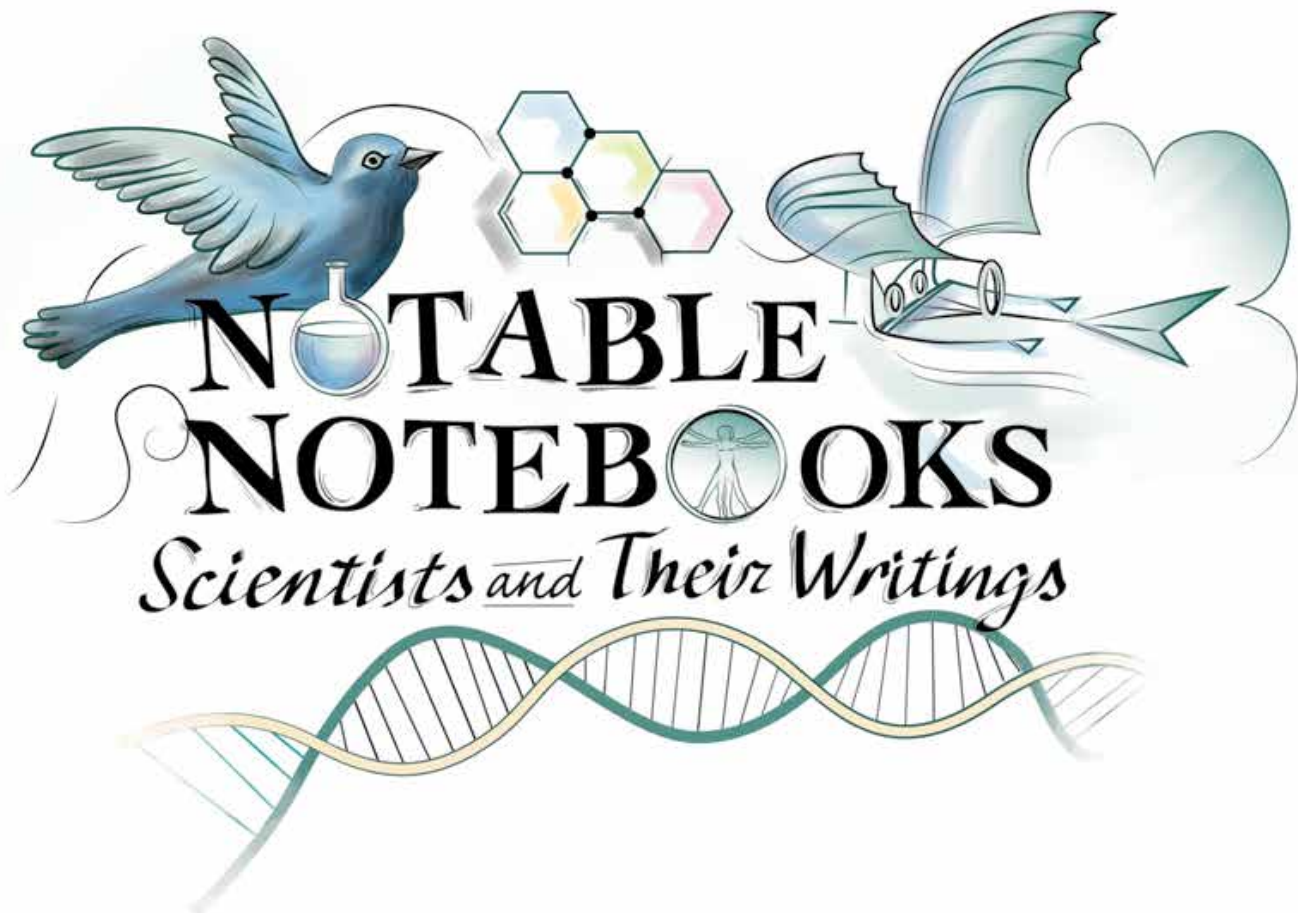


# NOTABLE NOTEBOOKS

*Scientists and Their Writings*

Jessica Fries-Gaither

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National Science Teachers Association





