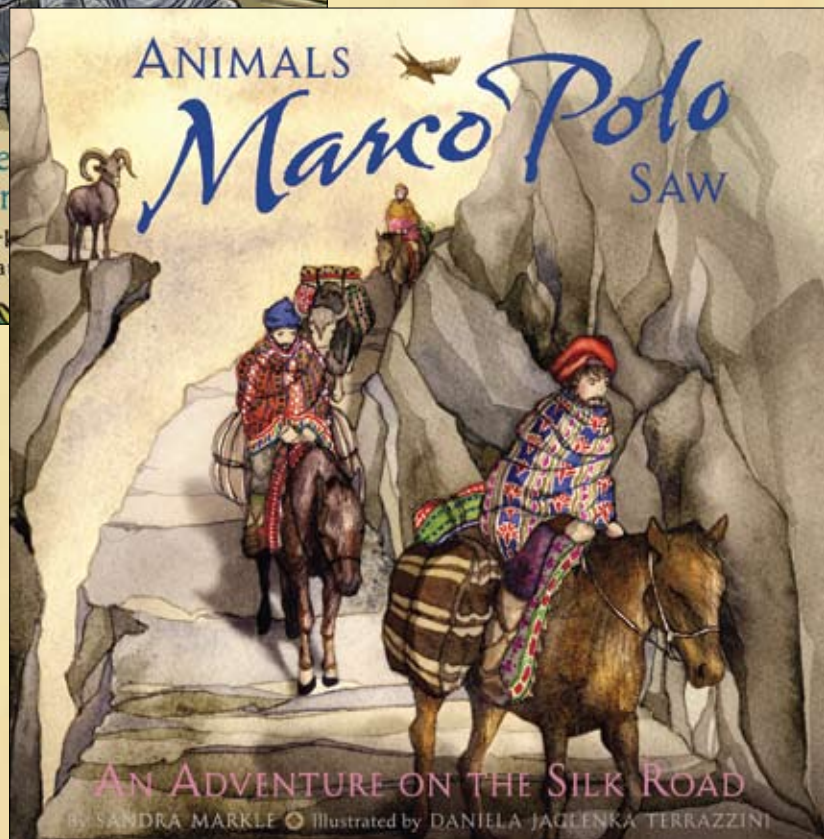
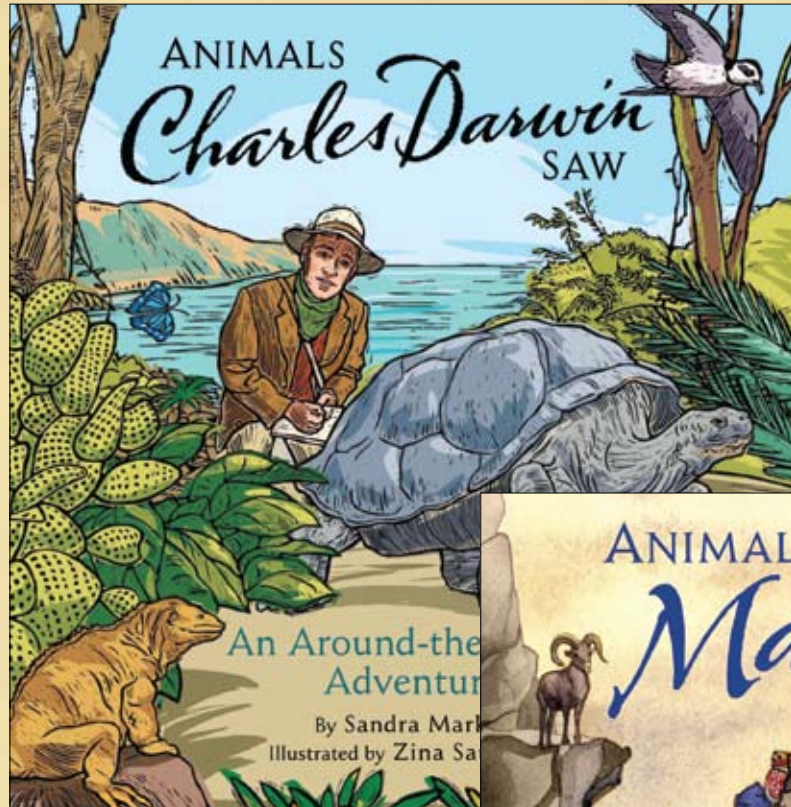




