Maria's Comet Unit Study and Lapbook

Book written by Deborah Hopkinson Unit study and printables created by Wende

Social Studies

Massachusetts – Maria and her family lived in Massachusetts. If desired, do a brief study of the state. Massachusetts is part of what are called the "New England States", located in the northeastern part of our country. Have student locate Massachusetts on the US map. Your child may be familiar with the state, having learned in the past about the Mayflower landing at Plymouth in 1620, the Boston Tea Party, the Midnight Ride of Paul Revere, or maybe the Salem Witch Trials. Well Massachusetts was also among the first states to experience rapid city growth, and today is one of America's most urbanized and industrialized regions. Massachusetts has been the home to many famous people including John Adams, our second president, and his son, John Quincy Adams, our sixth president. The state flower is the Mayflower, and the state bird is the chickadee. Looking at a map of Massachusetts, have your child locate the capital, Boston, as well as Nantucket, where Maria lived.

Living in a Whaling Village (Nantucket) – Maria's family lived in Nantucket, a small island off the south east coast of Massachusetts. While Nantucket is now used mostly as a summer vacation spot, during the 1800's it was a very prosperous whaling village. By 1835, large fleets of ships were sent out from Nantucket to as far away as the Pacific Ocean off the coast of Alaska to hunt whales. These voyages often lasted three or more years. Most of the people living in Nantucket in some way depended on the whaling industry for their livelihood. The whales were used to meet the high demand of whale oil, the chief illuminant of the day. When he first married Maria's mother, Mr. Mitchell worked for his father to convert a shipload of whale oil into soap. Later, he was an astronomer for the United States Coast Survey, helping the whaling ships to navigate and predict weather patterns. And like Andrew, Maria's brother, many a young male sailed off on the whaling ships as a cabin boy. As you read through *Maria's Comet*, make note of all the details characteristic of living in a whaling town. Examine the double spread title page, with the ships coming and going, and the lighthouse to show the sailors the way. Look at the observatory, overlooking the sea. Read of Maria's uncle who owned a whaling boat, the sea chest in the attic, and the whale oil lamps the family used. As the sale of petroleum-based oils took the place of whale oils, whaling greatly decreased. Nantucket is still rich in nautical history, with stately captain's houses and fishing shanties, and it was depicted in Herman Melville's classic novel *Moby Dick*. A good go-along easy reader about whales and the effects of whale hunting is *I Can Read About Whales and Dolphins* by J.I. Anderson. If desired, rabbit trails can be taken to further study whales. Included with this unit are a couple of whale lapbook components, to complete if desired.

→ Complete What Would You See in a Whaling Village T-book

→ Complete Whale Product Accordion Fold

 \rightarrow Complete Whale Graduated Book

Other Homeschool Share units focusing more on whales:

Whales Passing

Humphrey the Lost Whale

Whales Lapbook

Geography (Using an Atlas) – Maria and her brother would climb up to the attic and look through an old atlas, imagining themselves exploring foreign lands. Is your child familiar with how to use an atlas? An atlas is a book of maps. There are atlases that cover local regions, such as road maps throughout your state, and there are larger atlases that contain all the state maps of a country. There are even world atlases, which cover all the countries of the world. Try to obtain a children's world atlas this week, such as *Children's Illustrated World Atlas* by Courage Books, or *First Picture Atlas* by Gallery Books. Introduce to your child the different parts of a map, having him locate the following:

Title – the title of the map tells you where the map is about.

Compass Rose – A compass rose helps you tell the direction. North is always at the top.

Map Key – Contains symbols that tell you what products are produced, kind of work people do, areas of special interest, capitals and cities, and/or what landforms exist in the place on the map.

Scale – The scale tells you how many miles in the real world equal a certain distance on the map. The scale will help you to know distances between cities.

Have your child go on a scavenger hunt in the children's atlas to locate things such as countries that produce cocoa or silk, coast lines that are good fishing/whaling spots, the ocean that is to the east of Massachusetts, a country with a volcano, where the most oil can be found, etc.

→ Complete Atlas Scavenger Hunt

Quakers –

The members of the Mitchell family were Quakers. Also called the Society of Friends, the Quakers are a sect of Christians that believe that Divine revelation is immediate and individual, and for this reason they have no formal creed or ordained ministry. At their Meetings, they worship in silence and speak out as they are moved to do so. Quakerism is more of a way of life than a religion, focusing on all its members living according to the Scripture, which they take very literally. Quakers are expected to love and help all fellow men, take a stance of nonviolence, and be very self-disciplined. They endorse a simple lifestyle. Originating in Europe during the Reformation, the Quakers were persecuted for not taking oaths, rejecting the English Church, and breaking the laws forbidding them to meet privately for worship. In addition to Maria Mitchell, famous Quakers include William Penn, for whom Pennsylvania was named after, and Lucretia Mott, abolitionist and women's rights advocate. Great go-alongs are the stories about Obadiah Starbuck, a young Quaker boy living in Nantucket during the early 1800's by Brinton Turkle.