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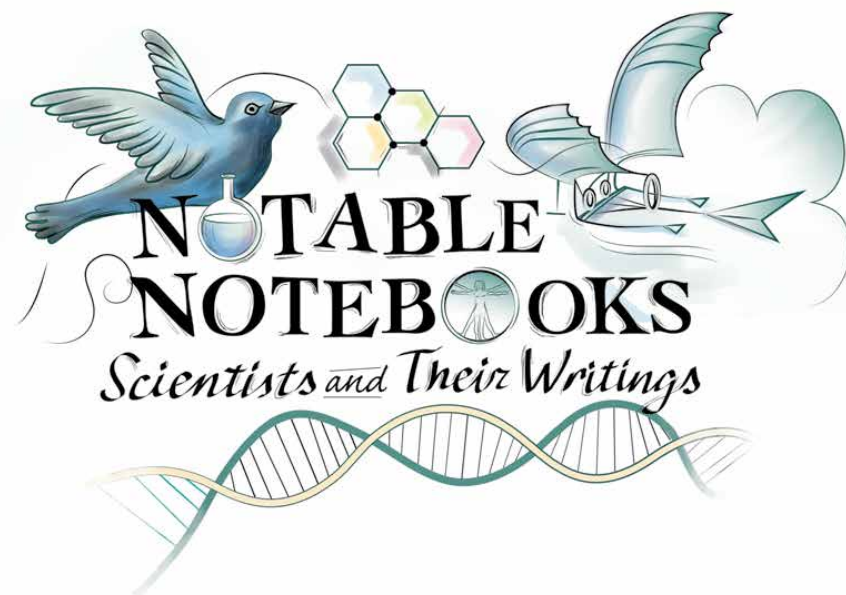
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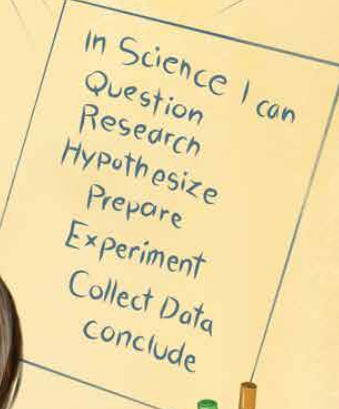
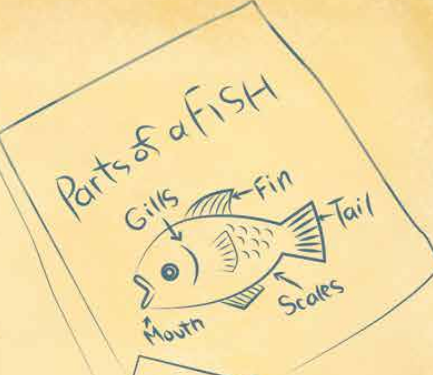
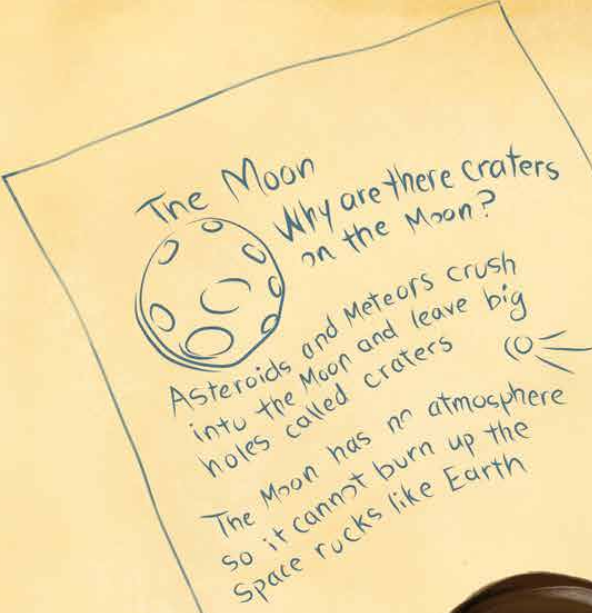
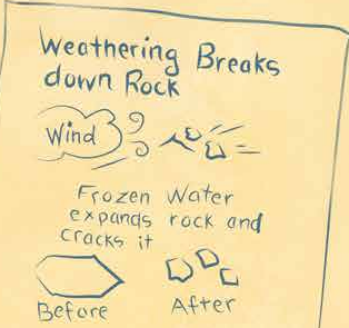
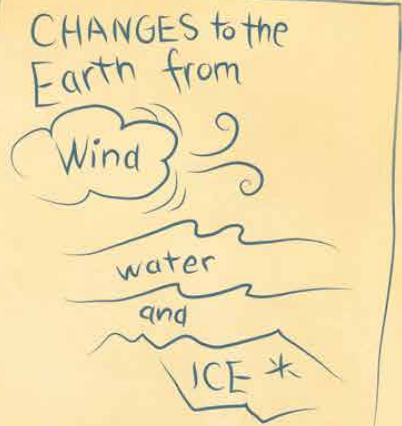
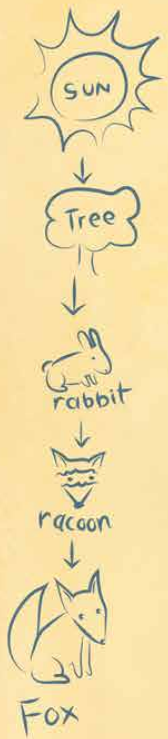
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By **Jessica Fries-Gaither**  
 Illustrated by **Linda Olliver**



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Of all a scientist's tools, objects rare and common, the lowly science notebook is most easily forgotten.

Scientists write in notebooks about every plant and crater; notebooks help them understand what they observe in nature.

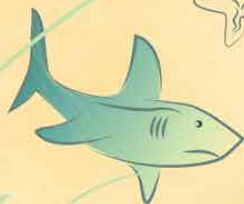
What makes a notebook special? It's a place to think and dream, to write down thoughts and questions about all that you have seen.