ANIMALS CHARLES DARWIN SAW
ANIMALS MARCO POLO SAW

TEACHER'S GUIDE

GRADES **2-5**



INTRODUCTION

This teaching guide provides a variety of instructional and enrichment ideas, to extend the wonders of reading and learning for children, both during and after children enjoy Sandra Markle's books. The guide offers ways to expand reading comprehension and critical thinking skills, as well as instructional opportunities to tie these books to geography, history, science, and writing. The suggested activities can be modified or augmented to meet the instructional needs of older or younger readers.

It is worth noting that both titles include the word "adventure." For many children, the word adventure brings to mind excitement, an opportunity to try or participate in something new, or maybe a journey or trip. Children may not comprehend, however, the risk or danger that the adventures entailed for Charles Darwin and Marco Polo. Children also will likely have difficulty imagining the magnitude and length of their journeys. Place their adventures into the time frame in which they occurred, before modern transportation or communication, and before the other conveniences of modern travel (including hotels, restaurants, etc.), and children will then begin to understand the greatness and significance of these men and their travels.

Some children today have traveled extensively and have seen interesting places and experienced numerous real-world learning opportunities. However, many children have never traveled beyond their own neighborhoods. For these children, reading and learning about the adventures of Charles Darwin and Marco Polo allows them the opportunity to travel vicariously to many varied and exciting places. Sandra Markle's words are so well chosen and the illustrations in the books are so realistic, that children can literally travel along and "see" the animals and geography that these great adventurers experienced themselves.

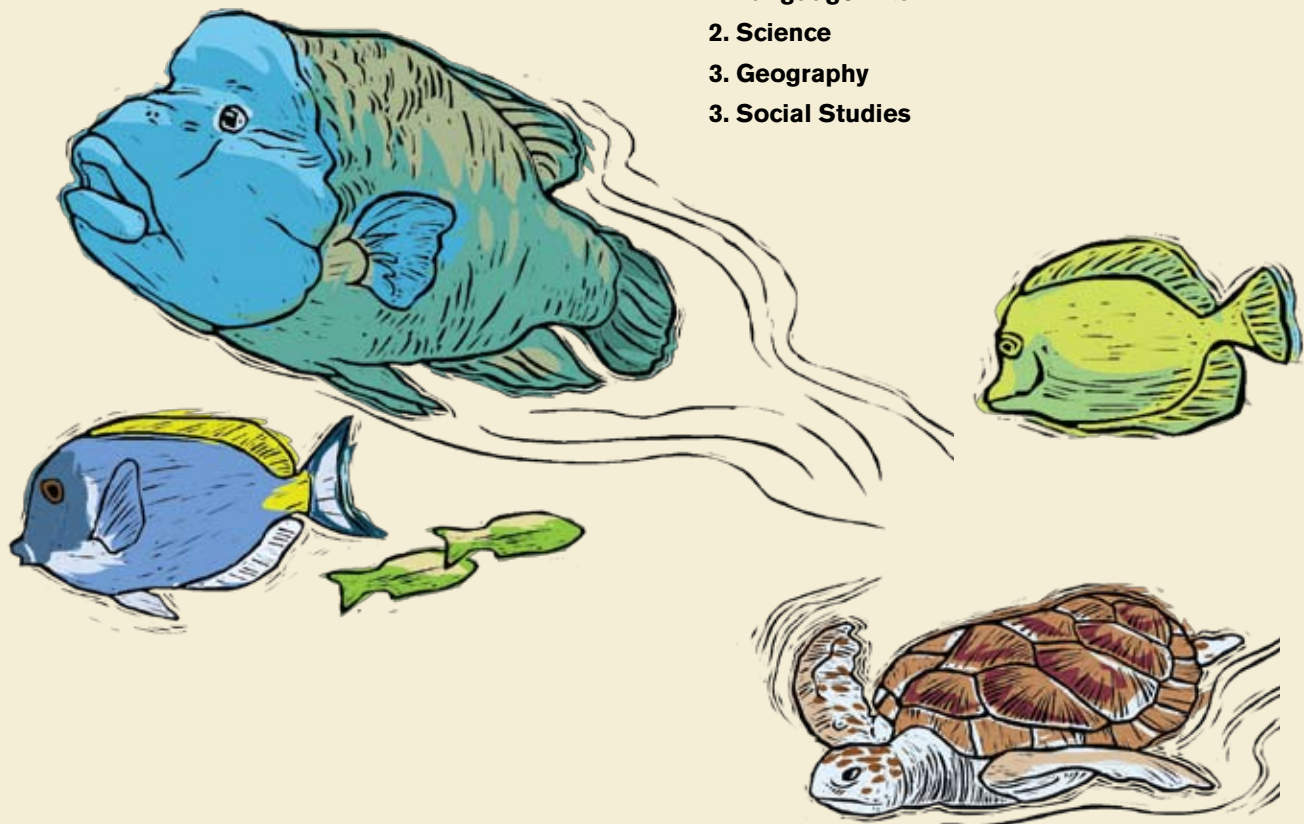
Suggested Activities: The activities in this teaching guide are divided into curricular sections that enhance reading comprehension, vocabulary development, and the development of critical thinking skills; those that enrich science learning; and those that connect reading to history and to geography.

