

ADA TWIST, SCIENTIST

by Andrea Beaty illustrated by David Roberts

ABOUT THE BOOK

The creators of the *New York Times* bestselling picture books *Rosie Revere, Engineer* and *Iggy Peck, Architect* are back with a story about the power of curiosity in the hands of a child who is on a mission to use science to understand her world. *Ada Twist, Scientist*, from powerhouse team Andrea Beaty and David Roberts, is a celebration of STEM, perseverance, and passion.

Like her classmates, builder Iggy and inventor Rosie, scientist Ada, a character of color, has a boundless imagination and has always been hopelessly curious. Why are there pointy things stuck to a rose? Why are there hairs growing inside your nose? When her house fills with a horrific, toe-curling smell, Ada knows it's up to her to find the source. Not afraid of failure, she embarks on a fact-finding mission and conducts scientific experiments, all in the name of discovery. But, this time, her experiments lead to even more stink and get her into trouble!

Inspired by real-life makers such as Ada Lovelace and Marie Curie, *Ada Twist, Scientist* champions girl power and women scientists, and brings welcome diversity to picture books about girls in science. Touching on themes of never giving up and problem solving, Ada comes to learn that her questions might not always lead to answers, but rather to more questions. She may never find the source of the stink, but with a supportive family and the space to figure it out, she'll be able to feed her curiosity in the ways a young scientist should.

About the Author and Illustrator

Andrea Beaty and David Roberts are the creators of *Iggy Peck, Architect*; *Rosie Revere, Engineer*; and *Happy Birthday, Madame Chapeau*, among other award-winning children's books. Out-of-this-world *Rosie Revere, Engineer* is currently orbiting Earth aboard the International Space Station as part of the Story Time From Space program, storytimefromspace.com. Beaty lives just outside of Chicago. Visit her online at andreabeaty.com and on Twitter: @AndreaBeaty. Roberts lives in London. Visit him online at davidrobertsillustration.com.

VOCABULARY

These vocabulary words can be found throughout the book (in the order they are listed). Use these words as a starting point for a vocabulary study with *Ada Twist, Scientist*. Research shows that reading and discussing vocabulary within the context of reading is one of the most effective ways to learn vocabulary.

Chaos

Conked

Frazzled

Quivered

Dazed

Havoc

Traits

Stench

Pungent

Aroma

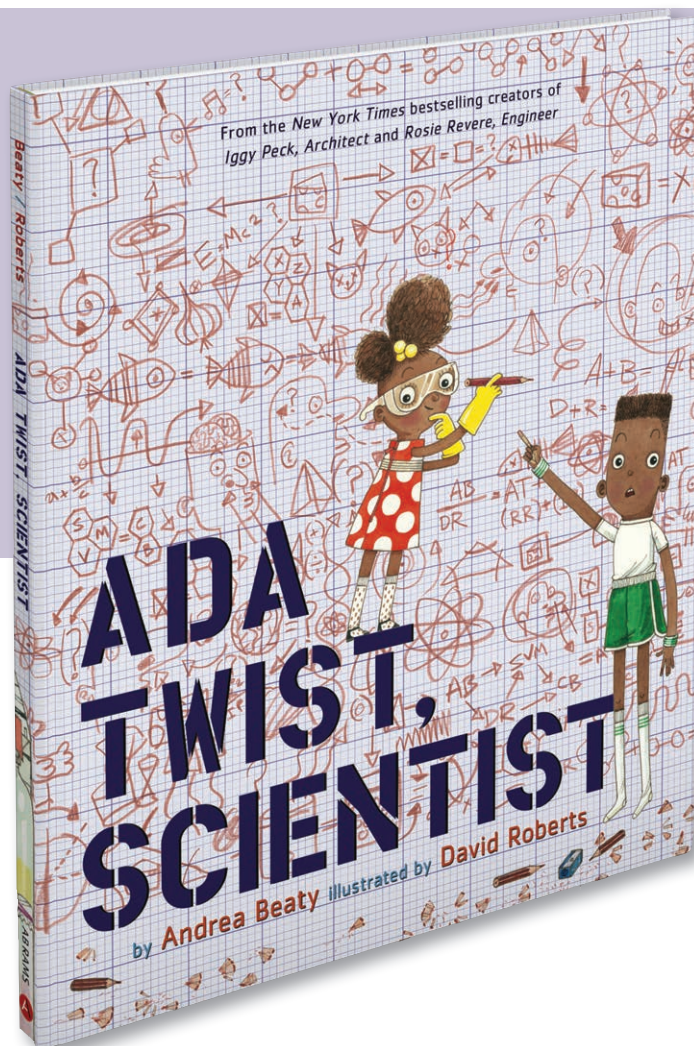
Hypothesis

Flop

Frazzled

Gawk

Fiction



ACTIVITIES: Use these activities to extend student learning with *Ada Twist, Scientist*

DECIPHERING ADA'S NOTES

On the cover, the spread of the Great Thinking Hall, and the page where Ada's on the ladder, Ada writes out her thought processes to help her think through a problem. Within these notes, the reader can find science bits and other fun things.

