentiate instruction and engage their students in reading (Pomerantz & Pierce, 2019).

This literature review will explore the importance of effectively teaching comprehension strategies. Section one will identify the factors that impact reading

comprehension. Section two examines the importance of comprehension and how it relates to student achievement across content areas. The third section focuses on comprehension instructional strategies.

Factors Impacting Comprehension

Several factors impact reading comprehension. As a result, it can often be difficult to pinpoint the specific issue(s) affecting it and develop effective strategies for improvement. Teachers must recognize the areas that affect reading comprehension and present strategies and interventions based on individual needs.

Vocabulary and word recognition play an important role in the comprehension of text. In order to be successful, readers need to not only read words efficiently, but understand their meanings (Liebfreund & Kristin , 2016). This becomes increasingly important as students progress to higher grade levels. The demands of text become increasingly more difficult, as evidenced by the “fourth grade slump”. This describes the phenomenon in which many students previously reading on grade level as third graders experience a drop in reading test scores in fourth grade (Solis, Scammacca , Barth , & Roberts, 2017). A 1997 study showed vocabulary knowledge in second grade explained 24% of the variance in fourth grade reading comprehension (Liebfreund & Kristin , 2016). Students in the upper elementary grade levels could benefit from interventions focusing on vocabulary.

Motivation is another important factor impacting reading comprehension. Motivation is “driven by individuals’ expectations for success at tasks (e.g., perceived competence, perceived difficulty, and expectation for successful task performance) as well as by individuals’ subjective enjoyment and perceived importance of tasks” (Cartwright, T.R., & Wray, 2016). Students who believe themselves to be “good” readers will be more motivated

to read, read more often and, in turn, develop better reading skills Liebfreund suggests that “reading comprehension may be linked to motivation because it can predict reading amount.” The more a student reads, the more skilled they will become. Unfortunately, for many students, reading attitudes and motivation decline as they progress through elementary school (Cartwright, T.R., & Wray, 2016). Educators must shift their viewpoint of how to choose appropriate text for students. In a 2018 article John Z. Strong states, “A student’s instructional level is not necessarily a fixed state; rather, it is something we should consider elastic depending on the degree of instructional support provided” (p. 201). Many times, curiosity is stifled due to the text being considered too difficult for a particular student. However, when readers encounter something challenging, they are more motivated to engage with it, especially the reader has an interest in the topic. (Strong, Amendum, & Smith, 2018).

According to the National Reading Panel, fluency is one of the crucial factors in the development of reading comprehension (Stevens, Walker , & Vaughn, 2017). Fluency is defined as: the ability to read a text quickly, accurately and with proper expression (Ribeiro, Cadime, Freiras, & Leopoldina Viana, 2016). Word recognition is essential for understanding. If a student misreads too many words, comprehension suffers maybe say why. Studies have shown that oral reading fluency can be used as a predictor for reading comprehension in first through fourth grades (Ribeiro, Cadime, Freiras, & Leopoldina Viana, 2016).

How Comprehension Relates to Student Achievement

To be successful readers, students must be exposed to a variety of texts. A 2008 study using Accelerated Reader, a computer-based program schools use to monitor reading progress, concluded that non-fiction reading was correlated with comprehension (Topping,

2015). Reading can no longer be considered an isolated subject, but rather a skill that is needed across content areas. This realization has increased the need to provide students access to informational texts. Students need exposure and instruction on how to read and comprehend informational text. Educators must find engaging, appropriate non-fiction material to motivate young readers. Recent years has shown an upsurge in the number of informational texts used for instruction in elementary classrooms (Liebfreund & Kristin , 2016). “Not only do informational texts build and extend prior knowledge, but they also appeal to the interests of certain readers and expose children to organizational structures and features they would not encounter in narrative texts alone” (Liebfreund & Kristin , 2016).