GENERAL OVERVIEW

THIS TEACHER'S GUIDE CONTAINS:

Pre-Planned Activities for Students

- 1. Language Arts**
- 2. Science**
- 3. Geography**
- 3. Social Studies**



ACTIVITIES TO DEVELOP VOCABULARY, ENHANCE READING COMPREHENSION, AND DEVELOP CRITICAL THINKING SKILLS

Activities to Develop Vocabulary:

1. The following list is composed of important concept and domain words in science and social studies, as well as important words for general reading and writing. The words should be incorporated into classroom discussions, and used in both reading and writing activities, to enrich children's word knowledge and word consciousness. They would also be excellent words to use in a crossword puzzle, which can easily be created using www.puzzlemaker.com, or some other puzzle format, to give students an opportunity to match words and their definitions.

Each of these words appears in one of Markle's books:

ADAPT	FOSSILS
BRACKISH WATER	GENETICS
CAMOUFLAGE	IMPACT
CARAVAN	INVESTIGATE
CHARACTERISTICS	MIGRATION
CLIMATE	NATURAL SELECTION
COCOON	NATURALIST
CORAL REEF	NOMADS
DISCOVERIES	OBSERVATIONS
DISTINCT	ORGANISMS
DIVERSITY	OUTCOME
EARTHQUAKE	PAMPAS
EMPIRE	SILK ROAD
ENCOUNTER	SURVIVE
EVOLUTION	TAXIDERMY
EXOTIC	THEORY
EXPLORATIONS	TIDAL POOLS
EXTINCT	TROPICAL
	VOYAGE

2. The following are two lists of all of the animals that are named in Markle's books. The animals are listed separately for each book for easy reference. By providing children with multiple experiences in reading these words, one can build the students' reading and speaking vocabularies.