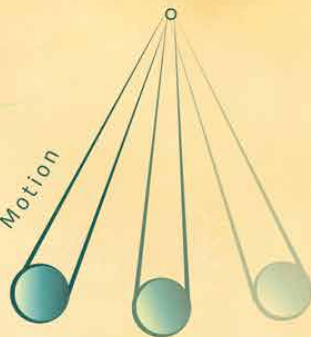


Environments

Oceans



Motion



Gravity



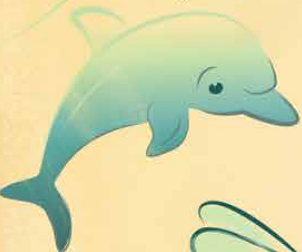
Space



If you find a science notebook, open it and have a look. You will surely be amazed by what's inside this book.

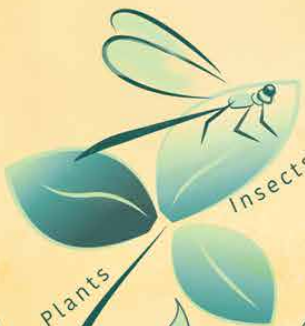
Reading such a notebook is a great way to explore. We can learn so many things from those who came before.

Sea Life



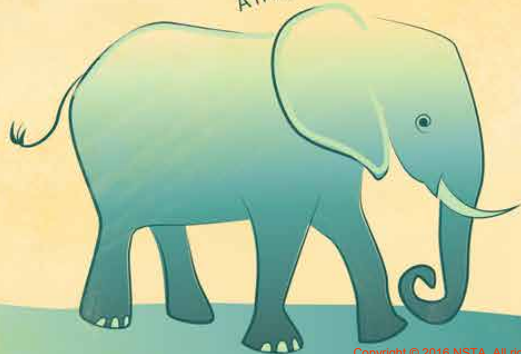
Reading such a notebook is a great way to explore. We can learn so many things from those who came before.

Insects



Plants

Animals



Energy



Don't believe me? Then let's go! Let's travel through time and see exactly how important one notebook just might be.

Wind

Weather



Climate

Let's visit Galileo  
back in 1641.  
He drew inside his notebooks  
planets orbiting the Sun.

In his notebook was a model  
of thinking that was new.  
His ideas, though quite correct,  
were not a welcome view.



Diagram of planetary orbits by Galileo

Galileo filled up notebooks  
viewing the night sky,  
observing moons and stars and comets  
as they were passing by.

Galileo's evidence  
helped imaginations roam.  
Other famous scientists  
looked at things closer to home.

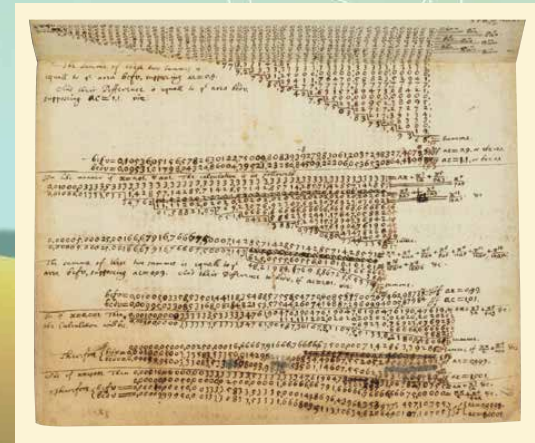
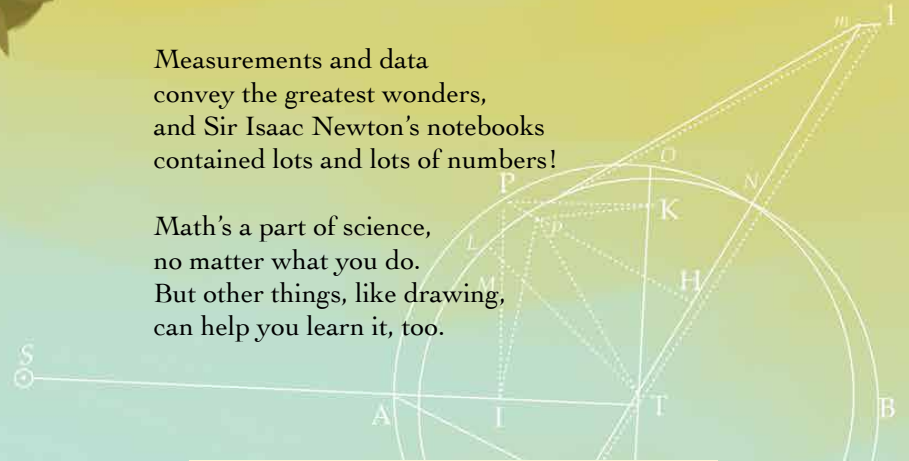


Isaac Newton was a genius;  
he truly did it all.  
Complex calculations  
in his notebook he did scrawl.

Legend says he thought, "Aha!"  
under a shady apple tree.  
Whatever's true, he did define  
the theory of gravity.

Measurements and data  
convey the greatest wonders,  
and Sir Isaac Newton's notebooks  
contained lots and lots of numbers!

Math's a part of science,  
no matter what you do.  
But other things, like drawing,  
can help you learn it, too.



Actual pages in Isaac Newton's notebook

Beatrix Potter was an author.  
She loved to write and draw.  
But she also was a scientist  
who recorded what she saw.