→ Complete Quaker Tri-fold Lapbook Component

1830's –

Maria was born in 1818, which puts the setting of this story at approx. 1828-1830. What does your child know about this era in American history? It was the period of time after the Revolutionary War and War of 1812, and preceded the Alamo and Civil War. One third of the American people was now living west of the Appalachian Mountains. The south was comprised of "slave states" where slavery was still allowed, and there were many riots fighting against it. In the north, which was comprised of "free states", many immigrants came from European countries, and worked at the factories popping up all over the northeast. There were no cars, telephones, or electricity. Girls rarely went to school at this time, and were often homeschooled. Children had to work hard helping their parents at home. Girls had to help their mothers take care of the children, clean the home and laundry, keep the fires going, cook, mend, spin, weave, and churn butter. Boys had to bring in wood, fetch water, help their fathers with their trade, hunt and butcher animals, and take care of the fields. As you read through *Maria's Comet*, have your child pay attention to how Maria's childhood is the same/different than his own.

→ Complete Venn Diagram Lapbook Component

Other Homeschool Share units focusing more on girls growing up in the 1830's:

Bobbin Girl by Emily Arnold McCulley

Ballot Box Battle by Emily Arnold McCully

SCIENCE

*Note for teacher: This HSS unit is heavy on the study of astronomy. As to not get overwhelmed, pick one or two topics that your child is most interested in, and focus on those throughout the week.

You can find more astronomy printables in <u>Homeschool Share's Space Lapbook.</u>

Astronomy –

Is your child familiar with the different branches of science? The Sciences most familiar to children, Natural Sciences, are broken down into two groups. Biological Sciences include Zoology (animals), Botany (plants), and Ecology (environment).

Physical Sciences include Physics (motion, matter, and energy), Chemistry (substances), Geology (earth, rocks, etc.), and Astronomy (outer space). Maria Mitchell and her father liked to study astronomy.

The word Astronomy comes from the Greek roots "astro" meaning "star" and "nomy" meaning "law of."

→ Complete Branches of Science Flap Book

→ Complete Astronomy Word Search Simple Fold

Astronomers –

A person studying astronomy is called an "astronomer". Maria's father was an astronomer, and when Maria grew up, she became one too. Astronomers have been working for thousands of years to learn about God's creation and how it works. Astronomy has come a long way since the days of Maria, with the invention of better telescopes, rockets, and space stations, but there is still much to learn about the solar system and the galaxies beyond. As you read about and study astronomers mentioned throughout *Maria's Comet*, complete the famous astronomer cards and store them in lapbook with provided pocket.

Maria Mitchell- *Maria's Comet* is loosely based on the childhood of Maria Mitchell. Be sure to read the Author's Notes to give you a little background on the life of Maria Mitchell. The following biography is shared with permission from <u>History's</u> <u>Women</u>:

Maria Mitchell was a pioneer in the field of science. Hundreds of women have over the years distinguished themselves in scientific pursuits, but Maria was one of the first to do so.

Maria was very patient, plodding, and persistent in her work and few have surpassed her in effort. She was born in Nantucket, and, as the land had few attractions, many of the people were natural observers of sea and sky. Maria was one of them. Her father was for years engaged in scientific pursuits in connection with his work of teaching. He was a man of superior intellect, but of meager income. He established a small observatory and earned one hundred dollars per year by astronomical work for the United States Coast Survey. Maria looked back upon her girlhood days as "an endless washing of dishes", and yet, she managed to study a great deal. She was for many years the librarian of the little Nantucket Athenaeum at a salary of one hundred dollars per year. Of this she was able to lay aside a portion for future studies.

So she toiled on, studying and observing in astronomical lines. When she was nearly thirty years of age, fame came to her as a result of her work. She discovered a telescopic comet. Her father communicated the discovery to Professor Bond of Cambridge. Edward Everett, president of Harvard College, learned that the Kind of Denmark had offered a gold medal for such a discovery and was instrumental in securing it for Miss Mitchell.

After this award, Maria visited Europe and was well received by such leading scientists as Sedgwick, Challis, Adams, Herschel, and Arnott, as well as by many of the literary leaders. Her best years were given as professor of astronomy is Vassar College, where she rendered a great service.

Her father was with her and his closing years were made glad by seeing his daughter being honored as a teacher of the science of astronomy, the first lesson in which she had received from him.

Copernicus – Maria loved stories about early astronomers such as Copernicus, who lived over 300 years before her. Nicolaus Copernicus was born in Poland in 1473. At this time, people believed that the Earth was the center of the universe, and that all planets and the sun revolved around Earth. Copernicus was an early astronomer who challenged this belief, and had written a theory saying that the sun was the center of the universe and all planets, including Earth, moved around it. He claimed that with his new system he could accurately calculate the positions of the planets. Copernicus died in 1543.