Animals named in *Animals Charles Darwin Saw*:

BARNACLES
BENCHUCAS
BIRDS
BOMBARDIER BEETLES
DUNG BEETLES
FLAMINGOS
GIANT SQUIDS
GULPER EELS
IGUANAS
INSECTS
LIZARDS
LLAMAS
MOCKINGBIRDS
MUSSELS
OCTOPUSES
TORTOISES

Animals named in *Animals Marco Polo Saw*:

BEARS
BOARS
CAMELS
DUCKS
EGRETS
ELEPHANTS
GRAY WHALES
HERONS
HORSES
LEOPARDS
MARCO POLO SHEEP
MOUNTAIN GOATS
MULLETS
PARROTS
PELICANS
PERSIAN LIONS
PORCUPINES
SNOW CATS
VAN CATS
YAKS
ZEBU OXEN




3. Using the Internet, have students look up each of the animals in the lists above. Have them find out the size of each animal. Then, download pictures of the animals. Write the size of the average adult animal on the downloaded picture, and then organize the animals by size (weight or height). Have students put them in order from smallest to largest. For younger or less able students, you may need to assist in accessing or clarifying the animals' sizes, but children will love researching and using this information as they also visualize the size differences. You may even want to select five or six animals and help children construct a graph that compares the animal sizes.


For a great cross-curricular activity, you can also utilize the books and Web sites to help students find the geographic location and habitat of each animal. Students can tape each animal's picture and its printed name on a world map, giving students one more "connection" from text to map. Visual information is processed so much faster than text, and this activity will help young students grasp what animals look like and will reinforce their geography skills as well.





Using Discussion and Writing to Build Understanding:

The following discussion questions will help build your students' comprehension skills. Additionally, many of the questions will help students develop their higher level thinking skills, asking them to think beyond the surface of the text or questions. The questions are written from the voice of the teacher, and can be used as is, or adapted to meet unique classroom needs.


 Ask students what they think was the most interesting animal that Darwin saw and why. Then ask them what they thought was the most interesting part of Markle's book about Marco Polo.


 In Markle's book about Darwin, she writes about what Darwin *saw*. In her book about Marco Polo, she writes about animals Marco Polo *probably saw*. Have students think about the purposes of these adventures and also the time in history that they took place, as they try to figure out why we can't be as certain about what Marco Polo saw as we can for Darwin. Remind students that scientists keep detailed logs of their observations, while merchants and warriors don't make a habit of keeping such detailed records.


 When Charles Darwin began his exploration, he thought he would be gone two years, but it turned out to be five years. Likewise, Marco Polo's father and uncle were gone on their initial journey much longer than they had planned. Ask students what some reasons are that a trip or an adventure might take longer than originally planned. Have students write about why plans sometimes have to change, or be extended, and to use examples from both the books and their own life. Ask them why is it important to be flexible.


 Sometimes a child's ideas are different from his or her parents' ideas, and sometimes his or her ideas can even be very different from those of his or her friends or classmates. Use the concept of differing ideas to begin a discussion about how Charles Darwin's ideas differed from those of his father. Use the following points to begin:


At one point, Charles Darwin's father refused to let him go on the adventure. Why didn't his father want him to go? Have you ever wanted to do something you thought was important, but your parents didn't want you to do it? Why do you think this situation happens? Using examples from your own life, write about how you developed a solution together with your parents, when you and your parents had very different ideas or plans.

 Why is it significant to have an animal named for someone, such as Marco Polo Sheep? How would it make you feel if something were to be named for you someday?

 Darwin realized his Theory of Evolution would meet resistance. What does resistance mean, and why do you think his theory was met with resistance? What are some ideas that you have had that were met with resistance from your parents?


 Why was it important that Darwin was invited to belong to the Royal Society of London when he returned to England?


 The travels, adventures, and studies of Darwin and Marco Polo served as motivation for other people. How did Darwin's studies motivate other people? How did Marco Polo's travels motivate other people?


 Sandra Markle writes many informational or nonfiction books. She does a great deal of reading and research before she begins her writing, to be sure it is accurate.

If you were going to write a nonfiction report, what would you choose to write about? What resources would you choose to do your research? Why would it be important to check more than one source or reference? Give some examples of the types of informational resources that are considered accurate and reliable, that you might want to consult.