Insects, rocks, and fungi  
all graced her notebook pages.  
The detail in her drawings is  
a treasure for the ages.



Actual page of Beatrix Potter's sketchbook

Ms. Potter used her talents  
to answer her own query.  
Sketching helped her understand  
the fungi's life quite clearly.

Notebooks can be valuable  
to organize and review.  
They also are essential  
when describing something new.



On the rooftop of a bank,  
Maria Mitchell could be seen  
peering through her telescope  
as part of her routine.

On a clear October night  
something caught her eye.  
Could it be a bright new comet  
she saw zooming by?

Indeed, it was as she had thought:  
a great discovery!  
Miss Mitchell with her careful notes  
helped all the world to see.

Notebooks aren't just for notes;  
there's more that you can do.  
Scientists plan experiments  
and then conduct them, too.

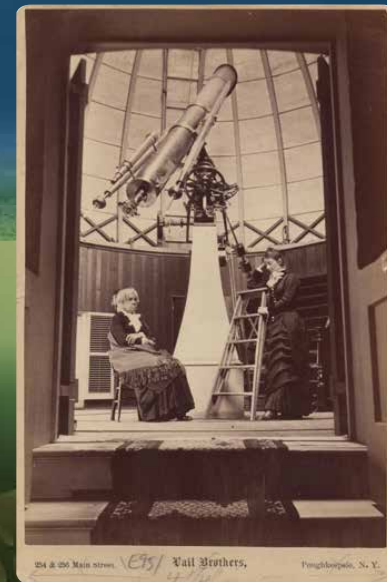



Photo of Maria Mitchell in her observatory



Did you know that insects hear?  
Surprising, but it's true.  
Before Charles Henry Turner,  
it was something no one knew.

Dr. Turner studied ants and bees  
and all the ways they act.  
His experiments uncovered  
things we now accept as fact.

Cockroaches, we know, can learn;  
bees see color — patterns, too.  
Without Dr. Turner's notes  
we'd think that insects only flew!

A notebook is a place  
to plan experiments or tests  
and also to see patterns  
in what data could suggest.

High atop a craggy peak with a notebook and a pen, Dr. Lonnie Thompson surveyed Peru once again.

He studied where a glacier lay, then looked back in his book. A single glance at early notes was all that it then took.



Actual notebook of Dr. Lonnie Thompson



The photos above from Dr. Lonnie Thompson show how much the ice has melted over the years. The top photo was taken in 1978 and the bottom photo in 2004.

“This glacier is retreating; there’s no doubt at all on that. The world has gotten warmer since the last time I here sat.”

Scientists craft explanations. They find the missing link. Good thing that in a notebook one can reflect and think.

2015

1986

1964



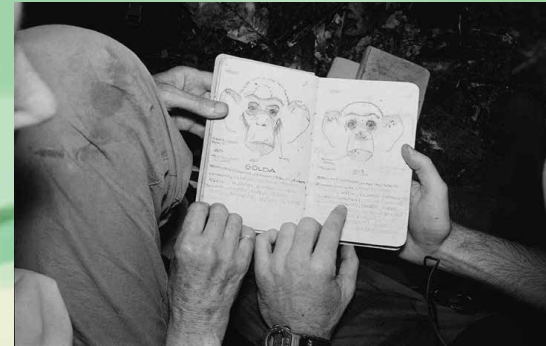
In a forest of Gombe,  
Jane Goodall sat quite still.  
The chimpanzees were very close,  
their nearness such a thrill.


She observed for many years—described their lives and play.  
Her notes on their behavior are important still today.

Many a page of journal writing helped her understand  
our relatives the chimpanzees and thus her fellow man.

Dr. Goodall took her notes in a remote and wild place.  
Our next scientist's notebooks have been to outer space!

Dr. Jane Goodall studies drawings of chimps with a colleague.



An illustration of a woman with curly brown hair, wearing an orange jumpsuit and black boots, floating in a space station. She is holding a blue cylindrical object. To her left is a black spiral notebook with 'Ellen Ochoa' written on it, a white rocket ship, and stars. An orange pen is also floating nearby. The background is a greyish-blue with various window shapes and control panels.

Ellen Ochoa is an astronaut  
and a brilliant engineer.  
On four short missions out to space,  
she explored a vast frontier.