Despite this recent awareness, informational text is still misused or under-utilized in elementary classrooms. Students continue to comprehend narrative text at a higher level than informational text. Many non-fiction books are of an inappropriate level of difficulty for the reading level of students (Topping, 2015). The fact that students read and respond to text across all content areas emphasizes the importance of successful comprehension of non-fiction text. Standards now suggest fourth grade students should spend fifty percent of their reading in expository texts (Liebfreund & Kristin , 2016).

Although difficult for many, students with learning disabilities are the most affected when it comes to reading comprehension (FIRAT, 2019). Students with reading disabilities may process information inefficiently and often have difficulty with text structure and text organization (Ulu & Akyol, 2016). The National Assessment of Educational Progress recently found that “only 35% of fourth grade students and 11% of students with learning disabilities are performing at a proficient level in reading” (Stevens, Walker , & Vaughn,

2017). This would suggest that teachers are not meeting the needs of LD students to close the reading gap with their same age peers.

Many teachers are under the impression that students will naturally develop fluent reading behaviors through silent reading. However, a struggling reader requires direct instruction of fluency and comprehension strategies (Stevens, Walker , & Vaughn, 2017). Students with learning disabilities often struggle to develop reading fluency. When a student must work to sound out each and every word, it slows the process of reading. This makes reading a frustrating experience and results in a lack of understanding. Besides fluency issues, students with learning disabilities often struggle to monitor their understanding of text. They are not aware of how and when to use comprehension strategies to aid in their success (FIRAT, 2019). Students with learning disabilities often spend less time reading than proficient readers which negatively affects vocabulary and comprehension development (Stevens, Walker , & Vaughn, 2017). According to FIRAT (2019), “The majority of students with learning disabilities have severe difficulties in reading comprehension and are significantly behind their peers in this area” (page for quote). These students must not only be taught comprehension strategies, but how and when to implement them.

Comprehension Interventions and Instructional Strategies

Effective readers adjust their reading strategies as needed. At different times effective readers might activate prior knowledge, underline, take notes, visualize, sketch, make inferences, ask questions, summarize, etc. (Mariage, Englert, & Mariage, 2020). However, struggling readers often do not use strategies effectively and have difficulty monitoring their understanding. Effective instruction of reading strategies is crucial to the development of reading comprehension.

Repeated reading is one of the most researched methods in improving reading fluency and comprehension. This method requires students to read the same text several times in order to increase reading automaticity and accuracy (Young, et al., 2018). Rereading provides an opportunity for error correction and clarification of text. Between 1975 and 2000 a systematic review of effective fluency interventions was conducted for elementary age students with learning disabilities. The results showed that repeated reading interventions improved reading rate, accuracy, and comprehension. Another finding was modeled repeated reading (teacher, computer, or audio recording) was more effective than not providing a model. Guided oral repeated reading with teacher feedback was identified as an effective strategy for the improvement of reading comprehension (Stevens, Walker , & Vaughn, 2017).

Inferencing is the process of connecting ideas and providing detail not stated in the text to form understanding. Many studies suggest inferencing has a significant impact on comprehension (Kelly & Moses, 2018). By using think aloud strategies, teachers can model how to make inferences during reading (Strong, Amendum, & Smith, 2018). Children as young as preschool, still learning to decode, can infer. By choosing texts rich in pictures and words, students will naturally ask questions and make connections. These discussions and interpretations provide opportunities for inference instruction. Students benefit from all kinds of discussion. Whole group discussion facilitated by the teacher provides a framework and model for how to talk about text. Small peer discussion groups allow students to revisit text and build on one another's ideas. By making inferences and participating in discussion groups, students build understanding they would not have reached without support (Kelly & Moses, 2018). Small group discussions also provide some freedom of reading selection and

help students develop comprehension strategies they will use inside or outside of the classroom (Knight & Justesen, 2017).

Text annotation or jotting are also strategies used to enhance the reader's understanding of, recall and reaction of the text. It can involve highlighting or underlining key pieces of information and making notes in the margins. The teacher should be clear that jottings are quick notes to help readers remember thoughts, feelings, ideas, and opinions as they read.