Thinking About an Author's Words and Style:


 The first sentence and the first paragraph of a book are very important because those first words can make a reader want to continue reading the entire book. Have students look at the first paragraph of one or both of Sandra Markle's books, to see what words she chose to make readers want to keep reading. Ask students what impact these opening words had on them. Ask them if they made them curious about what they would read and learn about. Then, have your students try to write a couple opening sentences about a nonfiction topic that interests them. Have them be sure to make them interesting and accurate, so other people will want to read the rest of their report or story.

 It is always interesting to talk to someone who does interesting things. Have students imagine that they could have a conversation with Sandra Markle. Have them make a list of questions they would like to ask her. Then lead a discussion about their questions. Have them predict how Ms. Markle would answer the questions.

 In the newspaper business or journalism, writers use a writing style or technique known as *the five Ws and the H*. Explain to your students that the letters each stand for something, and they can be used to describe or tell what an article or book is about. The letters stand for:

W – Who **W** – Where **W** – Why

W – What **W** – When **H** – How

 Have students answer *the five Ws and the H* for the books about Charles Darwin's and Marco Polo's adventures. You can give your students a chart like the one below, to help them.


	<i>Animals Charles Darwin Saw: An Around-the-World Adventure</i>	<i>Animals Marco Polo Saw: An Around-the-World Adventure</i>
Who		
What		
Where		
When		
Why		
How (means of travel or transportation)		


Comparing and Contrasting the adventures of Charles Darwin and the adventures of Marco Polo:


Older students may find it interesting to create a chart on which they compare Charles Darwin and Marco Polo. They can include comparisons of the explorers' backgrounds and families, their characteristics or attributes as explorers, the reasons or purposes for their travel and adventure, and the types of places and consequent observations they each made.


	Charles Darwin	Marco Polo
Describe their personal and family backgrounds.		
There were some interesting religious aspects of their lives. How did religion impact their lives?		
Why did they begin to travel? What were their original purposes?		
What methods of transportation did they use?		
To which countries and continents did they travel?		
What plants did they observe?		
What animals did they observe?		
What problems did they encounter?		
How do we know today what they observed?		


ACTIVITIES THAT ENHANCE SCIENCE LEARNING

 Help students improve their observational skills and note taking skills by creating an imaginary location or environment in the classroom. Have students carefully observe the things that you place in this environment. Then have students make careful notes of what they see. These things might include a clean chicken bone, a sea shell, a pebble, a piece of moss, a green leaf, an evergreen needle, a frond from a fern, several different types of egg shells, or some fish scales or fish bones.

 Have students describe what they see and feel. This will provide an excellent setting for a class discussion regarding the importance of careful observations, and also the importance of the careful notes that Darwin made as he observed the many plants and animals he encountered along his journey.

 Two of the important traits that Charles Darwin repeatedly demonstrated were his skills as a careful observer and his ability to keep accurate notes of what he observed. He realized how important it is always to “observe carefully, before you draw conclusions.” Have students explain why that is an important science skill and why it was extremely important for Charles Darwin.


 Ask students how Darwin’s travels might have resulted in a different outcome if he had been careless in his observations or if he had not kept careful, accurate notes and sketches.


 Explain to children that camouflage is the changing of color or color patterns, to blend in with the surroundings. Then, have them read Sandra Markle’s book *Animals Charles Darwin Saw*, to find out the answers to the questions below. Students may also want to do additional research to answer the questions.

How do octopuses change color?

What other animals can change color to camouflage themselves?


According to Sandra Markle’s book, what three reasons might cause an octopus to change colors?

 Have students make a chart about the animals listed in each of Sandra Markle’s books. The three columns should include the *name of the animal*, the *typical habitat of the animal*, and the *location where Markle writes that Darwin or Marco Polo saw the animal*.

