

A Standards-Aligned Educator Guide for Grades 3 - 6

# COPYCAT SCIENCE

## About the book:

Science is entertaining... science is funny... science is downright ridiculous! Explore the wacky world of STEM in this comic book of exciting experiments.

- Defy gravity with air pressure!
- Extract DNA from a living thing!
- Learn the science of SLIME!
- Create a lightning bolt in the dark!
- Prove theories about light with Newton's wheel!

...and much more! Discover STEM topics through the lives of over 40 scientists and their amazing discoveries. Read the comic strips then have a go at each STEM experiment yourself. Featuring a diverse range of scientists throughout history this book will inspire you to give science a go! Are you ready?

Age Range: 8 - 11 years

Grade Level: Grades 3 - 6

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## About the author/Illustrator– Mike Barfield:

Mike Barfield is a writer, poet, performer, songwriter, ukulele player, and cartoonist. He has written extensively for TV and radio - with credits as diverse as *Spitting Image*, *The Dennis the Menace* and *Gnasher Show* and five years on *Who Wants To Be A Millionaire*. His cartoon feature *Apparently* has appeared in the pages of *Private Eye* for over 20 years, and his drawings have been on display in the Cartoon Museum, the V & A, the Museum of London, and Nigella Lawson's downstairs loo.



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## Pre-Reading Discussion:

- Describe the images featured on the book cover. Do you identify any of the individuals in the illustrations? If so, who and what are they known for doing?
- What do you know about scientists? Can you name the different forms of scientific thinking represented in this illustration?
- The word *copycat* means an imitator, a copier, or a mimic. What connection can be made between the word *copycat* and the term *scientific reasoning*?

## Post-Reading Discussion:

*ALL good scientists learn from the work of those before them (4).*

- Analyze this statement. Explain how a scientist might benefit from the experimental discoveries made before their time.
- Scientists use a method of research known as The Scientific Method research, experiment, gather information, test, retest, then share their findings with others. Discuss the importance of such findings, should a scientist desire to dig deeper in a particular field of study.
- The first step of the Scientific Method is to formulate a question about a specific scientific phenomenon. What do you want to more about? Is there a field of science you find to be intriguing?

People used to think that plant sap circulated like the blood in humans.  
Wrong (11)!

- Notice that the scientists featured in the Living Things section (5-16) lived in distinctly different times in history, yet each were drawn to study plants and animals. Imagine the similarity of interests they might have shared.
- Predict how Theophrastus's work with plant kingdom might have help to guide Nehemiah Grew, Stephen Hales Born, and Jane Colden's in their explorations with plants.
- The second and third steps of the Scientific Method are gathering information and to form a hypothesis, also know as an educated guess. Determine how Maria Sibylla Merian and John James Audubon's work might have helped Charles Darwin to establish an educated guess in his studies of the world of worms.

DNA (Deoxyribonucleic Acid) is a long molecule found in cells that carries the code for how an organism is constructed (24).

- Discuss how Rosalind Franklin's work led the way for Jan Evangelista Purkynĕ and Hermann Von Helmholtz's discoveries.
- Human genetics are defined by the chromosomes of each person's distinctive DNA patterning. DNA is based on a living organism's unique genetic information. Being that genetic information is exceptional and exclusive to each organism's DNA, explore reasons why biological scientists rely on analyzing results of experiments conducted in the past.
- Identify how discoveries made by biological scientists affect your life today.

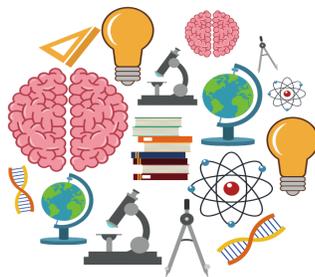
Daytime skies look blue because the blue light in sunlight hits air molecules and gets deflected (72).

- The study of light is called optics, which is an aspect of the school of science known as physics. Discuss the impact Ibn Al-Haytham had on the study of matter and energy thousands of years before Antoinie Van Leeuwenhoek was even born.
- Imagine how Albert Einstein benefitted from conclusions of the discoveries made by Lord Rayleigh or Isaac Newton.
- Consider the term *copycat*. Is it possible that, rather than copying the conclusions of prior discoveries, all good scientists find the work to be inspirational or motivational enough to dig deeper and learn more?

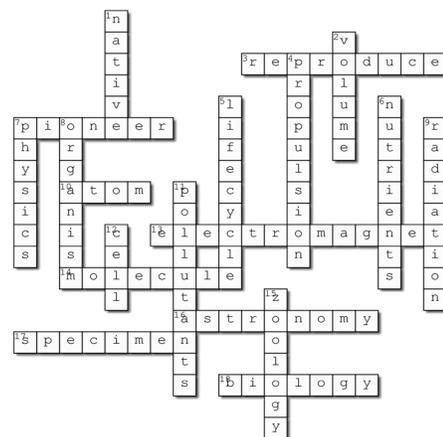
## The Scientific Method:

Perform an experiment using the six steps of the Scientific Method listed below. Document your findings. Share your work with the class.