This is rarely seen in the elementary school classroom. This is most likely due to the fact that it is not a natural skill for young children. Students need explicit instruction and modeling on how to jot while reading (Knight & Justesen, 2018). Jotting can be a valuable skill in reading comprehension. This strategy is most effective when used during the second reading of the text when students can perform a close read and make annotations (Strong, Amendum, & Smith, 2018). This process should begin by simply teaching students how to “read with a pencil.” By making simple markings in the text, such as circling, underling, question marks and exclamation marks, students become comfortable with marking up the text. Students are then ready to progress to the next stage of jotting questions, clarifications, connections, and comments (Mariage, Englert, & Mariage, 2020). The use of sentence stems or cues to provide a framework is often helpful in students learning to make annotations. Sometimes teachers may want to give specific instructions for annotations such as underlining main ideas, circling confusing words and summarizing in the margin (Strong, Amendum, & Smith, 2018).

Jottings give students ownership over their reading and promotes higher order thinking skills and requires students to become metacognitive about their understanding of

text (Knight & Justesen, 2018), meaning they develop an awareness and understanding of their own thoughts while reading. Peer discussions can be guided by jottings. Jottings not only help develop comprehension but are an important in driving engaging conversation about what is read. Students can refer to their annotations and quickly find places in the text that required them to think. This helps to encourage the discussion and reduces the frequency of lulls in the conversation about texts. Students can apply the strategy not only to the text they are currently reading, but to all types of reading material (Knight & Justesen, 2018).

Summary

Reading instruction is constantly developing and changing. Educators across content areas are responsible using strategies to engage their students in meaningful discussion of text and improve their overall comprehension. It is important to continue to examine and evaluate the effectiveness of reading comprehension strategies.

CHAPTER III

METHODS

The purpose of this study was to determine the impact of learning and using text annotation strategies on the reading comprehension of third grade students.

Design

The study used a quasi-experimental design with a pre-test and post-test to compare the mean reading comprehension scores of two groups (hereafter described as Group A and Group B) of students immediately before and after they received a short unit of additional reading instruction on how to use text annotation when reading nonfiction to their scores prior to the annotation strategy instruction.

The independent variable was the instruction about and use of text annotation. Text annotation instruction was used to provide students the opportunity to highlight key concepts and vocabulary as well as use symbols and jotting to indicate questions or thoughts in the text margins to aid their understanding of non-fiction texts.

The dependent variable for this study was student reading comprehension scores earned on a Newsela (<https://newsela.com>) quiz after reading a grade level nonfiction text. The quizzes consisted of multiple choice and written response questions and assessed reading comprehension of a grade-level nonfiction passage. For this study, the reading level of the text was kept constant at grade level 3.0 for all students. Copies of the passages are found in Appendix A and copies of the corresponding Newsela quizzes are found in Appendix B. Instruction and group work during the week used similar passages at the same difficulty level.

Participants

A convenience sample was used for this study consisting of seventeen third- grade students in the researcher's class who attend a Harford County Public School. All students were between the ages of eight and nine.

Group A consisted of ten students, four males and six females. Of the four males, one was Hispanic and three were Caucasian. All four females were Caucasian. Two students received special education services. They attended reading class with the researcher in person on Monday and Tuesday and virtually on Thursday and Friday. Group B was made up of seven students, four males and three females. All students in Group B were Caucasian. They attended reading virtually on Monday and Tuesday and in person on Wednesday and Thursday. All students took the pre and post-tests (Newsela tests on 2 articles of comparable grade level) remotely on Friday.

Instrument

The instrument used in this study was the website <https://newsela.com>. This is an instructional content website that allows teachers to find a wide variety of non-fiction articles with appropriate reading levels for students. Each article is leveled using reading lexiles and contains comprehension activities in the form of multiple choice and written response questions. For the pre-test, all participating students read a grade three appropriate nonfiction article and completed the corresponding quiz activities. After the text annotation instruction was given, students read a second nonfiction article at the same difficulty level and completed the corresponding Newsela activities as a post-test.