Galileo– Galileo Galilei was an Italian astronomer and physicist who lived between 1564-1642. He was the first person to use a telescope to look at the sky, and he supported Copernicus' belief that the planets revolved around the sun, not the earth. Galileo also challenged Aristotle's theory that heavenly bodies were divine and therefore perfect and without blemish. Using his telescope, Galileo discovered sunspots, craters, and peaks on the moon, and also discovered the four large moons of Jupiter. Galileo's work upset the Roman Catholic Church, shaking the foundations of their beliefs, and he was charged with heresy, which is saying or teaching things that go against the church. In 1633 he was sentenced to house arrest, and stayed there until his death in 1642.

Sun –

Early astronomers believed that the Earth was the center of the universe, and that the sun and all the planets revolved around it. They were proved wrong though, when it was discovered that all the planets revolve around the sun. The sun is a giant ball of extremely hot gas. Does your child know that the sun is a star? It is not the largest star, but at 93 million miles away, it is the star closest to the earth so it seems much brighter than the other stars. In addition to light, the sun provides us with heat and energy. The position of the earth as it rotates on its axis and revolves around the sun is what causes day and night, as well as the different seasons. Explain that the sun rises in the east and sets in the west.

ightarrow Complete Sun Simple Fold

Optional Go Along Books –

Sunshine Makes the Seasons by Franklyn Branley (Let's Read and Find Out)

I Can Read About the Sun and Other Stars by Richard Harris

Moon –

The moon travels around the earth, reflecting the light of the sun in the nighttime sky. The position of the moon in relation to the position of earth determines just how much of the sunlight is reflected. It takes 28 days for the moon to travel around Earth, moving at over 2,300 miles an hour, and as it moves we see the different moon phases. The moon is a big rock that has no air, water, or weather. The moon is full of craters and mountains, but no plant life of any kind.

→ Complete Moon Phases Mini Book

Optional Go Along Books –

The Moon Seems to Change by Franklyn Branley (Let's Read and Find Out)

All About the Moon by David Adler

Comets -

As a child, Maria Mitchell dreamed of discovering a comet, and as an adult she did just that! While they did not know what comets were made of in the 1800's, we now know that they are masses made up of gas, rocks, and pieces of ice, kind of like dirty snowballs. They are often larger in size than Jupiter. The three major parts of a comet are its nucleus (the small solid core), coma (the cloud of gas and dust that surrounds the nucleus), and fiery tail(s) (the glowing ionized gas trailing behind the comet). They circle around the sun, and as they get close to the sun, some of the ice melts. The water then vaporizes and blows behind the comet from solar winds, giving the comets an appearance of having a tail. Comets orbit around the sun very slowly, with the tails always pointing away from the sun, and are rarely seen on earth. Telescopic comets are those that can only be seen with a telescope, not with the naked eye.

Often, a comet is named after the first person to discover it. Edmund Halley saw a comet in 1682, and predicted its return every 76.5 years. The most famous of comets, Halley's comet will be seen again in 2061. The second most famous comet is Encke's Comet, which was found and predicted by German astronomer Johann Franz Encke in 1786. The first comet of the 19th century was simply called the "Great Comet of 1811" due to its tail that extended 100 million miles! And in 1847, Maria Mitchell spotted a comet that at the time was named "Miss Mitchell's Comet".

Throughout history, people looked at comets as landmarks for notable events. A comet was present in 44BC upon the death of Julius Caesar. The Black Death struck 90,000 people of London during the sighting of the Great Comet of 1665. Napoleon Bonaparte used the appearance of comets as his personal guides to conduct battle. And, both the birth and death of Mark Twain occurred under Halley's comet.

ightarrow Complete Comet Fact Envelope Book

→ Complete Parts of a Comet Simple Fold

Planets -

During Maria's childhood there were only seven known planets – Mercury, Venus, Earth, Mars, Jupiter, Saturn, and Uranus (then called Herschel after the

astronomer that discovered it). Later, Neptune and Pluto were named planets, (Pluto being recently demoted). The planets each have a different composition, but they all orbit around the sun. A way for children to remember the planet in order of their distance from the sun is this fun saying:

<u>My Very Eager Mother Just Served Us Nine Pizzas</u>

"Tiny Mercury" is 36 million miles away from the sun and orbits it once every 88 days. It is hard and rocky, with craters, cliffs, and a very thin atmosphere. Its temperatures can reach 797 degrees and drop to –300 degrees. During Maria's life, Mercury was the smallest known planet.

"Pale Venus" is 67 million miles away from the sun and is the closest planet to Earth. It orbits around the sun once every 225 days. Venus is the brightest object in the sky next to the sun and the moon. Venus is covered with thick clouds that act like a greenhouse, bringing its temperatures up to 842 degrees.

