

SCIENTISTS IN THE FIELD

WHERE SCIENCE
MEETS ADVENTURE

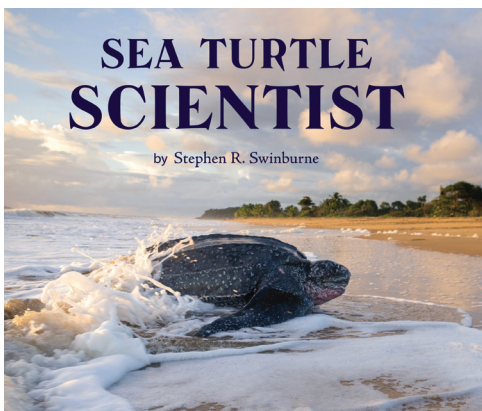
DISCUSSION AND ACTIVITY GUIDE

Sea Turtle Scientist
by Stephen R. Swinburne



About the Series

Sea Turtle Scientist is part of the award-winning Scientists in the Field series, which began in 1999. This distinguished and innovative series examines the work of real-life scientists doing actual research. Young readers discover what it is like to be a working scientist, investigate an intriguing research project in action, and gain a wealth of knowledge about fascinating scientific topics. Outstanding writing and stellar photography are features of every book in the series. Reading levels vary, but the books will interest a wide range of readers.



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About the Book

Sea Turtle Scientist introduces Dr. Kimberly Stewart, “the turtle lady,” and describes her work on St. Kitts with endangered loggerhead sea turtles. The book provides extensive information on sea turtles and Dr. Stewart’s research, as well as the efforts of WIDECAST to preserve and protect these amazing creatures.

About the Author

Stephen Swinburne was born in England and moved to America when he was a boy. His family moved a lot, and he took refuge in writing in his journals and listening to music. Stephen always wanted to be an adventurer or a naturalist or a marine biologist, and he graduated from Castleton State College with a degree in biology and English.

He worked as a ranger in several of our national parks and now writes and takes photographs for children’s books. Stephen loves to travel, read, sing and play his guitar, garden and take pictures. He and his wife live in Vermont.

Pre-Reading Activities

Working in groups, try to go back in your family history for as far as you are able. Who is your grandmother’s father? And who is that person’s mother? How many years are you able to trace back your lineage? Who in your class or your group is able to go back the most years? Was anyone able to get back to the 1800s or earlier? How many grandparents would you have to name to go back 110 million years?

Pick several numbers between zero and one thousand, say, 867, 392, 509, and 74. Write them on cards and post them facedown on a board so that students cannot see the numbers. Label the back of the cards A–D. Give students a scrap of paper and have them record their guesses of the numbers on the cards, A–D. Then collect their guesses. Tell the class that the only people who will receive points for this activity are the ones who correctly guess at least one of the numbers. Reveal

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the numbers on the card. Most likely no student will receive points. Discuss. Then examine the odds of winning one of the big multistate lotteries. Investigate how many tickets were sold and examine the ratio to the number of tickets sold and the number of winners. Compare these ratios with sea turtle survival rates and guessing random numbers between zero and a thousand. How many students would have to be in the class to make the odds likely to produce a student who guesses correctly?

Imagine working at a job in which you make \$1,000 for each project completed. However, you are forced to return \$999 back to your employer for each \$1,000 earned. Additionally, you are only able to complete about three projects each year and it could take more than a year before you earned your first \$1,000. These are horrible odds, but what circumstances would compel you to take such a job?

Brainstorm ideas why turtles and frogs have lasted longer on our planet than dinosaurs?

Dr. Kimberly Stewart is the only sea turtle scientist on St. Kitts, and her research is supported as part of the Wider Caribbean Sea Turtle Conservation Network. The word *network* implies that there are a lot of people involved. What other science-related jobs and volunteer work might there be in a sea turtle conservation network?

When researchers handle leatherback turtles, they wear gloves to keep from inadvertently infecting the turtles AND to keep them from getting an infection from the turtles. Do germs and disease have a factor in the leatherback turtle's (or any other animal's) ecological survival?

Applying and Extending Our Knowledge

Look back at the pre-reading activity in which students in a class attempted to guess random numbers between zero and a thousand. In that activity, students predicted how many students would have to be in the class to lower the odds enough for a student to guess the correct number.

- Find out how many fertile eggs the average female leatherback turtle lays. Find out the estimated world population of leatherback sea turtles. Determine the male/female ratio of leatherback

sea turtles. Record the average life span of a leatherback and then make a prediction for how many sea turtles will die each year. Knowing that only one egg in a thousand will survive, how many eggs would leatherback turtles have to lay each year to sustain the current population numbers? How many would be needed to increase the population by ten percent?