 Charles Darwin was raised to believe that each animal was created in its present form and that animals and plants do not change over time. In Punta Alta, however, Darwin discovered very large bones unlike any he had ever seen, studied, or imagined. He began to think about the possibilities that surrounded his observations. His new ideas were very important, as he wondered: (1) Animals today might not be the only animals that ever existed; (2) Animals might change over time or evolve.

Discuss with your students other times in history when new scientific ideas were developed. Copernicus introduced the idea that the sun was at the center of the solar system. His ideas were originally met with much resistance and disbelief. Your students might enjoy reading about his ideas and how they changed science.

New science ideas are also always being developed in medicine, especially as doctors and researchers try to cure diseases. Your students might also like to read about the beginning of modern medicines, the first antibiotics, or the discovery of a vaccine that would make one immune to polio.


 Discuss with your students the letter that Darwin received from a young scientist named Alfred Russel Wallace. Remind them that in his letter, Wallace asked Darwin’s opinion about Wallace’s theory, which turned out to be nearly the same as Darwin’s Theory of Evolution. Ask them why this was alarming to Darwin, and how he decided to resolve the situation.





ACTIVITIES TO CONNECT READING WITH GEOGRAPHY AND HISTORY

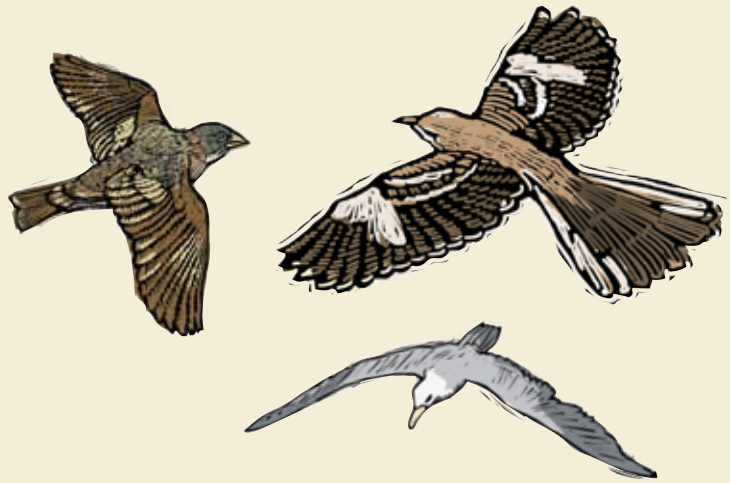
The goals of Charles Darwin's travels included the following:


- 1) To survey the coast of South America and to continue around the world.
- 2) To take necessary measurements to improve charts and maps for the navy.
- 3) To study and collect samples of plants and animals.


 Ask your students to list the goals of Marco Polo for his adventures on the Silk Road. Also ask your students to consider how his goals changed after he met Kublai Khan.

 Marco Polo traveled for many years and he told stories everywhere he went. Those stories were written down, becoming the first travel guide. Ask your students to think about the following questions: What was life like in the 1200s, and why did the conditions at that time make these stories and writing them down so important?