On the cover, there are letters throughout the drawing including AB, DR, SVM, CB, IP, RR, and AT. What could these letters stand for?

- AB=Andrea Beaty, DR=David Roberts, SVM=Susan Van Metre (editor), CB=Chad Beckerman (Art Director), IP=Iggy Peck, RR=Rosie Revere, AT=Ada Twist

What bits of science facts can you find on the cover and on the Great Thinking Hall wall?

- $E=MC^2$, atomic structure, equilateral triangles, ball and stock representations of atoms, graphing, and more!

On the page with the ladder, what great scientific question is Ada considering?

ANSWERING ADA'S QUESTIONS

The blocks on the first few pages of the book (and one towards the end) are used very thoughtfully. Have your students look at these pages and see if they can determine the importance of the blocks each time they are used.

Why does it tick and why does it tock?

Why don't we call it a granddaughter clock?

- **Extension:** Ada asks why the Grandfather clock cannot be Granddaughter clock, and it all goes back to an 1876 song called "My Grandfather's Clock." Have students read the lyrics to the song, and draw the clock that the grandson describes. As a class discuss how this song's description fits the modern Grandfather Clock and how it may have gone from being a song to a proper noun for a clock.
- **Source:** http://www.theclockdepot.com/history_of_the_grandfather_clock.html

Why are there pointy things stuck to a rose?

Why are there hairs up inside of your nose?

What is the source of that terrible smell?

BLOCKS

When Ada does talk, she automatically starts asking questions—all which have answers. Have your students do research to answer Ada's questions:

Title page (and on the ladder page): All elements

Crib scene: Spells out LOVELACE

Next page and clock page: Spells out ADA



ASTRONOMY

Ada becomes interested in astronomy at one point, and draws planets to share with her family. This page is a great place to start a discussion about planets vs. dwarf planets.

What are the differences between the planets on the floor and in Ada's hand vs. the ones her family is holding?

What is the difference between a planet and a dwarf planet?

Have students research Pluto and come up with an opinion over if they think it is a planet or a dwarf planet.

As a class, look at planetary size and distance comparison:

<http://nationalgeographic.org/activity/planetary-size-and-distance-comparison/>

- Add the dwarf planets to the comparison to connect past discussions

SODA GEYSER EXPERIMENT

Ada uses diet soda, mint Mentos, and food coloring to do a quite colorful and fun, yet messy, experiment. With your students, complete this activity, but then turn it into an experiment. Have students brainstorm ways to change and measure the geysers (cold vs. room temperature, flat vs. new, regular vs. diet).

Also, use this time to use the scientific method:

1. Ask a question
2. Do background research
3. Make a hypothesis
4. Test your hypothesis by doing an experiment
5. Analyze your data and draw a conclusion
6. Communicate your results



The why behind the geysers is a physical reaction called nucleation. The carbon dioxide grabs onto the textured Mentos's nucleation sites and as the Mentos drop to the bottom of the soda, more and more gas is built up and BOOM!

Source: <https://www.newscientist.com/article/dn14114-science-of-mentos-diet-coke-explosions-explained/>

SENSE OF SMELL

Ada becomes very interested in noses and smelling because she smells a “pungent aroma that curled her toes.” Use Ada’s question “How does a nose know there’s something to smell?” as a jumping off point for an inquiry activity. Students can research the nose and how it works.

Extension: We have five senses that each work differently to help us perceive the world around us. Instead of all students focusing on smelling, students can divide up into the five senses to learn how each works.

Writing tie-in: Imagery is a key part of creative writing because it helps immerse the reader into the story. After studying the senses, introduce imagery and have students write a story where they include adjectives and adverbs that cause the reader to feel, taste, smell, see, and hear what is going on in the story.

BOOKS

When Ada’s family started helping her with her experiments, they begin doing research by reading. These books are either well known scientific texts or cleverly made up. With your students, go through all of the texts and determine which are real and which are fake. The fake books link up to the initials found on the cover as well as one science joke.

Fake Books:

- THE ART OF SCIENCE by Dr. Roberts (David)
- IF by S Van Metre
- AS IF by Professor Beaty
- THE PHYSICS OF FONTS by Chad Beckerman
- HOW’S IT GOING, CAT? by Schroedinger

Real books:

- *IN THE SHADOW OF MAN* by Jane Goodall
- *SILENT SPRING* by Rachel Carson
- *ADA LOVELACE* (Actually what she looks like)
- *COSMOS* by Carl Sagan
- *RADIOACTIVE SUBSTANCES* by Marie Curie
- *DO WE NEED THE MOON?* by Maggie Aderin-Pocock



Although these texts are quite in depth, as a class you could look into what each is about and summarize it to help understand why each book is important.

FEMALE SCIENTISTS

Ada Twist is named after two of the most famous female scientists: Marie Curie and Ada Lovelace.

There was a clue within the book of Ada's name origin, can you find it?

- Ada Lovelace's book is on the page with Ada on a ladder.