Earth is 93 million miles away from the sun. Our planet orbits the sun every 365½ days, and is mainly covered with water. Earth is the only planet known to support life.

"Red-faced Mars" is 142 million miles away from the sun and orbits it once every 687 days. It is only about half the diameter of Earth, and is hard and rocky, and appears red to us. The largest volcano in the solar system is located on Mars, and it is the only planet whose surface is observable through telescopes on Earth.

"King Jupiter", the largest planet in the solar system, and is the fifth planet from our sun at 483 million miles away. From a telescope, Jupiter looks like a flat yellowish disc with a big red spot that is caused by violent storms on the planet. It has a smallish rocky core surrounded by a huge mass of swirling gas. While in Maria's day Jupiter was known to have four moons, there are currently sixteen moons around Jupiter that have been discovered.

Saturn is the second largest planet in the solar system, and 887 million miles away from the sun. It orbits the sun once every 29½ years. Composed mostly of gases and water, Saturn has a beautiful ring system, extending 260,000 miles out from the planet's surface.

"Blue-green Uranus" is the seventh planet out from the sun, being 1,783 million miles from it. Originally called Herschel after the astronomer that discovered it, Uranus was the very first planet to be discovered with a telescope. It orbits around the sun once every 84 years; this planet is made of gas, with few clouds and no solid surface. It is also different than the other planets in that it spins on its side, with the axis being horizontal.

Neptune, 2,794 million miles away from the sun, orbits it once every 165 years. It is made of gas and contains many cloud formations and a system of rings. Neptune was discovered during Maria's lifetime, in 1846, and is often considered the twin of Uranus.

Pluto, the smallest of the planets, is farthest from the sun, at 3,730 million miles away. It is the most recently discovered (and demoted) planet in our solar system. Most books about astronomy will still refer to Pluto as a planet. Pluto is different than the other planets in that it has an orbit shaped as an oval instead of a circle. It orbits once every 248 years

ightarrow Complete Planets Flap Book

Milky Way-

Maria compared the Milky Way to a quilt. The Milky Way is the faint band of light, created by the combined light of thousands of stars that stretch across the sky. The Milky Way is sometimes also referred to as our Galaxy.

Stars/Constellations -

Maria sees each constellation as a patchwork of stories. She mentions Orion the Hunter, Taurus the Bull, and Gemini the Twins. She mentions many stars, including Castor, Pollux, Rigel, Sirius, and Polaris. Read the definition of stars and constellations on the "Astronomy Terms" page in the back of *Maria's Comet*. Constellations are groups of stars in the shape of pictures. There are over 80 constellations recognized around the world. Has your child ever wondered how constellations got their names? We are told in Psalms 147:4 that God named and knows the numbers of all the stars. Throughout the Bible, we read of how God designed the stars to be signs, and to teach and reveal. Adam, Seth, and Enoch were the very first astronomers, using the stars as a source of God's inspired Word to pass down to generations before His Word was written. The stars were all in place, and they drew pictures around them as a way to remember them. As the Scriptures came into play, the old ways of reading stars gradually faded away. Ancient Egyptians, Greeks and Romans evolved the bits and pieces they had heard about the stars into their mythology, and renamed most of the constellations. Most of these names have stuck up until present day. There are a total of 12 (God's number of perfection) signs of the Zodiac, plus 76 additional constellations, all of which tell the story the Redeemer's coming, suffering, triumph, work, and future glory. The Zodiac marks the stages of the sun's path through the heavens, corresponding with the twelve months. Introduce your child to the stars and constellations that Maria mentioned, along with the additional Zodiac constellations.

ightarrow Complete Constellation Matchbooks

Orion (the Great Hunter) – contains the bright star Rigel, it was named after the great hunter that was killed by Diana in mythology.

Ursa Major (Great Bear) – contains the group of seven stars called the Big Dipper.

Ursa Minor (the Little Bear) – also called the Little Dipper, it contains the bright polestar Polaris that stays in the north.

Canis Major (the Great Dog) – contains the brightest star, Sirius.

Taurus (the Bull) – contains one of the twenty brightest stars in the sky, Aldebaran

Gemini (the Twins) – contains the two bright stars, Castor and Pollux, who were named after twin sons in Greek Mythology.

Cancer (the Crab)

Leo (the Lion) – contains one of the twenty brightest stars, Regulus.

Virgo (the Maiden) – contains one of the twenty brightest stars in the sky, Spica.

Libra (Scales) – named after the Ancient Roman pound.

Scorpio (Scorpion) – contains the bright star Antares, its scorpion shape represents a whip or scourge.