- Are there enough breeding female turtles to sustain the current population?
- Research the leatherback turtle range. If the numbers decrease by, say, five percent, what does this mean in terms of sustaining the population? Write a population forecast prediction. Be sure to include speculation on the ability of leatherback turtles to find a mate within the leatherback sea turtle range.
- Make a graph or a poster showing three (or more) scenarios of eggs and survivors that reflect the likely data for sustaining the current population, increasing the population by a given percent, and decreasing the population by a given percent.
- What is the point of all the yolkless eggs laid by the leatherback turtles in terms of their long-term survival? Is there any other possible explanation other than aerating the nest and creating "wobble room"?

Common Core Connections

CCSS.ELA-Literacy.WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

CCSS.ELA-Literacy.RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

CCSS.ELA-Literacy.RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CCSS.ELA-Literacy.RH.6-8.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

Swinburne states on page 7 that leatherback sea turtles have "the perfect hydrodynamic form."

- Design and, if possible, build turtle boats in the shape of a leath-

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erback sea turtle.

- Bring in toy boats or even small rowboats or canoes or kayaks and compare them to a leatherback turtle. What design principles are shared among the boats and the leatherback sea turtles?
- Bring in pictures of other types of sea craft, especially pictures of racing yachts that participate in events such as America's Cup, and compare these pictures to the leatherback sea turtle design.
- While the shape of the leatherback sea turtle contributes to its success in the ocean, there are other factors that make the leatherback sea turtle a powerful swimmer. What are these other factors, and do ship builders and boat designers or swimmers incorporate any of these factors to help boats or swimmers move through the water more swiftly? Use this information and the leatherback sea turtle form to suggest improvements that could be applied to a rowboat or a raft or some other type of water vehicle? Could we use this information to improve wetsuits or swimsuits or swimming accessories, such as goggles or fins?

The "Sea Turtle Facts" sidebar on page 3 provides a small glimpse at the world of sea turtles but does not mention other species. In chapter two we learn that there are seven species of sea turtles. Many of us, however, may not have a clear mental picture of sea turtles and may confuse turtles we see swimming in ponds to the loggerheads, greens, hawksbills, Kemp's ridleys, olive ridleys, flatbacks, and leatherbacks.

- Prepare an online presentation defining the word *turtle* and showing viewers representatives of all the different types of turtles, land and sea.
- In the presentation, make sure to explain the difference between turtles like snapping turtles and leatherback sea turtles.
- Make a map showing where various types of turtles live, including sea turtle ranges.
- Make a set of cards showing the types of turtles, their range, what they eat, threats to the various turtles, and other facts.
- Prepare a poster or an online presentation distinguishing sea turtles from land turtles and tortoises.
- Prepare a Venn diagram showing what sea turtles hold in common with other turtles and tortoises, and how they differ.

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The Wider Caribbean Sea Turtle Conservation Network (WIDECAST) is a network of biologists, fisheries, and wildlife officers, educators, and community leaders (p. xii). We know that Dr. Kimberly Stewart is one of the sea turtle scientists involved.

- Investigate what other science work is done by WIDECAST. What types of scientists are a part of it?
- How do the various officers, biologists, educators, and community leaders cooperate?
- Prepare an oral report using online and other resources (including, but not limited to, Skype interviews, videos, pictures, graphics, artifacts, etc.) to explain to the class the entire scope of the work done by WIDECAST, with special emphasis on the way in which Dr. Stewart fits into the picture.
- Prepare a map slide showing the location of all the countries that are members of WIDECAST.

In the information about WIDECAST, we read, "All conservation, in my opinion, is local,' says Karen, 'and while this is not to say that national laws, regulations, and codes of conduct aren't essential, the truth is that sea turtles live or die every day as a result of decisions made by fishermen, coastal landowners, and others who encounter them.'"

- Prepare a mock trial of a fisherman who sees one hundred pounds of meat swimming away and kills the critically endangered sea turtle to feed his starving family. Assign a prosecution team, a defense team, and a judge, and have the rest of the class serve as the jury.

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- You may wish to have a few students serve as local reporters, foreign reporters, and reporters from various organizations (such as PETA) that have very different perspectives.

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CCSS.ELA-Literacy.RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

CCSS.ELA-Literacy.SL.7.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.

CCSS.ELA-Literacy.SL.7.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

CCSS.ELA-Literacy.RH.6-8.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

Create a picture glossary of the animals (and, if you're adventurous, plants too) that are found on St. Kitts.

- Indicate which ones, if any, are found only in the Caribbean; map the locations where others are found.
- Include scientific name, common name, range, physical description, habitat description, diet, and any noteworthy facts (about behavior or endangered status, etc.).
- Group animals by families and then alphabetically by scientific name.

Theophilus Taylor once caught 58 sea turtles that he hauled to the shore, decapitated, and butchered. For nearly ten years he made his living catching, killing, and selling sea turtle meat.