- Ask Questions
- Research
- Form a Hypothesis
- Experiment
- Analyze Data
- Establish a Conclusion



## Crossword Puzzle Answers

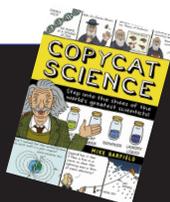


### COMMON CORE ANCHOR STATE STANDARDS ALIGNMENT:

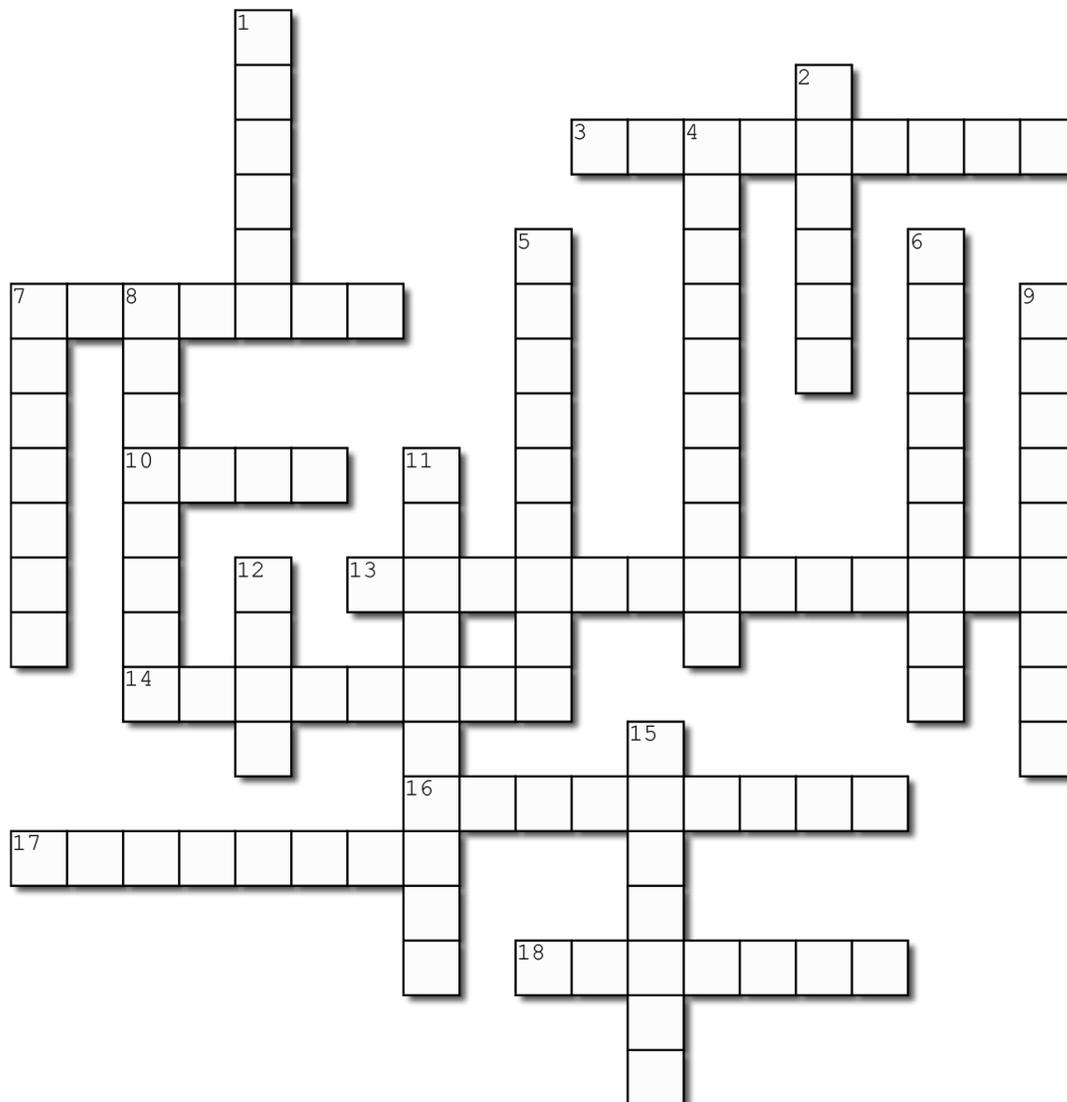
Reading: CCRA-RL.1, RL.2, RL.3, RL.4, RL.7, RL.10 Writing: CCRA-W.2, W.3, W.4, W.7 Speaking & Listening: CCRA-SL.1, SL.2, SL.4, SL.6

### NEXT GENERATION STANDARDS ALIGNMENT - DOMAINS & CORE DISCIPLINES:

Physical Science: PS1, PS2, PS3 & PS4 Earth Science: ESS1, EES2 & ESS3 Life Science: LS1, LS2, LS3 & LS4 Engineering: ETS1



## COPYCAT SCIENCE Vocabulary Crossword Puzzle



### Across:

3. When living things make copies of themselves
7. A first person to attempt or achieve something new
10. A building block of matter
13. A coil of wire wound around a central iron core
14. A group of atoms bonded together
16. The branch of science which explores space and the physical universe
17. An individual organism collected for scientific study
18. The study of the human physiology

### Down:

1. A word used for living things that are normally found in a certain ecosystem
2. The amount of space that a substance or object takes up
4. The act of pushing or driving an object forward
5. The stages a living thing may pass through before it reproduces and dies
6. The substances that living things need to survive, grow, and reproduce
7. The natural science that explores the force of energy
8. A living thing
9. Energy emitted in the form of electromagnetic waves
11. Substances introduced into an environment or ecosystem that have a harmful effect
15. The study of the animal kingdom

