

# Hidden Figures: The True Story of Four Black Women and the Space Race

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**Before John Glenn orbited the Earth or Neil Armstrong walked on the Moon, a group of four dedicated, black, female mathematicians known as “human computers” used pencils, slide rules, and adding machines to calculate the numbers that would launch rockets and astronauts into space. This is the amazing, true story of their work at NASA that helped achieve some of the greatest moments in our space program. These inspirational women lived through the Space Race, the Cold War, the movement for gender equality, and the harsh realities that preceded the civil rights era. Their work forever changed the face of NASA and the country.**

## Create Successful Reading Habits

Academic language is a critical component of vocabulary development, oral language, and developing a student’s ability to read, think, speak, and write about a topic. By guiding students to develop their academic language skills, teachers can mitigate some of the challenges that students encounter when learning to comprehend text.\* Students should engage in a variety of activities that purposefully support the development of their academic language. Inferential language instruction can be helpful when learning about figurative language because it supports a student’s ability to think critically, make inferences, connect ideas, and determine the deeper meaning of the text.

\* U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, What Works Clearinghouse. (n.d.). Practice Guides. <https://ies.ed.gov/ncee/wwc/PracticeGuides>

## SCIENCE OF READING – EXPLICIT AND SYSTEMATIC INSTRUCTION

Effective reading instruction is systematic, explicit, and scaffolded; it provides multiple examples and opportunities for students to practice the skill or concept being taught.

### Systematic instruction is ...

- thoughtfully outlined, builds upon prior learning, and is delivered on a continuum from simple to complex skills.
- broken down into manageable step-by-step chunks that are appropriate to the instructional goals and pacing of instruction.
- a carefully planned scope and sequence of instruction.

The goal of **systematic instruction** is to ensure that whenever students are asked to learn a new skill or concept, they already possess the appropriate knowledge and understanding to efficiently learn the new skill or concept.

### Explicit instruction is ...

- making the skill taught obvious to the student.
- scaffolded and typically follows the “I Do, We Do, You Do” instructional routine.
- an instructional routine that gradually shifts the responsibility from the teacher to the student.

The following scaffolding should occur during explicit instruction:

1. **I Do:** The teacher explains and models the skill or concept by showing exactly how to do what was explained. The teacher should provide multiple examples and, when appropriate, nonexamples.
2. **We Do:** The teacher provides guided practice with scaffolding. The teacher monitors and scaffolds instruction by prompting and giving corrective feedback as students practice the skill or concept with the teacher or a peer.
3. **You Do:** The teacher provides independent practice. Students practice the skill or concept independently while the teacher monitors and gives feedback.

## STANDARDS ALIGNMENT FLORIDA’S B.E.S.T. STANDARDS

The ELA standards are designed to be user-friendly so that every stakeholder will understand what students are expected to master.

Taken together, the benchmarks, clarifications, and appendices represent the expected outcomes for the students of Florida and carry the full weight of the standards.

Look for standards alignment in each section of this guide.

# WORD WORK – PREFIXES

Help your students identify **prefixes** to read and understand complex vocabulary words.

A **prefix** is a word part that is added to the beginning of a base word, like **unfriendly**. **Prefixes** have meaning and will change the meaning of the base word when added. Base words are single words that cannot be broken into smaller word parts and still have meaning. Here is an example of how the meaning of the base word *agree* changes when the prefix *dis* is added to the beginning of the word.

Base Word	Prefix	New Word	New Meaning
agree	<b>dis</b> (not)	disagree	to not agree

Here are some examples of prefixes from the book and a description of what they mean.

Example from the book	Prefix (Meaning)	Meaning
research (p. 15), rebuilt (p. 38)	<b>re</b> (again)	to search again, built again

Practice discussing words with prefixes from the book.

Point to the word *research*. Say to the students:

- This word is *research*. *Research* is made up of two word parts, a prefix, and a base word. A prefix is a word part that is added to the beginning of a base word to change its meaning.
- The prefix *re* is at the beginning of the word *research*. The prefix *re* means “again.”
- If the prefix is *re*, what is the base word in *research*? (Allow students to respond.)
- The base word is *search*. What does the word *search* mean? (Allow students to respond.)
- To search for something means to look for something carefully. When the prefix *re* (again) is added to the base word *search*, the word *research* means “to search for something carefully again.”
- When you research something, you are carefully searching through the information again. People who *research* often have to look through the information many times until they discover what they are looking for, they search again and again.

Find more opportunities to practice identifying and analyzing words with prefixes as you read the book together.

**ELA.4.F.1.3: Use knowledge of grade-appropriate phonics and word-analysis skills to decode words.**

- a. Apply knowledge of all letter-sound correspondences, syllabication patterns, and morphology to read and write unfamiliar single-syllable and multisyllabic words in and out of context.

**ELL and SWD suggestion:**

Students who need additional practice identifying word parts can highlight the prefixes and suffixes in a word. Highlighting will help students to clearly see each part (chunk) of the word.