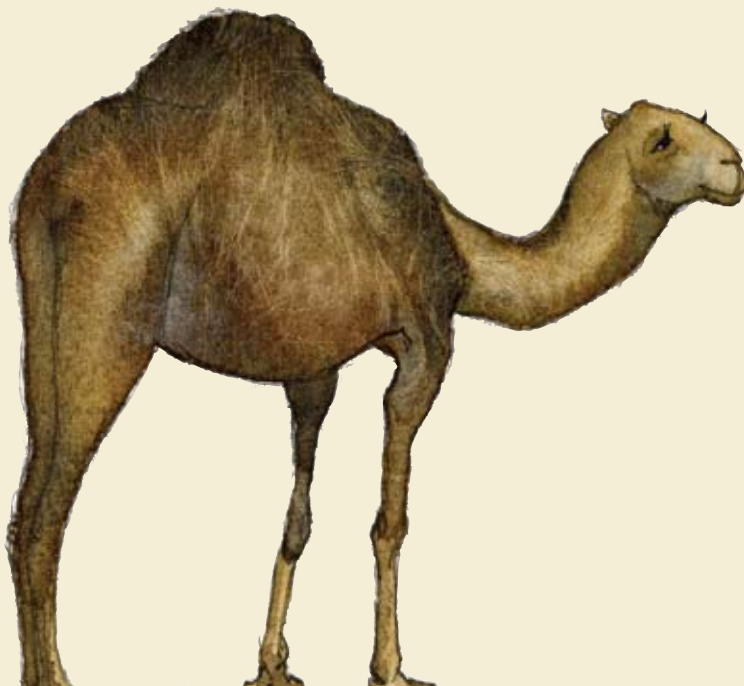
 Kublai Khan was curious about Europe and about Christianity. He asked Marco Polo to ask the Pope to send 100 religious men to Cathay (China) to tell the people about Christianity. Ask your students to think about how China might be different today if the two Christian friars sent by the Pope had not become frightened and run away, or how China might be different today if the Pope had sent the one hundred religious men to China that Kublai Khan had requested, to tell the people about Christianity.




 Kublai Khan gave Marco Polo's father and uncle a "Golden Tablet." Ask your students what a Golden Tablet was, and why it was important.

 Have your students identify important geographic locations on a world map. This should probably be done first as a group activity using a large pull-down map in the classroom. Then, students should be encouraged to mark the same important geographic locations on their individual maps. The following places and important bodies of land and water are a suggested list that students should mark and identify on their maps.

Atlantic Ocean	New Zealand
Australia	Pacific Ocean
Cathay (China)	Rome
England	South America
Galapagos Islands	Tahiti
Jerusalem	Venice



 Have students make a time line, including the important dates from both of Sandra Markle's books. Also have them insert other important events in American history and the dates on which they happened, to help students understand what was happening in the United States at the same time that Darwin was developing his Theory of Evolution. This could be done on a large time line that circles the classroom.

Suggested dates to be included on the timeline follow:

September 15, 1254: Birth date of Marco Polo.

1271: Marco Polo sets off on horseback, traveling the Silk Road.

1274: Marco Polo, his father, and his uncle arrive in Cathay (China).

1291: Kublai Khan sends Marco Polo (age 37) to explore Cathay, Burma and India.

1295: The Polo men (Marco, his father, and his uncle) return to Venice.

1298: Marco Polo is captured during battle between Genoa and Venice; he begins to share the stores of his travels.

February 12, 1809: Birth date of Charles Darwin.

1825: Darwin studies medicine at Edinburgh University.

1827: Darwin studies religion at Cambridge University.

1831: Darwin graduates from Cambridge University and is offered a job as assistant naturalist.

1832: Darwin sends samples home to England.

1832: Darwin discovers large bones in Punta Alta, Argentina (South America).

1833: Traveling through Chile, Argentina, and Uruguay, Darwin finds inland salt water lakes.

April 22, 1833: Darwin returns to Punta Alta.

1834: Darwin experiences an earthquake in South America.

1835: Darwin explores the Galapagos Islands.

October 2, 1836: Darwin returns to England. He is invited to join the Royal Society of London.

1859: Darwin publishes *On the Origin of Species*, explaining why he believes in evolution.

Note: Specific dates were not recorded for many things and events in Marco Polo's time, in contrast to the specific information recorded in Darwin's time. Darwin was keeping very specific notes as a scientist or observer of scientific phenomena, whereas Marco Polo was a merchant and didn't keep track of dates in the same fashion.



ABOUT THE AUTHOR

Sandra Markle is a former elementary school science teacher, a nationally known science education consultant, and the author of many award-winning books for children. *Animals Robert Scott Saw* was inspired by her own experiences in Antarctica.

ABOUT THE AUTHOR OF THIS GUIDE

This guide was prepared by Donna L. Knoell, educational consultant.

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