Sagittarius (Archer)

Capricorn (Goat)

Aquarius (the Water Carrier)

Pisces (the fishes)

Aries (the Ram)

Telescopes –

Papa says, "My telescope gathers and focuses light." Telescopes were first invented about 400 years ago to make objects appear closer than they were. Telescopes such as the one invented by Galileo in 1609 were "refracting telescopes". They had two lenses, a larger objective lens and a smaller ocular lens, which was held near the eye. Rays of light would enter through the objective lens, and as they passed through the second lens, the light was bent again to magnify the image. The image, while appearing to be up to 33 times closer, actually appeared backward and upside down. This design was later improved by the addition of mirrors.

LANGUAGE ARTS

Vocabulary –

Introduce unfamiliar words and their definitions to younger children. Have older children look up any unknown words in dictionary and show understanding.

→ Complete Vocabulary Flap Book

Fiercely – the sun burns *fiercely* - violently

Valleys – Papa can find valleys on the moon – low lands between mountains

Ancient - comets look like ancient creatures - very old

Fro – push the broom to and *fro* – away from

Jade – a single stone of *jade* – a greenish mineral used as a gemstone

Trove – a treasure trove of books – something of value discovered or found

Harbor – chase him to the *harbor* – a sheltered place on the coast of the sea where ships are anchored

Lads – the *lads* went out to sea – a boy

Cloak – take your *cloak* – loose outer garment, usually without sleeves

Luminous – the *luminous* sky – full of light; glowing

Thought Question -

Maria said, "Sometimes even a few steps can be as hard to take as a journey to a distant land." Ask your child what she thinks is meant by that statement. Has your child ever heard the phrase "the first step is always the hardest"? Why do you think it was hard for Maria to ask her father if she could join him? Was she afraid of rejection? Afraid she would get in trouble? Was there ever a time you felt that way? Have your child write about it in The Hardest Step Triangle Book.

Similes –

A simile is a comparison between two unlike things using the words "like" or "as". The author used a variety of similes throughout *Maria's Comet*:

Papa sweeps the sky like a sailor scanning the waves.

Comets compared to ancient creatures

I turn his words over and over, like an otter trying to open an oyster shell.

Milky Way compared to a crazy, luminous quilt

Needle compared to heavy anchor

Onomatopoeia –

Onomatopoeia is the use of a word whose sound suggests its meaning. The author uses this literary device as she describes the *whoosh* of a broom.

Creative Writing (Option 1)-

Maria made up stories to tell her siblings of all that Andrew the Sailor would see. Have your child write or narrate to you a short story about what a young runaway boy may see as he travels the sea.

Creative Writing (Option 2)-

Maria imagines herself grabbing the tail of a comet and blazing through the sky, and taking hold of a star, going wherever it takes her. Your child may enjoy writing a story about his/herself taking a ride through space on the tail of a comet or point of a star. What would he see? How fast would he go? When would he return? Would he bring anything back with him? Encourage your child to have fun with this writing assignment, letting him know the more "out there" the story is, the better. Use border paper and pocket to store it in, if desired.

Idiom –

An idiom is a phrase or expression that means something different from what the words actually say. Marie and her brother would "spin yarns". "Spin yarns" is an idiom that originated in about 1800. Thought to first have originated with groups of women spinning yarn on spinning wheels, and telling stories to pass the time, it carried over as a nautical phrase used by seamen who had the job of "spinning" or loosely twisting together pieces of old rope to use for small tying jobs, also while telling stories. In time, the word "spin" came to mean "tell" and "yarn" to mean "story", and when someone "spins yarns", they are usually stretching the truth to tell a lavish story.

Homonyms –

Homonyms are words that are spelled and pronounced alike but have different meanings. One example of a homonym used in the story is the word "sweep". Maria's father would "sweep" the sky, meaning he would pass over, searching the sky, while Maria would "sweep" the floor with a broom. Another homonym used was the word "sea". "Sea" can mean a great body of water, or it can mean a vast, widespread area, such as the sky. Ask your child if he can think of any other homonyms.

Spelling –

You can use this book as an opportunity to teach or review with your youngest children the special letter team, AR. There are many "ar" words throughout this story including star, hard, far, spark, Mars, darkness, yarns, harbor, and starts. Use the letter tiles and pocket (or wooden Scrabble tiles if you have them) to review different "ar" words. Have your child write a sentence including at least three of the words.

Copywork –

If desired, handwriting can be incorporated into this unit using Copywork of Maria Mitchell's Quotations. Manuscript and cursive options are both provided.

MATH

Counting –

Psalms 147:4 says that God "*telleth the number of the stars*". Have your child try to count all the stars on the picture with Maria on the rooftop. How high could he count? Was it hard? It is not hard for God! He has every single star counted and named! Now isn't that amazing!