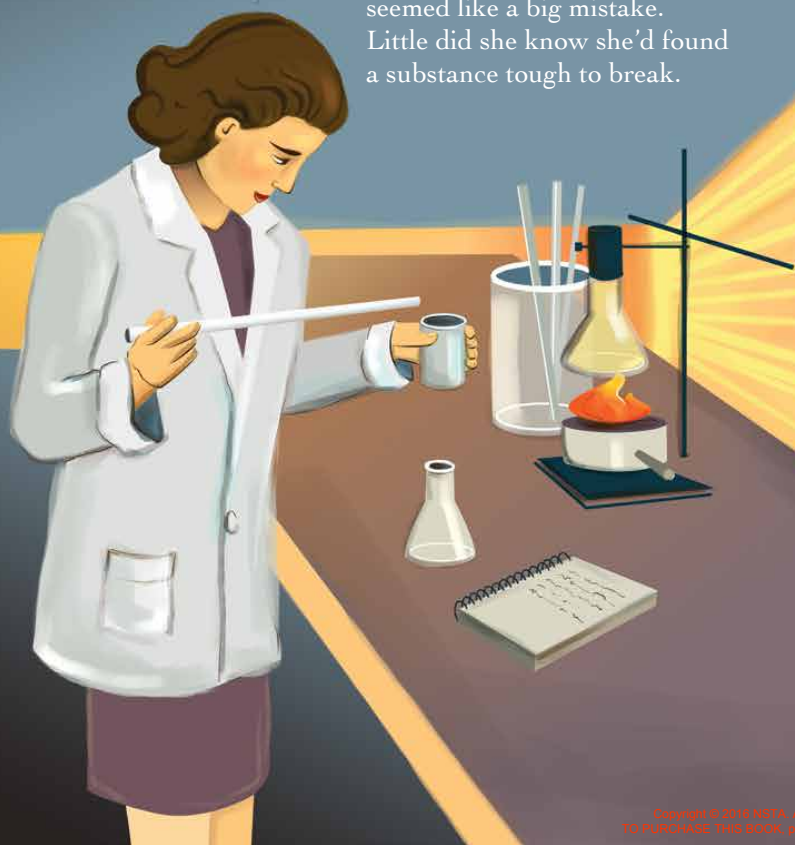
Dr. Ochoa used her notebooks  
to describe her NASA missions.  
Another set of notebooks  
fulfilled other great ambitions.

Notebooks hold the story  
of her various designs.  
She used many, many pages  
to think, create, refine.

Inventors also use notebooks  
to plan, design, and dream.  
Sometimes the results they get  
are not quite what they seem.

The chemist Stephanie Kwolek —  
her job was to invent.  
She is now remembered  
for a happy accident.

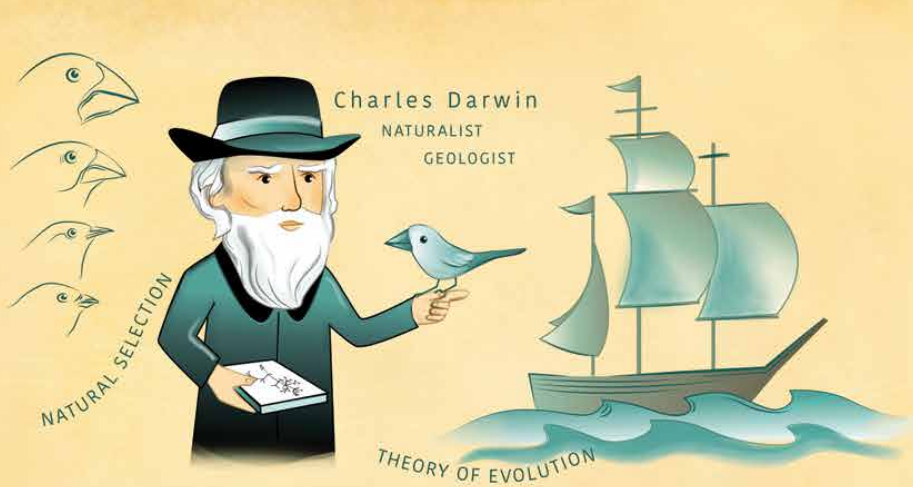
At first, her best discovery  
seemed like a big mistake.  
Little did she know she'd found  
a substance tough to break.



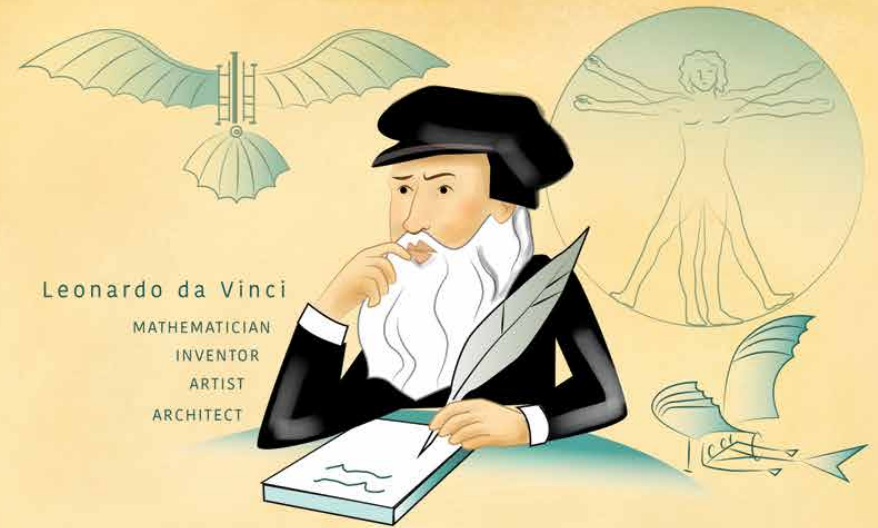
Her notebooks outline all the steps  
for inventing this strong strand.  
A fiber she called Kevlar  
would save lives across the land.

Making sense of data  
can be difficult to do.  
But if you keep on trying,  
then you might find something new.