## TALK ABOUT NEW AND INTERESTING WORDS

Tier 2 vocabulary words can be used for explicit vocabulary instruction. When teaching vocabulary, it is important to create and share student-friendly definitions that are appropriate for the level of your students. Help students make connections to the word by providing contextual information that relates to the text being read and builds upon their background knowledge. Here are some examples of Tier 2 vocabulary words from the book:

**prevent** (p. 14)   **analyze** (p. 14)   **commit** (p. 21)   **perseverance** (p. 30)

When readers encounter a new word, it is often helpful to look at the words, phrases, and sentences surrounding the unfamiliar word to help them determine its meaning. These hints before and after the word are called **context clues**.

Page 205 of the B.E.S.T. Standards outlines five different types of context clues; definition, synonyms, antonyms, examples, and inference. The author of the book *Hidden Figures* uses definitions to help readers understand unknown vocabulary words. Use the gradual release process to practice identifying and using definition context clues with your students. Use the chart below to help students practice this skill.

- For each word, students will:
- identify the word and the page number.
  - copy the example from the text.
  - explain how the meaning of the word helps you understand the meaning of the text.

Word & Page #	Definition from text	Meaning of the word in context.
Turbulence (p. 15)	In one of her first projects, she learned how to analyze <i>turbulence</i> , or dangerous gusts of air.	<i>Turbulence</i> describes the dangerous gusts of air that come from airplanes.
Wind tunnel (p. 12)		

Students will continue to identify the use of definitions to determine the meaning of unknown words and fill out the chart.

**ELA.4.V.1.3: Use context clues, figurative language, word relationships, reference materials, and/or background knowledge to determine the meaning of multiple-meaning and unknown words and phrases, appropriate to grade level.**

- **Clarification 2: See Context Clues and Word Relationships.**

**ELL and SWD suggestion:**

Help students identify the word and the definition that is provided by asking students to circle the unknown word and underline the definition that is provided.

Word & Page #	Definition from text	Meaning of the word in context.
Turbulence (p. 15)	In one of her first projects, she learned how to analyze <u>turbulence</u> or <u>dangerous gusts of air</u> .	<i>Turbulence</i> describes the dangerous gusts of air that come from airplanes.

# READING FOR MEANING – CHARACTERIZATION AND PROBLEM & SOLUTION

- ELA.4.R.2.1: Explain how text features contribute to the meaning and identify the text structures of problem/ solution, sequence, and description in texts.
- ELA.4.R.1.1: Explain how setting, events, conflict, and character development contribute to the plot in a literary text.

## Before:

Before reading this book, consider doing one of the following activities to activate your students' prior knowledge and background information that will help them comprehend the story. The B.E.S.T. standards emphasize the importance of understanding how a time period influences the story being told. Here are a few suggestions for exploring the time period of *Hidden Figures* with your students.

- Students can research topics, such as NASA or The Space Race, and report back their findings to the rest of the class.
- Explore the timeline provided on pages 33 – 34 and provide information on what was happening in society during that time.
- Discuss segregation, what it means, and how it affected people of color during that time period.

## During:

- As you read and learn about each of the four women in this story, use the graphic organizer to answer the following questions for each character.

	Dorothy Vaughn (p. 4 – 11)	Mary Jackson (p. 12 – 13)	Katherine Johnson (p. 15 – 24)	Christine Darden (p. 27 – 30)
Describe the character's job. What does she do?				
What is the main problem this character is facing in the story?				
What action(s) does she take to solve this problem?				
What character trait BEST describes this character?				
Provide one piece of text evidence to support the character trait you chose.				
What can you learn from this character's experiences?				

- When they are told their dreams are impossible, how do each of the women react? (p. 6, 12, 16)
- How does the work of the black, female, human computers who came before Christine influence her experiences working at Langley? (p. 26)

## After:

- The word **figure** can mean a person, and it can also be used to refer to a number. Why do you think the author chose the title *Hidden Figures* for the book?
- How do segregation laws impact these women as they follow their dreams?
- What does this book teach you about **perseverance**?
- **Write:** Using your chart and knowledge of the text, write two constructed responses for the following questions. Be sure to cite evidence to support your answer.
  - Describe how these four women are similar.
  - How do each of these *Hidden Figures* influence the next generation of scientists, mathematicians, and engineers?

## ELL and SWD suggestion:

Use the RACE strategy to help students learn and remember how to write a constructed response. RACE is an acronym that helps students remember the steps for writing a constructed response. Focusing on each component of the RACE strategy will allow students to tackle writing a constructed response one step at a time and help them to see how all the pieces fit together to create one well-written answer.

**R – Restate** the question.

**A – Answer** the question.

**C – Cite** text evidence.

- Provide a framework for citing text evidence. The author stated, "... " or According to the text, "... "

**E – Explain** what it means.

- Provide students with elaboration stems such as, *This shows . . .*, *This proves . . .*, or *This means that . . .*