Million –

Maria thought that the dust she imagined her father swept up would scatter into a million shimmering specks. How much is a million? Introduce or review this place value with your child. Show him how the number looks, with six zeroes - 1,000,000. Can he identify each place value? Have him point to the ones, tens, hundreds, thousands, ten thousands, hundred thousands, and millions. Explain that a million specs would be like having 1,000 M&M's in 1,000 pockets. That's a lot of M&M's!

As you read about the distant planets, you will come across the talk of "millions of miles". With your older child, have him figure out the differences in distances from the sun between planets. Complete word problems such as:

How much closer to the sun is Mercury than Jupiter? Answer: (483,000,000 – 36,000,000 = 447,000,000 miles closer)

How much farther from the sun is Earth than Venus? Answer: (93,000,000 – 67,000,000 = 26,000,000 miles farther) *This one may be tricky because it moves into billions! What is the difference in miles between the farthest planet and the closest planet? Answer: (3,730,000,000 – 36,000,000 = 3,694,000,000 miles different)

Have your child try to stump you with some Planet Problems!

Timeline –

Your child may like to use the astronomy timeline in the printables section to figure out the span between landmarks in the world of Astronomy. For younger children just pick 8 or so dates to put in order. Some dates you may want to place on the timeline include:

- 1473 Copernicus was born
- 1514 Copernicus's theory that Earth orbits the Sun is recorded.
- 1543 Copernicus died
- 1564 Galileo was born
- 1608 Dutch scientist Hans Lippershey invents telescope.
- 1609 Galileo improves telescope, and is first to use it to look at space.
- 1642 Galileo died
- 1682 Edmund Halley first spotted "Halley's Comet"
- 1759 Halley's Comet returns as predicted
- 1781 Sir William Herschel discovers Uranus
- 1786 Johann Franz Encke spotted and predicted "Encke's Comet"
- 1801 Giuseppe Piazzi discovers the first asteroid, Ceres.
- 1818 Maria Mitchell was born
- 1821 Catholic Church removes ban on teaching the Copernican system.
- 1847 Maria discovered a telescopic comet
- 1926 Robert Goddard used liquid rocket fuel to launch his first rocket
- 1930 Pluto was discovered
- 1958 NASA was established
- 1961 John Glenn was first American to orbit around the Earth.
- 1969 Neil Armstrong said to be first on moon.

Older children can be asked to figure out the dates between births, deaths, discoveries, etc.

Illustrator –

The illustrator of this story is Deborah Lanino. Mrs. Lanino had an interest in art and drawing ever since she was in kindergarten. She studied Fine Arts at Pratt Institute in New York where she received a Bachelor's degree. She has also studied art and art history in Florence, Italy. Mrs. Lanino has worked at the Museum of Modern Art in NYC, fine art galleries, and as a computer graphics trainer and designer before becoming a full time illustrator. Her artwork has been featured in magazines, on book covers, and on theater posters. She has illustrated numerous children's picture books including *The Littlest Angel*, by Charles Tazewell, *Maria's Comet*, by Deborah Hopkinson, and *Nina's Waltz* by Corinne Demas. You can relay to your child that Mrs. Lanino, just like Maria Mitchell, followed her childhood interests and dreams, and so can you!

Crayon Resist -

Your child may enjoy doing some artwork depicting a nighttime sky. A fun way of doing this is using a technique called crayon resist. On a piece of heavy paper or cardstock, have your child draw moon, stars, planets, and/or comets with light colored wax crayons (white, yellow, and silver work well). Be sure to press fairly hard with crayons, and allow areas of paper to show. Then, using black and/or dark blue watercolors, cover the entire surface with paint. The uncolored paper will absorb the paint, and the crayon will "resist" the paint. After the artwork dries, it could be used for the cover of lapbook if desired.

Concentric Stars -

Have your child examine the illustration of the broom floating next to a group of stars. The illustrator used concentric circles to make the stars appear luminous and sparkly. An artist well known for his use of concentric circles in his paintings of nighttime skies is Vincent van Gogh (1853-1890). Try to obtain a picture of van Gogh's painting, *The Starry Night*. Using light colored tempera paints or chalks, have your child draw pictures of stars or the moon on dark colored paper, approx. 5" x 5" if you would like to include it in your lapbook. Then, to give the picture a feeling of radiance, go around each star or group of stars with two or three broken strokes that don't connect. Then go around that concentric circle again, with strokes that don't connect, using *The Starry Night* and the illustration in *Maria's*

ART

Comet as examples. Glue picture into My Starry Night Simple Fold and include in lapbook, if desired.