Kevlar is a super-strong nylon fiber. Because of its strength-to-weight ratio,  
it can be stronger than steel. Some of the things that Kevlar has made  
possible include body armor, tires, boats, and airplane wings.

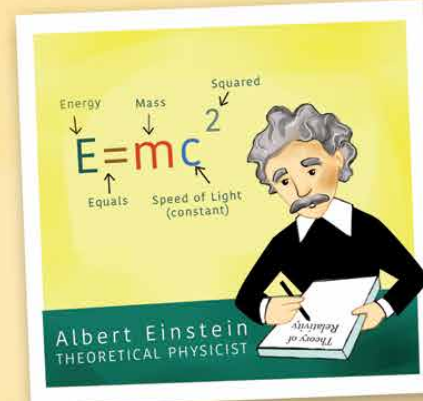
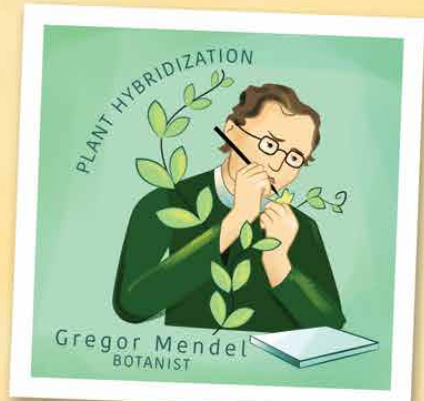


Charles Darwin wrote in his while sailing on a boat. And you'd need to use a mirror to read what da Vinci wrote!



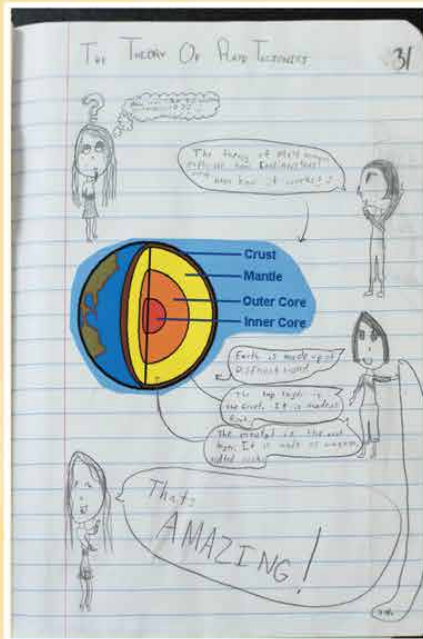
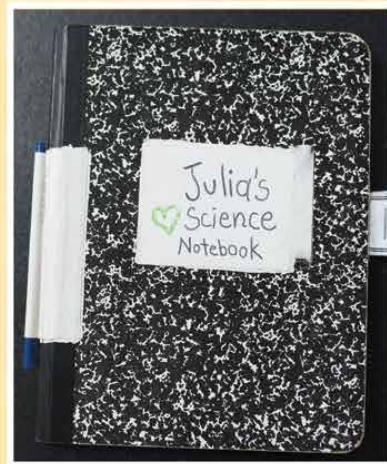
Their studies may be different, both in subject and in style, but the modest science notebook has been essential all the while.

Gregor Mendel, Albert Einstein, Rachel Carson, too—they all relied on their notebooks. Now, what about you?



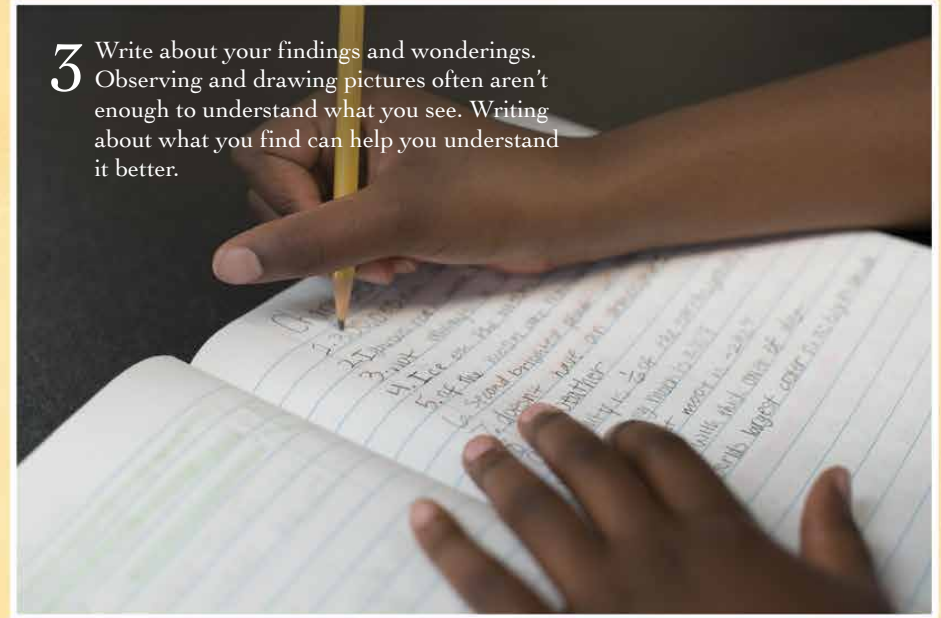
You can start your own science notebook!  
Here's how:

**1** Choose a notebook. It doesn't have to be fancy or expensive; even some paper stapled together will do! Your notebook can have lined or unlined paper or even graph paper. Whatever you like best will be fine.

