

CURRICULUM GUIDE



Breaking Through the Clouds

The Sometimes Turbulent
Life of Meteorologist
Joanne Simpson

By Sandra Nickel

Illustrated by Helena Perez Garcia

WHEN JOANNE SIMPSON (1923–2010) was a girl, she sailed her boat beneath the puffy white clouds of Cape Cod. As a pilot, she flew her plane so high, its wings almost touched them. And when World War II began and Joanne moved to the University

of Chicago, a professor asked her to teach Air Force officers about those very clouds and the weather-changing winds.

As soon as the war ended, Joanne decided to seriously study the clouds she had grown to love so much. Her professors laughed. They told her to go home. They told her she was no longer needed. They told her, “No woman ever got a doctorate in meteorology. And no woman ever will.”

But Joanne was stubborn. She sold her boat. She flew her last flight. She saved her money so that she could study clouds. She worked so hard and discovered so much that—despite what the professors said—she received a doctorate in meteorology. She was the first woman in the world to do so.

Breaking Through the Clouds tells the story of a trailblazing scientist whose discoveries about clouds and how they work changed everything we know about weather today.

“An energetic, compassionate examination of a determined researcher who left her mark on the field of atmospheric sciences.”

—PUBLISHERS WEEKLY

Also by Sandra Nickel



ABRAMS

srandnickel.com helenaperezgarcia.co.uk abramsyoungreaders.com

The Common Core State Standards addressed by the discussion questions and activities in this guide are noted throughout. For more information on the Common Core, visit corestandards.org.

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DISCUSSION QUESTIONS

Unless otherwise noted, all discussion questions align with the following Common Core State Standards:

CCSS.ELA-LITERACY.RI.1.1; CCSS.ELA-LITERACY.RI.2.1; CCSS.ELA-LITERACY.RI.3.1; CCSS.ELA-LITERACY.RI.4.1

-  As a child growing up in Cape Cod, what types of things made Joanne happy?
-  Joanne and her mother had a difficult connection. What weather-related words does the author use to describe the relationship between the mother and daughter?
CSS.ELA-LITERACY.RL.1.4; CSS.ELA-LITERACY.RL.2.4; CSS.ELA-LITERACY.RL.3.4; CSS.ELA-LITERACY.RL.4.4
-  Why do you think that Joanne was drawn to flying planes? **CCSS.ELA-LITERACY.RL.1.3; CCSS.ELA-LITERACY.RL.2.3; CCSS.ELA-LITERACY.RL.3.3; CCSS.ELA-LITERACY.RL.4.3**
-  Right before the US joined World War II, Joanne went to the University of Chicago where she studied with meteorologist Carl-Gustaf Rossby. What special assignment did Rossby give to Joanne and how was this job helpful to officers going into the war?
-  After World War II, Joanne was interested in pursuing her doctorate in meteorology. Why was she discouraged by others from getting her Ph.D.?
-  Joanne returned to Cape Cod and heard that the Woods Hole Oceanographic Institute had films about her area of interest in meteorology. What did Joanne discover from watching the films about clouds at the institute in Woods Hole?
-  Joanne overcame others' doubts about her ability and interest in pursuing a doctorate when she returned to the University of Chicago. What important discovery about cumulus clouds did Joanne describe that helped her receive her Ph.D.?
-  Joanne's fascination with clouds led her to organize an expedition to take a closer look at them. How were the U.S. Navy and the Woods Hole Institute involved in Joanne's expedition?
-  What does Joanne's reaction to the difficulty in planning and participating in the expedition reveal about her character? Do you think that women today would face the same difficulties in planning a scientific expedition? **CCSS.ELA-LITERACY.RL.1.3; CCSS.ELA-LITERACY.RL.2.3; CCSS.ELA-LITERACY.RL.3.3; CCSS.ELA-LITERACY.RL.4.3**
-  Even though Joanne discovered and collected important data about clouds, her mentor, Rossby, still believed that clouds were unimportant. What helped Rossby change his mind about Joanne's study of clouds?
-  Joanne went on to hold many important leadership roles in the study of meteorology and wrote over 200 articles on the topic of clouds. Joanne famously said, "You don't just sit there and all of a sudden a light bulb flashes over your head and you say, 'Aha!' What you have to learn to be is . . . stubborn." What do you think that she meant by this? Cite examples from the text to support your opinion. **CCSS.ELA-LITERACY.RL.1.3; CCSS.ELA-LITERACY.RL.2.3; CCSS.ELA-LITERACY.RL.3.3; CCSS.ELA-LITERACY.RL.4.3**

ACTIVITIES FOR STUDENTS

CLOUD WATCHING

As a child, Joanne spent a great deal of time outside studying nature, including staring at the clouds in the sky. Collect your own observations of clouds by either drawing in a sketchbook the clouds you see outside or use a tablet to take photos of the clouds you observe. Use the labeled sketches of clouds in the end papers of *Breaking Through the Clouds* to help you identify the different types of clouds you observed.