The activities on this site were designed to assess reading comprehension. After reading the article, students answered multiple choice and written response questions. These questions cover a variety of comprehension objectives including defining vocabulary, identifying main idea, summarizing, analyzing key concepts, and using text support. Total pre- and post-intervention Newsela quiz scores were calculated by using raw data from the multiple choice and written response questions.

Procedure

This study began on March 8, 2021. All twenty-three students were given a pretest with no special instruction. This assessment required students to read a third-grade level nonfiction article from the website <https://newsela.com>. Group A read the text “Big Questions” Why is Polar Bear Hair So Fair?”, Group B read “Big Questions: Why Do Baby Animals Have Pink Ears?”. After reading the assigned article, students completed the Newsela quiz associated with the article they were assigned. This consisted of multiple choice and written response questions and total score was calculated for each student. (One quiz had four items and one had five, so the researcher added one item of comparable difficulty to the four-item quiz so raw scores could be compared directly and each item had equal weight in the score calculations.)

Following the pretest, all students in attendance participated in two class reading sessions of approximately one hour each. During these sessions, students read nonfiction texts and received specific instruction on text annotation.

- On day one of the instruction students were introduced to the strategy. Text annotation symbols were introduced and modeled using a piece of nonfiction text. Students were shown how to highlight important key ideas. The students also received instruction on how to return to the text and use text annotation to find

answers and evidence for comprehension questions. Day one instruction relied heavily on modeling the strategy for the students.

- On day two, text annotation symbols and highlighting were reviewed. Students worked in small groups to implement the strategy with a new piece of nonfiction text and set of questions. This allowed students to discuss how to use the text annotation strategy to answer questions. Following small group work, students were provided a nonfiction article and set of questions to complete independently. Students then worked in small groups to discuss individual text annotation strategies and review answers.

At the end of the study, both groups were given a post-test Newsela quiz about a nonfiction article they were assigned to read. For the post-test, students were assigned the article they did not read for the pre-assessment. Group A read the text “Big Questions” Why Do Baby Animals Have Pink Ears?”, Group B read “Big Questions: Why is Polar Bear Hair So Fair?” Students were asked to use the annotation strategies as they read these articles for the post-intervention quiz.

The results of the pre and post-intervention Newsela quiz scores were compared to determine whether the Newsela scores after annotation instruction and use were significantly different from those using prior reading strategies. Results follow in Chapter 4.

CHAPTER IV

RESULTS

The purpose of this study was to determine whether reading comprehension quiz scores about grade-level nonfiction texts would be higher after students participated in two lessons on text annotation. The null hypothesis tested follows:

$$H_0: \text{Mean post-intervention reading comprehension scores} = \text{Mean pre-intervention reading comprehension scores}$$

The null was tested by conducting a t-test for paired samples to determine if the pre- and post- intervention scores differed significantly for the entire group.

Descriptive statistics for the groups and total sample

In order to determine whether the mean pre- and post-intervention reading comprehension test scores differed significantly for the entire sample (17 students), a t-test for dependent samples were run to compare them. The means compared in the t-test were for the total sample, but since the design was counterbalanced in terms of what the students read, the pre-and post-test scores were also computed by group. Overall group B scored higher on average than Group A on both the pre-test (mean=4.5 vs. 3.0) and post-test (mean=5.375 vs. 4.444). No t-tests were run to compare the groups' means, as all 17 participants who attended both lessons and completed both tests were included in the analysis which follows. Descriptive statistics regarding the pre- and post-test scores follow in Table1 and the results of the t-test follow in Table 2.