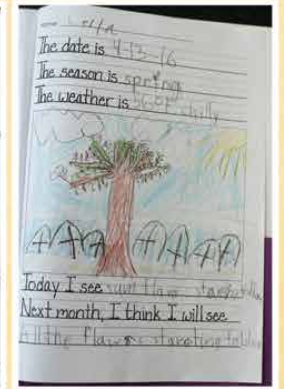
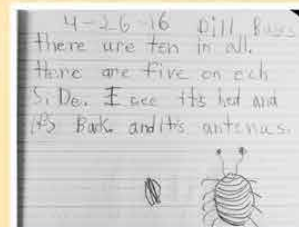


**2** Decide what you'd like to study. Maybe you'd like to watch birds or sketch pictures of flowers. Maybe you'd like to try experiments with liquids or look at pond water through a microscope. Whatever you do, your notebook is a great place to record what you are studying.

**3** Write about your findings and wonderings. Observing and drawing pictures often aren't enough to understand what you see. Writing about what you find can help you understand it better.



**4** Share your work. Just like the work of the scientists in this book, your work is important! Share it with your family, friends, or teachers at school.





The scientists profiled in this book are a diverse group of men and women who have studied many different branches of science throughout history. Learn a bit more about them here.



**Galileo Galilei** (1564–1642) lived in Italy. He was a professor of mathematics and also constructed a telescope that allowed him to make detailed observations of objects in space. He discovered several of Jupiter's moons and determined that our Moon's surface is not smooth but is covered by craters and mountains. His observations of Venus provided evidence to support the theory that the Earth revolved around the Sun. This was an unpopular view, and he was accused twice of heresy by the Roman Catholic Church.



**Isaac Newton** (1642–1727) lived in England. He was a prolific scientist, studying math, astronomy, light, and physics. Newton invented calculus; created a reflecting telescope that he used to study light and optics; and described how objects move, stop, and change direction in his laws of motion. Legend has it that Newton's work on motion and gravity was inspired by an apple falling from a tree. While this cannot be confirmed, his ideas about gravity also helped explain the motion of planets and other celestial bodies.



**Beatrix Potter** (1866–1943) is best known as the author of children's books such as *The Tale of Peter Rabbit* and *The Tale of Benjamin Bunny*. She was also keenly interested in mycology, or the study of fungi. Her detailed paintings and drawings led her to write a paper describing how fungi reproduce through spores. However, she had to have a male friend present the paper on her behalf at the Linnean Society in 1887 because women were not permitted to attend.



**Maria Mitchell** (1818–1889) was the first female professional astronomer in the United States. Her father nurtured her interest in astronomy from an early age and taught her to use a telescope. It was on the rooftop of her father's bank that she first observed a new comet, which was known as Miss Mitchell's Comet. Mitchell received a medal for her discovery from the king of Denmark. She went on to become a professor of astronomy at Vassar College.

**Charles Henry Turner** (1867–1923) was a zoologist and the first African American to receive a PhD from the University of Chicago. Through experimentation, he discovered that insects can hear and can change their behavior based on previous experience. He also showed that bees can see in color and recognize patterns. Turner conducted much of his work without lab assistants or research space. Nevertheless, he invented new techniques for conducting field research and changed our understanding of insect behavior.



**Lonnie Thompson** (1948–present) studies paleoclimatology, or Earth's past climate, through the analysis of ice cores from mountain glaciers and ice caps in tropical regions. One important project was the study of the Quelccaya Ice Cap in the Andes mountains of Peru. Thompson's work has shown that glaciers around the world are melting, important evidence of global climate change. He and his wife, Ellen Mosley-Thompson, have received recognition and awards for their work.



**Jane Goodall** (1934–present) spent 45 years studying chimpanzees in Gombe Stream National Park, Tanzania. Through her study of the life and social interactions of the chimps, she was able to challenge two commonly held ideas: Only humans use tools, and chimpanzees are vegetarians. She proved that neither idea is true. Goodall founded the Jane Goodall Institute to support continuing research, as well as a global youth program known as Roots & Shoots. Goodall continues to travel the world as an advocate for conservation and animal welfare.



**Ellen Ochoa** (1958–present) became the first Hispanic woman in space when she served on a nine-day mission aboard the space shuttle *Discovery* in 1993. She participated in three additional missions, spending almost 1,000 hours in space. Ochoa has degrees in physics and electrical engineering and holds three patents. She is currently the director of the Johnson Space Center.



**Stephanie Kwolek** (1923–2014) was a chemist who is best known for her discovery of Kevlar, a synthetic fiber stronger than steel. Kwolek discovered Kevlar by accident while conducting research for new fibers to use in tires. Since its discovery in 1964, Kevlar has been used in more than 200 products, including tennis rackets, boats, cables, bulletproof vests, and even cell phones.