Adapted from Discovering Great Artists by MaryAnn F. Kohl

Stencil Patterns –

Have your child take notice of the patterns painted on the walls of the Mitchell home. These patterns were painted with stencils, a popular decorating technique in the 1800's. Once pioneers had settled and had started to establish themselves, they often had extra money to beautify their homes. Traveling painters would come through town and offer up their services. The stencils were made of an oiled heavy paper, leather, or sometimes tin, unlike the plastic stencils of today. They used whatever paint materials were available to them; sometimes oil-based, and sometimes water-based mediums were used, such as milk. The pioneers' homes were dark and cold, so the colors chosen were usually vibrant and strong. Typical pre-1850 colors were lamp black, yellow ochre, red ochre and Prussian blue. You can make your own stencils, cutting a design out of cardboard with a sharp knife, or you can buy pre-cut stencils at craft stores. Obtain some stencils, and encourage your child to try his hand at stenciling.

- Lay out lots of newspaper over the work area.
- Put a small amount of paint on a paper plate.
- Place stencil on piece of paper (a paper bag makes a nice effect) and hold firmly in place.
- Using a sponge, gently dab the sponge into the paint, then over the cut area of the stencil.
- Too much paint may run under stencil and cause it to smudge.
- Let paint dry before repositioning stencil to create a pattern.

BIBLE

If you have read any go-along resources about the solar system, you have probably come across much talk of the theory of evolution. While it is easy enough to skim over, or edit it out altogether, with your older children you may want to discuss what and why you believe differently. How did the solar system come to be? Read the creation story with your child:

Genesis 1:14-19 –

And God said, "Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years:

And let them be for lights in the firmament of the heaven to give light upon the earth:" and it was so.

And God made two great lights; the lesser light to rule the night: He made the stars also.

And God set them in the firmament of the heaven to give light upon the earth,

And to rule over the day and over the night, and to divide the light from the darkness: and God saw that it was good.

And the evening and the morning were the fourth day.

Discuss what a creative, artistic God we have, and how carefully and skillfully the heavens and earth were created. Encourage your child to strive for this same creativity by designing his own lapbook component to represent the fourth day of creation.

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Cut out all the letter cards on solid lines. Form "ar" words with cards. Store in pocket when not in use.

A	В	С	D	E	F
G	Η	Ι	J	K	L
M	N	0	Ρ	Q	R
S	Τ	U	V	W	У
S	S	Τ	Τ	K	Κ
A	R	A	R	A	R
A	R	A	R	A	R
S	T	S	Ρ	S	T

Cut pocket out on solid lines. Fold flaps and pocket back on dotted lines. Glue pocket into lapbook, leaving top flap free. Fold over flap to help keep cards in pocket.



Cut out all pages on solid lines. Stack with cover on top and staple on the side. You might want to double check your atlas to be sure these symbols are used and only include appropriate pages in your mini book.

	Is silk manufactured?	Are sheep raised?
	Country	Country
Where in the World	Page number	Page number
Is cocoa grown?	Is there a volcano?	Are north, south, east, and wost?
Country	Country	
Page number	Page number	
Can oil be found?	A re whales caught?	Are diamonds mined?
Country/Ocean	Country/Ocean	Country
Page number	Page number	Page number

Is cotton grown?	Are the Rocky Mountains?	A re?
Country	State/Country	Country
Page number	Page number	Page number
Is the capital city, D ublin?	Is gold mined?	Would you like to visit?
Country	Country	Country
Page number	Page number	Page number
Are peanuts grown?	A re the P hilippines?	
State/Country	Ocean	
Page number	Page number	



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Print out pocket and fold tabs under. Glue tabs into lap/notebook and insert paper into pocket.





Print out pocket and fold tabs under. Glue tabs into lap/notebook and insert paper into pocket.



Cut out as one piece. Fold on dotted lines so cover is on top. Cut flaps on solid line. Under each flap, have older children list the sciences, and younger children draw pictures pertaining to correct sciences. Physical Sciences include Physics (motion, matter, and energy), Chemistry (substances), Geology (earth, rocks, etc), and Astronomy (outer space). Biological Sciences include Zoology (animals), Botany (plants), and Ecology (environment).

Physical Sciences	Biological Sciences
Branches	oß Science

Cut out as one piece on solid lines. Fold on dotted line, so that text is on top. Cut flaps on solid lines. Have child compare and contrast Maria's childhood to his own.



Cut out on solid lines. Fold each corner on the dotted line so words are to outside. Fold in half on dotted line so that cover is on top. Have child write answers under each flap.





Print out book on cardstock and cut on outside sold lines. Fold on centerline with blocks towards the inside. Glue graphic and text to the cover. After all of the Constellation Match Books are completed, glue them where marked inside book. Glue entire unit into lapbook.





Print out matchbooks on solid lines. Fold on dotted lines so that Constellation name folds down over the top of constellation. Inside each flap, have child make notes such as what the constellation represents, the brightest star in the constellation, the story behind it, etc. Either glue matchbooks individually throughout lapbook, or glue them all inside Constellation Book. (Included separately)





			(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
Taurus	Gemini	Cancer	Leo

Ursa Major	Ursa Minor	Orion	Canis Major

Print on cardstock. Cut out pocket as one piece, fold under tabs, and glue into lapbook. Cut each card out on solid lines. Fill out info, and store in pocket.