ANALYZING CLOUD DATA

Extend your observation of clouds by collecting data of the types of clouds that your class observes each day for a month. Create a class graph on butcher paper of which of the three main types of clouds you see each day—cumulus, stratus, or cirrus. Have a cloud monitor in the class check the sky each day and mark on the graph which type of cloud is seen. After a month of collecting cloud data, work with a partner to describe the data. What was the type of cloud your class saw the most? The least? What is the difference between the number of days each type of cloud was observed?

CCSS.MATH.CONTENT.1.MD.C.4; CCSS.MATH.CONTENT.2.MD.C.4; CCSS.MATH.CONTENT.3.MD.C.4; CCSS.MATH.CONTENT.4.MD.C.4

CREATE A CLOUD

Make your own cloud in a jar. Supplies needed: a glass jar with a lid, such as a mason jar; hot water; blue food coloring; aerosol hairspray; and three to five ice cubes. Fill the jar half way with hot water and add a few drops of blue food coloring. Next, spray a touch of hairspray into the jar and quickly seal the jar with the lid. Place the ice cubes on top of the lid and observe what happens in the top part of the jar. Record what you observe and the changes that happen as the cloud begins to form. Finally, open the lid to see what happens as the cloud moves out of the jar and into the air. What role do you think the hot water and the ice cubes played in creating your cloud?

PERSONAL NARRATIVE

Joanne Simpson said that in order to discover something new, you can't just sit there, you have to be stubborn. Think of a time in your life when you were learning something new. Write a personal narrative describing how you went about learning a new idea or a new skill. Did you “just sit there” or were you stubborn like Joanne Simpson?

CCSS.ELA-LITERACY.W.1.3; CCSS.ELA-LITERACY.W.2.3; CCSS.ELA-LITERACY.W.3.3; CCSS.ELA-LITERACY.W.4.3



The discussion questions and activities in this guide were created by Leigh Courtney, Ph.D. She teaches in the Global Education program at a public elementary school in San Diego, California. She holds both masters' and doctoral degrees in education, with an emphasis on curriculum and instruction.

Name: _____

CAUSE AND EFFECT



The events in Joanne Simpson's life as described in *Breaking through the Clouds* are all connected to one other. Look at the story events listed in the CAUSE column. Think about what happened in the story right after each event listed. Write a description of the EFFECT of each story event on the course of Joanne's life.

CCSS.ELA-LITERACY.RL.1.3; CCSS.ELA-LITERACY.RL.2.3; CCSS.ELA-LITERACY.RL.3.3

CAUSE	EFFECT
<p>Joanne went to the University of Chicago to study with meteorologist Carl-Gustaf Rossby right before World War II.</p>	
<p>Joanne watched films of clouds and spent more than a year making calculations and studying all she could about clouds. She came to an amazing conclusion and presented her work to professors at the University of Chicago.</p>	
<p>Joanne organized an expedition at the Woods Hole Institute of Oceanography to work with the U.S. Navy to fly into clouds and study them. Woods Hole scientists banned Joanne from going on the expedition.</p>	

Name: _____

FUN WITH WEATHER IDIOMS



An idiom is an expression that can't be understood from the literal meaning of its separate words, but it conveys something nonetheless. For example, if something "costs an arm and a leg" it doesn't literally mean that one has to surrender body parts to purchase it; it means that it's expensive. Look at the following idioms involving clouds and weather. Draw a picture of the literal meaning of each idiom and then write an explanation of its figurative meaning.

CCSS.ELA-LITERACY.RL.1.4; CCSS.ELA-LITERACY.RL.2.4; CCSS.ELA-LITERACY.RL.3.4; CCSS.ELA-LITERACY.RL.4.4

IDIOM	LITERAL DRAWING	FIGURATIVE MEANING
Every cloud has a silver lining.		_____ _____ _____
He has his head in the clouds.		_____ _____ _____
She is on cloud nine.		_____ _____ _____
It's raining cats and dogs.		_____ _____ _____
She's saving for a rainy day.		_____ _____ _____
Don't rain on my parade.		_____ _____ _____

Name: _____

MAKING CONNECTIONS

Readers help to make sense of books by noticing how the stories connect to other books they've read, experiences they've had, or similar things happening in the real world. Think carefully about *Breaking Through the Clouds* and what you've learned about Joanne Simpson and make connections! **CCSS.ELA-LITERACY.RL.1.9; CCSS.ELA-LITERACY.RL.2.9; CCSS.ELA-LITERACY.RL.3.9; CCSS.ELA-LITERACY.RL.4.9**



TEXT TO TEXT

Connections you can make between the story and other books you have read.

TEXT TO SELF

Connections you can make between the story and your own life experiences.

TEXT TO WORLD

Broader connections you can make to the larger world—to things you have seen or learned from television, movies, newspapers, etc.