Table 1: Pre- Intervention Scores Vs. Post-Intervention Scores by Group

Descriptive Statistics for the pre- and post-intervention reading comprehension scores for the total sample and the sample disaggregated by group.

| Score | Group | n | min | max | Mean | Standard Deviation |
|------------------------------------|--------------|-----------|------------|------------|--------------|-------------------------------|
| Pre -Intervention Score | Total | 17 | 1 | 7 | 3.706 | 1.687 |
| | Group A | 9 | 1 | 5 | 3.000 | 1.225 |
| | Group B | 8 | 1 | 7 | 4.500 | 1.852 |
| Post-Intervention Score | Total | 17 | 2 | 7 | 4.882 | 1.219 |
| | Group A | 9 | 2 | 6 | 4.444 | 1.333 |
| | Group B | 8 | 4 | 7 | 5.375 | .916 |

The t-test results, shown below in Table 2, revealed that the pre- and post-test scores were significantly and positively correlated ($r=.499$, $p < .041$). The mean pre- and post-test scores of 3.706 and 4.882, respectively, differed by 1.176 points, which yielded a t statistic of -3.213. This t value was large enough to meet criteria for statistical significance ($p < .005$). Therefore, the null hypothesis was rejected, as the mean post-test score for the whole sample of 17 students was significantly higher than the mean pretest score.

Table 2: Total Pre-Intervention vs. Post Intervention Scores

Results of t-test comparing the pre and post-intervention reading comprehension scores for all participants (equal variances assumed)

| t | df | Sig (2-tailed) | Mean Difference | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | |
|--------|----|-------------------|--------------------|-------------------|--------------------|---|-------|
| | | | | | | Lower | Upper |
| -3.213 | 16 | .005 | -1.176 | 1.510 | .366 | -1.953 | -.400 |

Survey Results

The results of the survey found in Appendix C were summarized to illustrate how students felt about their ability to answer questions about non-fiction texts before and after using the text annotation strategy taught. Descriptive statistics for items one to four for the 15 participants who attended both lessons and completed a survey follow in Table 3. The researcher asked these questions in order to analyze the comfort level students had with the text annotation strategy. The survey also provided insight into whether the students found the strategy helpful and solicited specific feedback regarding which parts of the strategy were most beneficial to students.

Table 3: Descriptive statistics for survey responses

| Item | N | Range | Mean | Std. Deviation |
|---|----|-------|-------|----------------|
| 1. I was able to find answers to nonfiction text questions easily BEFORE using the text annotation strategy. | 15 | 1-2 | 1.667 | .488 |
| 2. The text annotation strategy is easy to understand and use. | 15 | 1-3 | 2.40 | .632 |
| 3. Learning the text annotation strategy helps me find answers to questions about what I read. | 15 | 2-3 | 2.60 | .507 |
| 4. It is easier for me to find the answers to nonfiction text questions now that I know how to use text annotation. | 15 | 2-3 | 2.73 | .458 |

Finally, short answer responses to item five were tallied and are depicted in Table 4 below.

Table 4: Summary of responses to item 5

| Item 5: The part of text annotation I find most helpful is: N=17, includes 2 absent | |
|---|-----------------|
| Short Answer Responses to Item 5 | Frequency given |
| Highlighting | 10 |
| Marking where I could find answers/questions | 4 |
| Labeling where I can find information | 1 |
| Absent for survey | 2 |

CHAPTER V

DISCUSSION

The purpose of this study was to examine whether the use of the text annotation strategy during reading instruction would result in improved reading comprehension assessments about non-fiction texts. After comparing the pre- and post-test scores for the whole sample, the null hypothesis was rejected as the data showed that the post test scores on parallel Newsela quizzes following the text annotation instruction were statistically significantly higher than the pre-test scores.

Implications of Results

The results of the study suggest that text annotation instruction had a positive impact on reading comprehension. The data from this study illustrates benefits of text annotation instruction including by showing higher post-test scores. The survey results also show students find the strategy beneficial and easy to use. Research suggests comprehension of non-fiction text is an important part of building a good reading foundation. The use of text annotation instruction will benefit students in more than just the area of reading, as non-fiction text appears across content and subject areas and comprehension of it is critical.