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Nicolaus Copernicus Born: Died: Died: Nationality:	Galileo Galilei Born: Died: Nationality: Known for:
Born: Died: Nationality: Known for:	Maria Mitchell Born: Died: Nationality: Known for:

Cut out on solid lines. Fold diagonally on dotted line with text to the outside, and then unfold. Fold diagonally on other dotted line with text to outside, and then unfold. Fold on center dotted line with text to inside, and then unfold. On side of without print, write about a time it was difficult to take that "first step". Collapse whole unit into a triangle, so graphic is on the cover. Glue into lapbook.

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Print all pages on paper. Cut on solid lines. Fold all pages on the dotted lines with print to the outside. Assemble book so that each copywork quote is to the left and the blank lines are to the right. Staple through cover, being sure to catch all pages.



Do not look at stars as bright spots only. Iry to take in the vastness of the universe. Every formula, which expresses a law of nature, is a hymn of praise to God.

 The greatest object
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Print all pages on paper. Cut on solid lines. Fold all pages on the dotted lines with print to the outside. Assemble book so that each copywork quote is to the left and the blank lines are to the right. Staple through cover, being sure to catch all pages.



Do not look at stars as bright spots only. Try to take in the vastness of the universe.
Every formula, which expresses a law of nature, is a hymn of praise to God.

The greatest object in educating is to give a right habit of study.
I am just learning to notice the different colors of the stars, and already begin to have a new enjoyment.

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Cut out on solid lines. Stack pages with cover on top, staple on left side. Have child look at the moon each night and draw the moon phase. Glue back of last page into lapbook/notebook.

MOON PHASES	Date: Time: Weather:
Date:	Date:
Time:	Time:
Weather:	Weather:
Date:	Date:
Time:	Time:
Weather:	Weather:
Date:	Date:
Time:	Time:
Weather:	Weather:



Parts Of a Comet

Cut out Flap Book on solid lines. Fold on dotted lines. Cut out planet pictures. Glue picture of correct planet to back of text flap. Under flap write planet facts such as how far from sun, size, rock or gas?, etc.

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Cut out as one piece on solid outside lines. Fold in half on dotted line, with text on the outside. Fold "Name some famous Quakers" in towards center. Then fold "What are Quakers also called?" in towards center so that cover is on top. Open back up folds, and cut flaps on solid lines. Write answers under each flap, then refold and paste into lapbook.



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Print and cut out as one piece. Fold on dotted line. Glue child's depiction of *The Starry Night* inside book.





Cut on solid line and fold inwards on dotted line. Cut out sun and glue to cover if desired.



1969	Neil Armstrong said to be first on moon.
1961	John Glenn was first American to orbit around the Earth.
1958	NASA was established.
1930	Pluto was discovered.
1926	Robert Goddard used liquid rocket fuel to launch his first rocket.
1889	Maria Mitchell died.
1847	Maria Mitchell discovered a telescopic comet.
1821	Catholic church removes ban on teaching the Copernican system.
1818	Maria Mitchell was born.
1801	Giuseppe Piazzi discovers the first asteroid, Ceres.
1786	Johann Franz Encke spotted and predicted "Encke's Comet."
1781	Sir William Herschel discovers Uranus.
1759	Halley's Comet returns as predicted.
1682	Edmund Halley first spotted "Halley's Comet".
1642	Galileo died.
1609	Galileo improves telescope, and is first to use it to look at space.
1608	Dutch scientist Hans Lippershey invents telescope.
1564	Galileo was born.
1543	Copernicus died.
1514	Copernicus's theory that Earth orbits the Sun is recorded.
•	
1473	Copernicus was born.

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Cut out as one piece on solid lines. Fold in half on center dotted line so VOCABULARY is on top. Fold both sides in towards center. Cut flaps on solid lines. Have child write definitions under flaps.



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WHAT KIND OF TEETHY WHAT KIND OF BODY COVERINGY SOVERINGY

BIRD	
rish	
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REPTILE	
RMCHIBIRM	
INSECT	
kind of animaly	

Print out all pages and cut on solid lines. Stack with smallest page on top and staple at top. Fill out info on each page. Glue back of last page into lap/notebook. Cut out as one piece. Accordion fold. Have child research and record items made from whales. Possibilities include margarine, soap, lubricant, candles, cosmetics, ointments, perfume, livestock food, and fertilizer. People of some countries eat the meat. Glue back of bottom fold into lapbook.

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Cut out book on solid lines and fold on dotted lines. Two side flaps will fold in towards center, and then cover fill fold down. Have child write about or draw pictures of things possibly seen in a whaling town. Cut on solid lines and fold on dotted line with text towards the inside. Cut out and paste cover words and graphic.



word search



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