Ada Twist, Scientist is a great jumping off point to discuss female scientists who have had an impact in the scientific world. This discussion would be best as student-centered. Separate the class into two or more groups and provide them with resources to read about female scientists include Marie Curie and Ada Lovelace. These resources can be nonfiction picture books or online resources suitable for your students. The students can then read about their assigned scientist, and answer the following questions (or teacher-created questions) collaboratively:

- When did your scientist live?
- What field of science did they study?
- What were three ways that they impacted their field?

Students can then either present their findings to the class or pair up with students from the other group(s) and share their findings.

This information could also start as a teacher presentation sharing information about the female scientists followed by a student-chosen inquiry project into the life of one of the scientists.

Some other female scientists to consider: Jane Goodall, Caroline Herschel, Mary Anning, Irene Curie-Joliot, Barbara McClintock, Dorothy Hodgkin, Shirley Jackson, and so many more!



DISCUSSION QUESTIONS: Use these questions as whole class discussions, reading check-ins, or as writing prompts with *Ada Twist, Scientist*

On the second spread, Ada has labeled the animals all with different numbers. What do these numbers represent? Are any wrong? Why did Ada get it wrong?

They label the animals' legs; however, she put that the elephant has 5 because of its trunk.

Similar to Ada Twist, Albert Einstein didn't talk until he was four years old, and wrecked some havoc at school. What does this tell you about these two thinkers? Does behavior at school always equal intelligence? Why might they have caused problems at school? How did the book pay homage to Einstein?

When Ada is holding the turtle, what is similar between the turtle and the eggs all around Ada? Why should the turtle be scared? What question is Ada trying to answer?

Extension: Have students answer Ada's question: Why do turtles have an outside shell? What's on the inside of a turtle's shell?

What are some ways the author and illustrator showed that time was passing throughout the book. It never says that Ada grew to age 7 or 8 as indicated by the final spread; however, there were clues showing that time was passing.

How did Ada follow the Scientific Method to determine the mystery smell? What was her question? Her research? Her hypotheses? Her experiments? Did she draw a conclusion?

"[Ada Twist] had all the traits of a great scientist." What character traits does she possess that makes her a perfect scientist?

Ada's parents send her to the thinking chair for experimenting on the cat. How could Ada have kept from getting in trouble? What could Ada's parents have done instead of automatically sending her away?

On the final spread in the book, there are three students who have something the other students don't, see if your students can figure it out.

Rosie Revere, Iggy Peck, and Ada Twist all have pencils.

Theme is a lesson that the reader takes away from a text. What did this text teach you?

COMMON CORE STANDARDS

Here are a few examples of English Language Arts Common Core Anchor Standards that can be met by extending *Ada Twist, Scientist* with the above discussion questions/activities.

CCSS.ELA-LITERACY.CCRA.R.1

Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCSS.ELA-LITERACY.CCRA.R.2

Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas..

CCSS.ELA-LITERACY.CCRA.R.3

Analyze how and why individuals, events, or ideas develop and interact over the course of a text.

CCSS.ELA-LITERACY.CCRA.R.4

Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

CCSS.ELA-LITERACY.CCRA.R.5

Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.

CCSS.ELA-LITERACY.CCRA.W.7

Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.CCRA.W.9

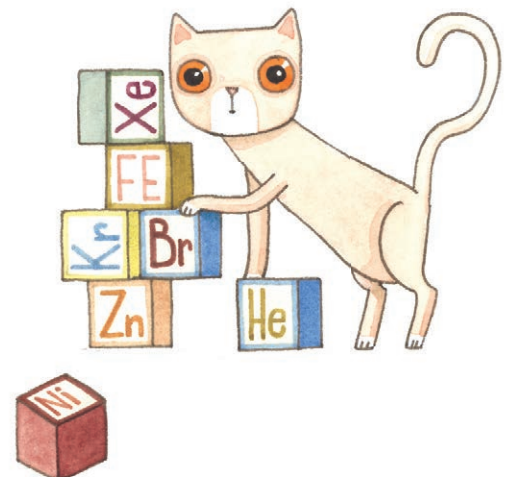
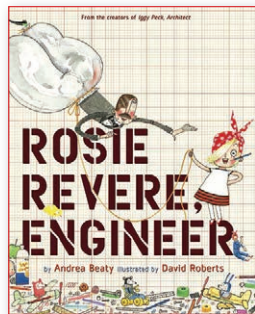
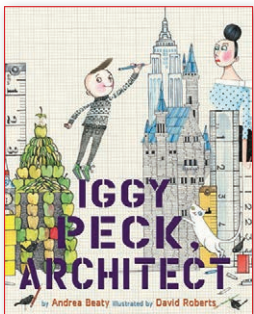
Draw evidence from literary or informational texts to support analysis, reflection, and research.

NEXT GENERATION SCIENCE STANDARDS

Here are a few examples of Next Generation Science Standards Topics from grade Kindergarten - Middle School that can be met by extending *Ada Twist, Scientist* with the above discussion questions/activities.

- Space Systems
- Space Systems: Stars and the Solar System
- Structure and Properties of Matter
- Structure, Function, and Information Processing
- Engineering Design
- Natural Selection and Adaption

ALSO AVAILABLE



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