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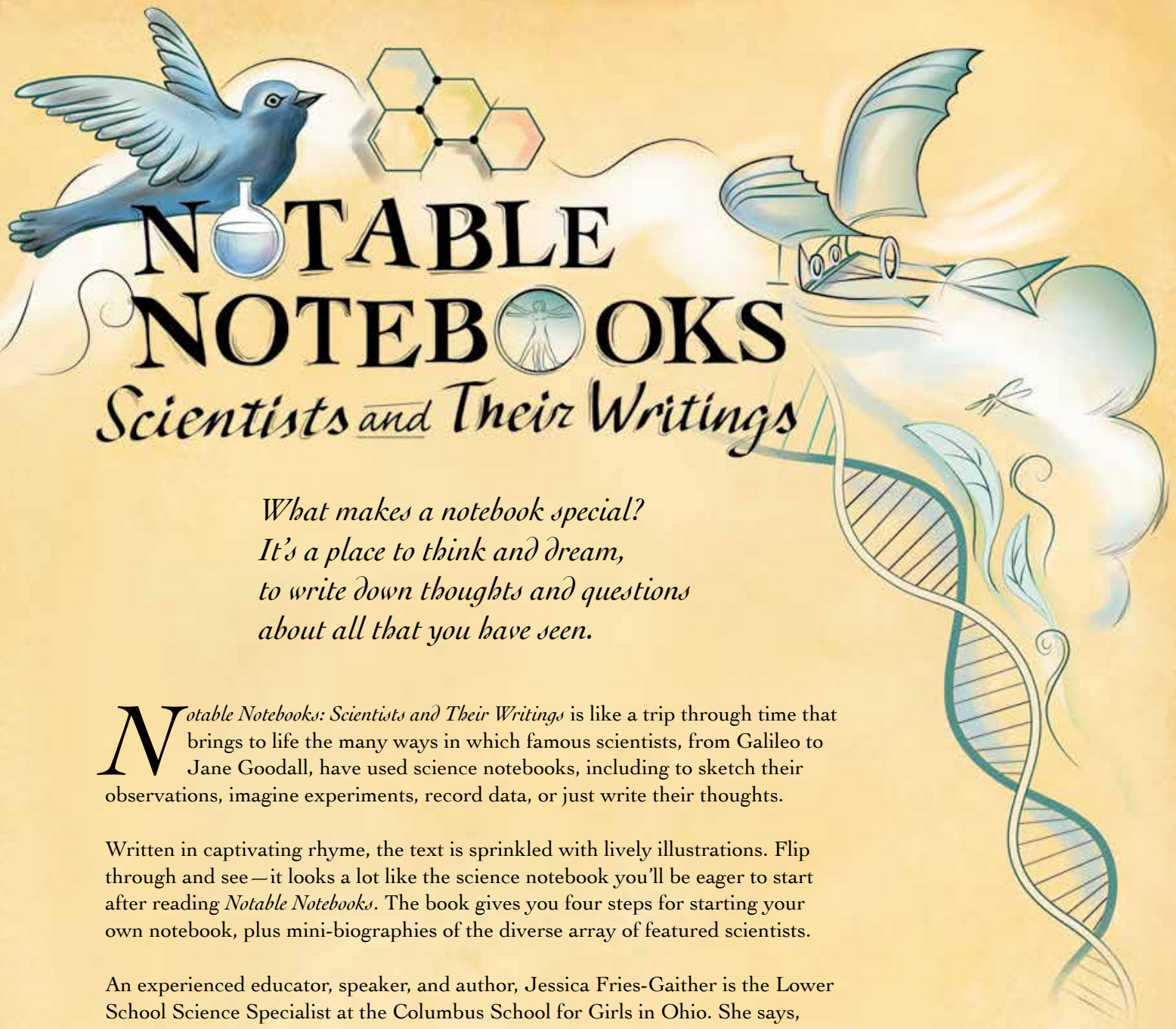


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p. 21: Dave Morgan is  
 showing his drawings  
 of study chimps to Jane  
 Goodall. Michael Nicole/  
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# NOTABLE NOTEBOOKS

*Scientists and Their Writings*

*What makes a notebook special?  
It's a place to think and dream,  
to write down thoughts and questions  
about all that you have seen.*

**N**otable *Notebooks: Scientists and Their Writings* is like a trip through time that brings to life the many ways in which famous scientists, from Galileo to Jane Goodall, have used science notebooks, including to sketch their observations, imagine experiments, record data, or just write their thoughts.

Written in captivating rhyme, the text is sprinkled with lively illustrations. Flip through and see—it looks a lot like the science notebook you'll be eager to start after reading *Notable Notebooks*. The book gives you four steps for starting your own notebook, plus mini-biographies of the diverse array of featured scientists.

An experienced educator, speaker, and author, Jessica Fries-Gaither is the Lower School Science Specialist at the Columbus School for Girls in Ohio. She says, "Every year, I wished I had a great read-aloud about scientists and their notebooks as we kicked off notebooking in my classes. I never found one, so I decided to write one myself." After reading her one-of-a-kind book, you'll see just how special it can be to have a place to jot down your thoughts and discoveries.

Grades 3-5  
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