- How do people change long-standing traditions and habits? How would we begin to change eating habits in this country so that we eventually no longer consumed something popu-

lar, such as hamburgers? Make a list of the pros and cons for moving our country from eating say, turkey for Thanksgiving and replacing it with something else—say, rabbit or something vegetarian. Is comparing leatherback sea turtle hunting to eating hamburgers or turkey a fair comparison? Debate whether or not there is any truth to this sort of comparison.

- Could you live three weeks without cell phones, social media, Internet, television, radio, or any other communication device? What circumstances would have to be present to force us even consider the fact that we might need to change our behavior? (Note: the attempt is to have students discuss ways to see the need to change an accepted behavior in the first place and then HOW to change that behavior.)

Common Core Connection

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CCSS.ELA-Literacy.RH.6-8.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.

CCSS.ELA-Literacy.SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

On page 20 we read, "Tourists are drawn to island-made jewelry, and we soon realized that broken and discarded glass could be a source of income to help pay the sea turtle fishermen." Often endangered animals are killed and eaten by people who do not see any other way to acquire the resources needed to make any other choice. Dr. Stewart says a bit later that selling jewelry by itself will not end the turtle harvest, but will be a factor in limiting it.

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- The people on St. Kitts looked for sources of inexpensive materials to use for art that could be sold. Look around your school. Do you have too much Styrofoam? Too many plastic bottles? Find an abundant resource that is currently seen as trash or as something not worth much. Create art projects from these items to display in the classroom.
- Adopt an endangered animal that is in your area, or adopt leatherback sea turtles. Use the artwork from recycled products to sell at school events. Donate the money to an organization working with your adopted animal or to an organization like WIDECAST.

Common Core Connections

CCSS.ELA-Literacy.SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

In chapter 6 we read that scientists do not have a clue where newly hatched leatherback sea turtles go once they reach the waves.

- Write and illustrate a speculative children's picture book postulating various theories about the hatchling's journey.
- Create an interpretive dance or a soundtrack that evokes the drama of the hatchling's journey, keeping in mind that the odds are not good for the young turtles.
- Visit an elementary school and share the science behind leatherback sea turtles and then share your books, music, or theatrical show. Make sure to find and use WIDECAST's Sun, Sand & Sea Turtle curriculum in planning your presentation.

Common Core Connections

CCSS.ELA-Literacy.SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

CCSS.ELA-Literacy.W.6.3 Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-Literacy.W.6.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

On page 22 we learn that leatherback sea turtles eat jellyfish and are not bothered by their stinging toxins. Earlier we learn that leatherback sea turtles ingest plastic (as well as getting trapped in gill nets and more) (p. 14–15).

- Take plastic bags and plastic wrap and build jellyfish models out of them. Use the picture on page 43 as a model. Put them in a swimming pool or large water container. Then look at real videos of jellyfish.
- Find pictures of other common jellyfish that the leatherback sea turtles consume. Use plastic to make models of these jellyfish.
- Go to the library and research how long the plastic you used to make your models would take to break down in salt water. Take a look at a book like *Tracking Trash* by Loree Griffin Burns (another Scientist in the Field book) and read until you have an idea of how much plastic is in the ocean. Is it easier to understand how easy it would be for a turtle to mistake plastic floating in the water for a food source?

Common Core Connection

CCSS.ELA-Literacy.WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

CCSS.ELA-Literacy.RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

CCSS.ELA-Literacy.W.6.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

On page 49 there is a "Turtle-Watching Toolkit."

- Think about the various animals in your area that elementary students would enjoy watching. Using the toolkit on page 49 as a model, develop a toolkit that your class could share with younger students that would help them understand the procedures of doing field research and make watching the chosen animal more enjoyable.
- Perhaps your class could write a grant to fund several of these kits for various classrooms in your area.

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CCSS.ELA-Literacy.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

CCSS.ELA-Literacy.W.6.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Further Reading

Cerullo, Mary M. *Sea Turtles: Ocean Nomads*. Penguin/Dutton, 2003.

Franklin, Carl J. *Turtles: An Extraordinary Natural History 245 Million Years in the Making*. Voyageur, 2007.

Other Websites to Explore

Sea Turtle Conservancy

www.conserveturtles.org/sea-turtle-information.php

Extensive information of sea turtles, various species, migration, and habitats and efforts to preserve them.

Sea Turtle Facts

www.seaworld.org/animal-info/info-books/sea-turtle/habitat-&-distribution.htm

Information on sea turtles including a distribution map from Sea World.

Leatherback Sea Turtle

animals.nationalgeographic.com/animals/reptiles/leatherback-sea-turtle/?source=A-to-Z

Information on the leatherback sea turtle from National Geographic.

WIDECAST

www.widecast.org

Official site of WIDECAST (Wider Caribbean Sea Turtle Conservation Network)