Theoretical Consequences

Being able to comprehend facts and think critically can build the basis for which students understand content areas such as science, history, and the arts. The English language arts standards for grade three state by the end of grade three students should be able to: “Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers” and “Determine the main idea of a text; recount the key details and explain how they support the main idea.” Based on these standards, text annotation instruction

was used to teach students to identify main ideas in a text and use evidence to support their responses.

Threats to Validity

One threat to the validity of this study was the environment in which the instruction took place. Due to the COVID-19 pandemic, the students had just returned to in-person learning a week prior to the study after spending several months at home learning virtually. The return was to a two-day hybrid attendance model, meaning students were leaning in-person at school for two days and at home for three days each week. The adjustment to coming back to school may have impacted leaning. Also, it was necessary for some of the students to take the pre-test virtually from their homes as they were unable to attend in-person learning. Due to the fact that some students took the pre-assessment at home, parent involvement may also have affected the validity of this study. Students often ask their parent for help when they are confused.

The brevity of the study also presented a threat to the validity of the results. The study took place over a two-week period in which students were only present in school for two days of instruction. Given more time, there students may have shown a greater improvement in reading comprehension or the impact of the new strategies might have diminished.

The sample for this study posed another possible threat to the validity of the findings the study used a small convenience sample of students from the researcher's third-grade class. A more effective sample would have included a larger group of students who more clearly and fully represented a range of comprehension skills.

Connections to Existing Literature

Literature has indicated that the use of text annotation instruction leads to an increase in reading comprehension. This study included explicit instruction and teacher modeling on the text annotation strategy which supports prior findings. For example, Knight & Justesen (2018) noted that students need explicit instruction and modeling in this area as it not a skill developed naturally in young readers. Strong, Amendum, & Smith (2018) also stressed the importance of the teacher giving specific instructions for annotations such as underlining or highlighting main ideas and circling confusing words when showing students how to annotate texts.

Strong, Amendum, & Smith (2018) also found that this strategy is most effective when used during the second reading of text, as students can perform a close read and make annotations after hearing the content once?. Due to these suggestions?, the students in this study were asked to? read texts being annotated several times.

Implications for Future Research

Future studies regarding the effectiveness of the text annotation strategy on reading comprehension should consider the following points. It would be beneficial to conduct the study during a year where students participate in in-person education or to control for that condition if some do not. In the current study, many students had been learning from home for close to a year at the time this study was conducted. The effects of this unusual delivery of instruction on learning (combined with many other social changes due to the pandemic) are unknown and may have impacted the results of the study.

A longer study period is also suggested for future studies. Due to time constraints of the project and combined with the hybrid learning model, students were given limited

instruction of the strategy. An increased amount of instruction would provide students more opportunity to practice the strategy. A longer time period would also have enabled the teacher to provide more detailed instruction about on reading online text and questions, which was difficult for some students.

In addition, the need to for social distancing limited the time and opportunity for students to discuss the text and strategy. Students can learn a great deal through discussion. The researcher proposes conducting the study at a time when students can collaborate more easily in order to help them better understand and apply text annotation strategies.

Conclusion

The null hypothesis for this study was rejected as results suggested that providing text annotation instruction increased reading comprehension in third-grade students. Results of a short, written survey showed that the students felt highlighting was the most beneficial aspect of the strategy. Future studies conducted in a more stable, in-person school environment and using longer timelines and more diverse samples may provide more insight into the effectiveness of text annotation.

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Article 1

Big Questions: Why is polar bear hair so fair?

Take a peek at a polar bear. What color is its fur? The bear looks white. But that answer is not quite right.

Polar bears are closely **related** to brown bears. However, they have a special set of **adaptations**. These special qualities allow the bears to live in the cold Arctic. The most famous adaptation is their bright white coloring. It helps them **blend** in. The bears can easily hide against the ice and snow. Can you imagine a brown bear trying to hide against the snow?

Fur Is See-Through

Polar bears usually look white. But their fur is not really white at all. It is actually see-through. Polar bear fur takes on a white color because of its **structure**, or shape.

Your hair gets its color from something called pigment. There are different kinds of pigment. They form in different amounts depending on your hair. When light hits them, they create colors. It is sort of like mixing different shades of paint. But polar bear hair has a structural color. It does not come from pigment. It comes from the way light bounces around the shape of the hair.



Polar bears' bright white coloring is an example of an adaptation. This quality helps the bears blend into the ice in the Arctic, where they live. Photo: Wikimedia.

Polar bear hair is not like human hair. It is actually hollow like a straw. The tubes are exceedingly small. They can only be seen with a special **tool** called a microscope. However, there is still enough room for light to enter them. The light bounces around inside. Then it is reflected back out. When the bears stand in the sun and all that light bounces off them, they look white.

When Weather Is Warm, Hair Can Look Green

Sometimes you might see a polar bear who looks a little green. This is because of hollow hairs. Tiny plants called algae sometimes grow inside these hairs. They fill the space where light would be. The algae are green. It makes the bears look like they rolled around in some grass.

This happens only when it is warm. That is because algae grow faster in warmer temperatures. Green bears are most likely to be seen in zoos. The weather there can get pretty warm. Fortunately, zookeepers have found a solution. Chilled, salty water can keep algae from growing. That helps bears keep their white coats all year long.

Science & Math

Big Questions: Why do baby animals have pink ears?



Animals in colder parts of the world have lighter skin. If a light-skinned animal has blood vessels close to the surface of their ear skin, this will make the ears look pink. Photo from Wikimedia Commons.

By The Conversation, adapted by Newsela staff

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Recommended for: Lower Elementary School - Upper Elementary School

Text Level:3

Question: Why do baby animals have pink ears when their bodies are not all pink?

Answer: Animals have many blood vessels in their ears. Blood vessels carry warm blood through the body. Some blood vessels are right under the skin. They sit very close to the **surface** of the ear. The skin there is pretty thin, so the vessels show through a bit. They make the ears look pink.

Keeping Temperature Right

Having blood vessels close to the skin helps animals keep their body temperature just right. This is true for people, too. When we are cold, the blood vessels close to our

skin **react**. They tighten up. This makes it harder for blood to flow. Less blood gets close to our skin. This means less heat escapes our bodies.

When we are hot, the opposite happens. The blood vessels near our skin widen. More blood can flow. That means more heat can escape our bodies. It helps cool us down.

Are baby animal ears really pink, though? Read on to find out.

Animal Types Can Change

A species is a kind of animal. Over an awfully long time, animal species can change. They adapt new traits. They help the animals survive. A trait might be what the animals eat. It might be how they hunt.

Animals with these helpful traits will live on. If an animal lives long enough, its children can also have traits that help them survive. Animals without these traits might get eaten. Or they might die out for other reasons.

Skin color is another animal trait. Animals living in hot **climates** often have darker skin. This **includes** the skin on their ears. One example is the African elephant. Its ears are quite dark. They are also huge. The African elephant has the biggest ears of any animal!



Zoom-outImage 2.

Animals that live in warmer climates have darker skin. The African elephant is one example. It lives on the hot and sunny continent of Africa. Its ears are huge -- but they don't look pink! Photo: Wikimedia Commons.

Animals who live in colder environments **usually** have lighter skin. Why is skin color darker in hot places and lighter in cold ones? It is because of something called pigment. Our bodies make pigment. It gives our skin color. The more pigment our body makes, the darker our skin looks. Pigment helps protect skin against the sun's hot rays.

A Pink Glow

Animals in warmer climates make a lot of pigment. They need dark skin to protect themselves from the sun. Without it, they would be in danger.

The sun is not as strong in colder regions. Animals living there do not need dark skin to survive. So, they make less pigment. Their skin is lighter.

Some of these light-skinned animals do not have fur or feathers on their ears. Their ears look pink. What you really see, though, is the color of the blood vessels. They sit right under the ears' thin skin. This gives some animal ears a pink glow.

Appendix B

Article 1 Quiz

1 Which sentence from the section "Fur Is See-Through" BEST explains why polar bears look white in the sun?

- (A) Your hair gets its color from something called pigment.
- (B) When light hits them, they create colors.
- (C) It comes from the way light bounces around the shape of the hair.
- (D) However, there is still enough room for light to enter them.

2 Read the paragraph from the section "When Weather Is Warm, Hair Can Look Green."

This happens only when it is warm. That is because algae grow faster in warmer temperatures.

Green bears are most likely to be seen in zoos. The weather there can get pretty warm.

Fortunately, zookeepers have found a solution. Chilled, salty water can keep algae from growing.

That helps bears keep their white coats all year long.

Which question is answered in this paragraph?

- (A) How does algae get inside a polar bear's hair?
- (B) Where can you see polar bears that are green?
- (C) How do zookeepers keep polar bears safe?
- (D) Where do most of the white polar bears live?

3 What information will the reader find in the section "Fur Is See-Through"?

- (A) how polar bears are able to live in the Arctic
- (B) how polar bears are taken care of in the zoo
- (C) why a polar bear looks like it has white hair
- (D) why polar bears need to live in cold water

4 What does the introduction [paragraphs 1-2] show the reader?

- (A) It shows how polar bears need thick fur to stay warm.
- (B) It shows how a polar bear's fur gets its white color.
- (C) It shows how polar bears have fur that is see-through.
- (D) It shows how a polar bear's fur helps them in the Arctic.

Written Response:

Write a short paragraph that explains the central idea of the article. Use at least two details from the article to support your response.

Article 2 Quiz

1. Read the paragraph from the section "Animal Types Can Change."

Animals who live in colder environments usually have lighter skin. Why is skin color darker in hot places and lighter in cold ones? It is because of something called pigment. Our bodies make pigment. It gives our skin color. The more pigment our body makes, the darker our skin looks. Pigment helps protect skin against the sun's hot rays.

Which question is answered in this paragraph?

- (A) How does pigment help make pink ears?
- (B) How much pigment do elephants have?
- (C) Why is pigment helpful in cold places?
- (D) Why is pigment important in hot places?

2. Read the section "A Pink Glow." Select the sentence from the section that BEST explains why some animals look like they have pink ears.

- (A) Animals in warmer climates make a lot of pigment.
- (B) They need dark skin to protect themselves from the sun.

(C) What you really see, though, is the color of the blood vessels.

(D) This gives some animal ears a pink glow.

3. Which section from the article gives information about an animal that has skin with a lot of pigment?

(A) Introduction [paragraphs 1-2]

(B) "Keeping Temperature Right"

(C) "Animal Types Can Change"

(D) "A Pink Glow"

4. What information will the reader find in the section "Keeping Temperature Right"?

(A) a description of how an animal's blood vessels make its ears look pink

(B) an explanation of how hot and cold weather changes how blood vessels act

(C) a description of how animals with dark skin are able to live in hot temperatures

(D) an explanation of why some animals have fur or feathers in cold areas

Written Response:

Write a short paragraph that explains the central idea of the article. Use at least two details from the article to support your response.

Text Annotation Survey

Name: _____

| | | | |
|--|---|--|---|
| <p>1. I was able to find answers to nonfiction text questions easily BEFORE using the text annotation strategy.</p> |  |  |  |
| <p>2. The text annotation strategy is easy to understand and use.</p> |  |  |  |
| <p>3. Learning the text annotation strategy helps me find answers to questions about what I read.</p> |  |  |  |
| <p>4. It is easier for me to find the answers to nonfiction text questions now that I know how to use text annotation.</p> |  |  |  |

5. The part of text annotation I find most helpful is: