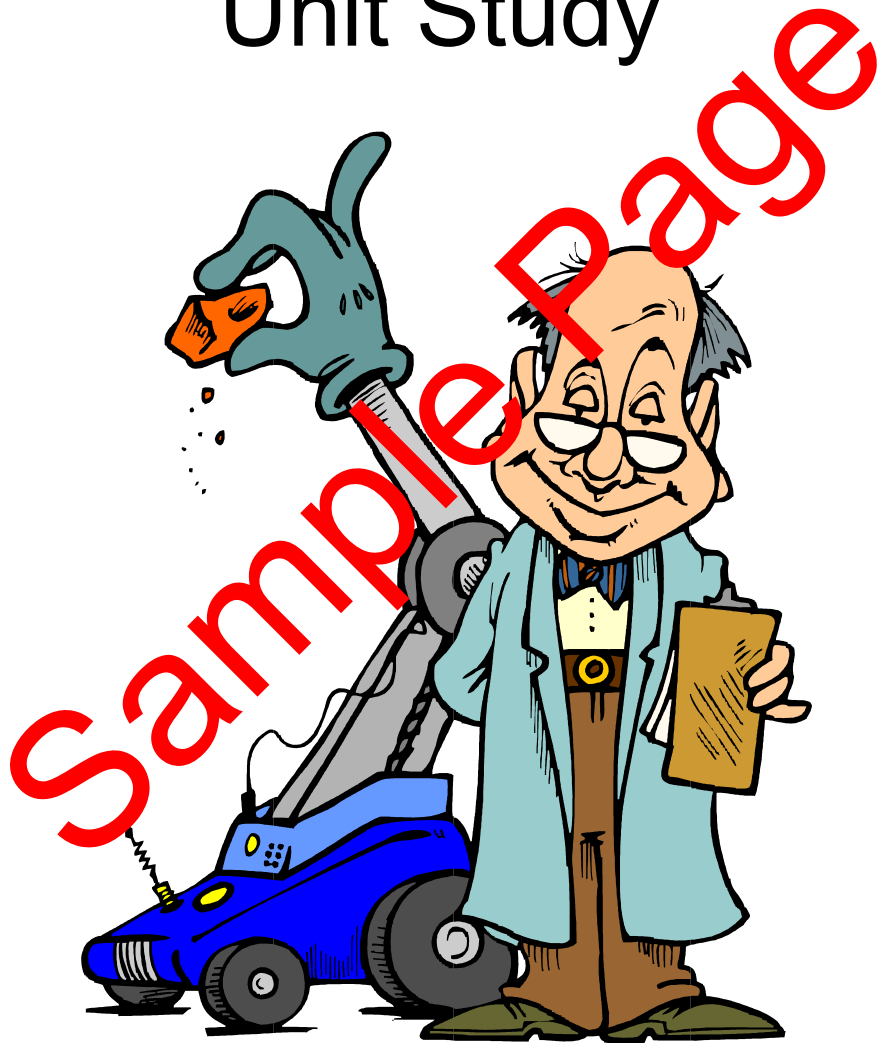




Grades 2-7

The Great Inventors

Unit Study



A Journey Through Learning
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Welcome

Thank you for purchasing from A Journey Through Learning. We hope that you enjoy our unit study entitled The Greatest Inventors (and their inventions). Getting started is easy.

First, take the time to just browse through the pages to familiarize yourself with the layout. In this book, you will find several topics about some of the world's greatest inventors and their inventions.

Each topic has an:

- * information page
- * activity page
- * vocabulary study

Information Page

Each of the topics has an information page to read to your child. You will notice that some of the words in the information pages are underlined.

Vocabulary Study

The underlined words are vocabulary words. Read each sentence that contains the vocabulary word very carefully. It is important that your child hear the vocabulary words in context. Ask your child if he/she can get the meaning of the word from listening to the sentence it is contained in. Next, turn to the vocabulary pages in the back of the book. Here you will find an area for your child to write down the actual definition of each vocabulary word. Vocabulary study increases your child's knowledge of the topic!

Activity Page

When your study of the topic is complete, it is time to go on to the activity that correlates with the topic. Some of these activities are more for fun while others are more challenging. All of them will enrich your child's understanding and knowledge of each topic.

We hope you and your child are blessed by this study! Please check our website frequently for new products!

www.ajourneythroughlearning.com

Thanks again,
Paula Winget
Nancy Fileccia

How Long Does it Take to Complete A Unit Study?

Doing a study guide page and an activity sheet a day, it should take about one month to complete. However, you can expand the study portion and make it last as long as you like! That's the beauty of homeschooling! Do it YOUR way!

Study Choices

Choice #1- Read the first page of the study guide. Then use the internet and fun children's books to learn more about the topic that is covered in that study guide. For instance-our American Indians Unit Study has a study guide page about Geronimo. Dig into Geronimo. There are probably lots of interesting things to learn about him that the study guide does not cover. Spend a day on Geronimo or spend a week! When your child has completed studying that particular topic, it will be time to do the activity sheet for that topic. The activity sheets are found right after the study guide page that it goes with.

Choice #2- Read only the study guide page and do the activity sheet that goes with it. The activity sheets are found right after the study guide page that it goes with. You may choose to do one study guide/activity sheet per day, two per day, two per week, three per week, etc. It doesn't matter. The pace is completely up to you. At one per day, it will take about a month to complete this unit study.

Tips and tricks to go the extra mile!

Supplies Need:

½ inch three-ring binder

8 tabs (if you are using our copywork and/or notebooking pages, you will need to have 10 tabs. Label with copywork and notebooking)

Your study guide and activity sheet pages

1. Label your tabs: Study Guide, Activity Sheets, Book Log, NICK, Biography Reports, Outlines, and Narration pages (Copywork and Notebooking, if using these).
2. Make copies of NICK notes and outline forms and narration forms, put them behind the tabs. Your child can use either the NICK notes form (easier) or the outline form (a bit harder) after any of the study guides. The narration forms also come in two levels. Choose the correct level for your child. These serve as a good way for your child to show what they have learned.
3. Hole punch your study guide and activity sheets and place behind the correct tab. You will read a page of a study guide. Behind the study guide are all of the activities that go with that study guide.



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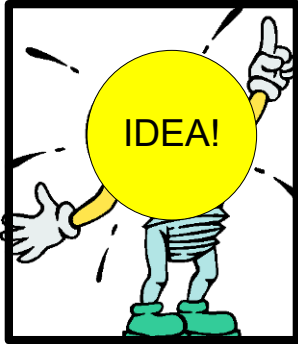
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What is an Invention?



Have you ever stopped to wonder how a dark room is lit up on or how that huge airplane got up into the sky? At one time, someone just like you had the same thoughts. Except when they thought them, electrical lights did not exist and nothing flew up in the sky. These things had to be invented.

Webster's defines an **invention** as;

- the creation of something in the mind
- a creation (a new device or process) resulting from study and experimentation
- the act of inventing

An **invention** is any new thought or idea that someone puts to work. Anyone can be an **inventor**. Anyone can take their ideas and make them known. All it takes is an idea and hard work to see it become a reality.

Everything around you started with an **idea**. Most of the time, an invention is started out of a need for something. Most inventions, once created, seem so simple. Think about the wheel. Image what your life would be like without the wheel. There would be no cars, trains, scooters, or roller skates.

Have you ever stopped to think about all of the inventions that you use in a day? How your life would be different without them?

In this study, we will learn about some of the people who had a simple idea. However, instead of just thinking about it, they acted on it. Because of their ideas, our lives today have become much easier.

What inventions did I use today?



Think about all of the inventions that you have used since you woke up this morning. List them below. Next, in the boxes beside them, number them in order of importance.

Sample Page

Johannes Gutenberg

In 1436, Johannes Gutenberg began inventing his wooden printing press. Movable type is also called **foundry** type or hot type. In foundry type, each piece of type was cast into a precise size from metal. Many people had experimented with making a metal type with individual woodcut letters. It would become the first form of printing to use movable type. By 1462, his invention was accepted throughout Europe.

Early in his career, Gutenberg worked as a **goldsmith**, which enabled him to devise a metal type of block. He designed a typeface mold and used individual pieces of type, which he molded out of alloy that was soft enough to cast yet hard enough to use for printing. For his press, Gutenberg copied the process of making wine, cheese, and paper. An operator worked a lever to increase and decrease the pressure of the block against the paper. The invention was the printing press. Even though the press would eventually change life, as we know it today, Gutenberg was a poor businessman and made little money from his printing system.

Around 1450, Gutenberg began printing the Bible. That same year, he entered in to business with Johann Fust who invested money to help with the production of the Bible. Gutenberg is credited with printing the very first Bible with movable type. It is sometimes called the Gutenberg Bible. The Gutenberg Bible was written in Latin. It had colored initials and other **illuminations** that were hand drawn after the pages were printed. The pages of the book were folio- each page had two columns, and each column has 42 lines.

The Gutenberg Bible lacked many print features that modern readers are accustomed to such as pagination, word spacing, indentations, and paragraph breaks. The Bible had over 1280 pages. The German Gothic type style was modeled on manuscripts of the period. The columns of text were tightly justified right and left. The printed text was black with red and blue headers and initials being added later by an illuminator. The edition included both vellum and paper copies. In design and workmanship, the Gutenberg Bible holds its place as one of the finest of all printed books.



History of Typesetting



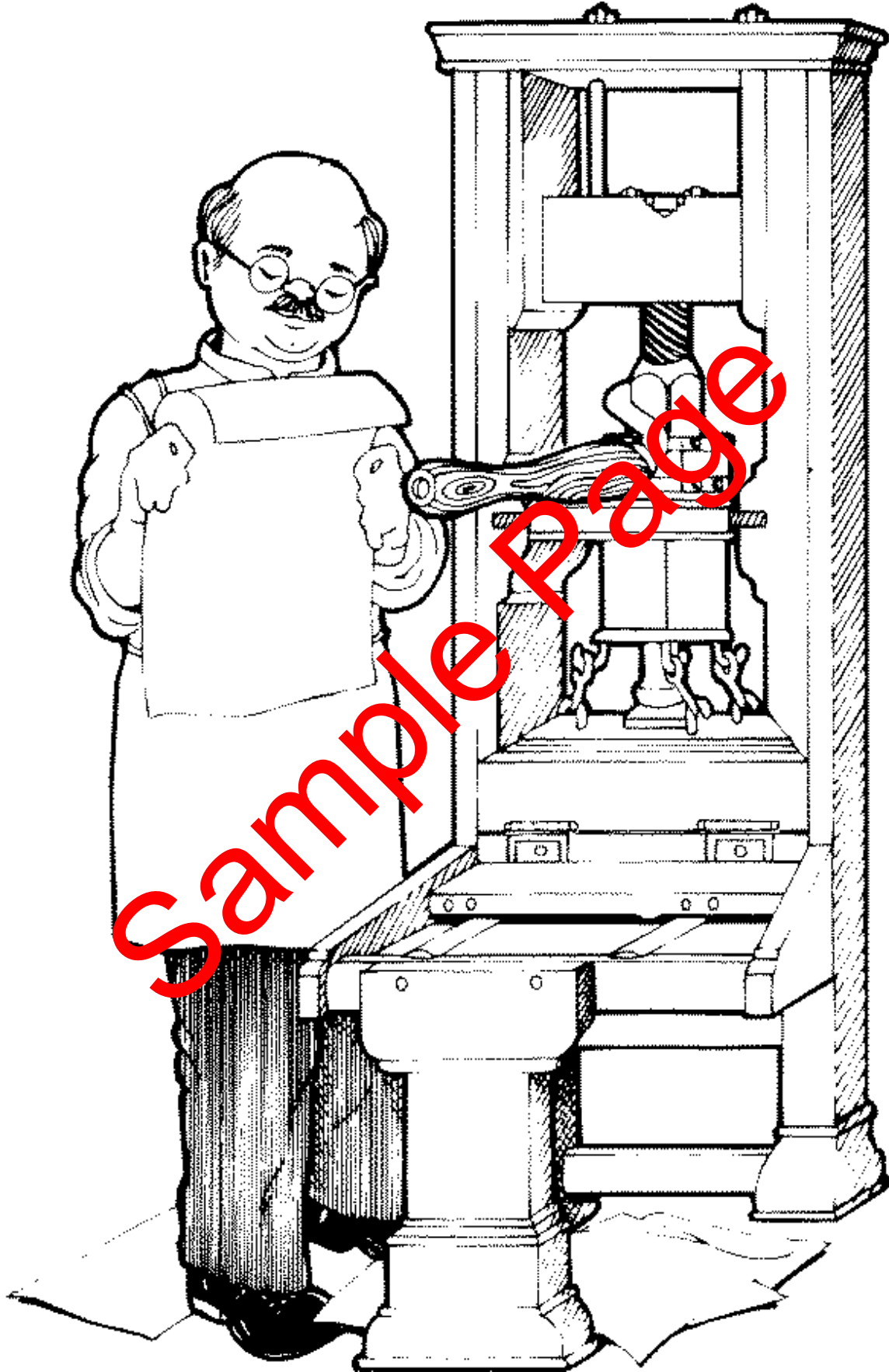
In foundry type, each piece of type was cast into a precise size from metal. Each piece contained a raised image of single letter, number, or other character. The block of metal that carried the raised image was called the body. We get our word “typeface”, from the raised image that was inked for printing, the top was called the face.

A box had enough compartments so that each letter, number, and character was assigned a specific compartment. The letters were selected one at a time and lined up in what was called a composing stick. Then, by placing the blocks on a line with spaces between words they were laid in lines until the sentence was the right length. Each line was placed by hand in a larger box made especially for housing the type. The individual lines were laid out exactly like the page of the newspaper was going to be. When you laid out the sentences, all of the words were placed backwards as if looking at it in a mirror.

Type was set, inked and copied by hand. When they were finished, they had to take everything apart, clean it and then return to its correct case in the box.

Now, make your own case with face letters. Have your mom give you the egg cartons that she has been saving. Using a stapler, hook the cartons together, two on top and then two on the bottom. This will be your box. Next take an old mouse pad and with a permanent marker write the letters of the alphabet about 1 x 1 in size. Have your parent cut out the letters as close as possible with a sharp knife. Then using dry new sponges, cut long stripes 1 x 2 in size. Glue the letter on the tips. Place the types in each of the pockets in the case. Now, choose your letters one by one to write out your sentence. Lay the sentence out backwards. After you have your sentence, drip each in black paint. Now, hold your sentence up to a mirror. You have just created a typeset letter.

Johannes Gutenberg Printing Press Coloring Sheet



Leonardo di ser Piero da Vinci

Leonardo di ser Piero da Vinci was born in 1452 in the small town of Vinci, in Tuscany, Italy. Da Vinci was considered a skillful architect, sculptor, engineer, painter, scientist, and inventor. In 1460, his family moved to Florence, Italy.

In 1481, he began his first large painting, The Adoration of the Magi. Around 1482, Leonardo began working with the Duke of Milan, Ludovico Sforza. There, he began documenting his ideas on building portable bridges, constructing bombardments, making cannons, building ships, armored vehicles, catapults, and other war machines; he also began **sculpting** in marble and clay.

From 1495 to 1497, Leonardo worked on his **masterpiece**, The Last Supper. The Mona Lisa, Leonardo's most famous work, is as well known for its mastery of technical innovations as for the mysteriousness of its legendary smiling subject. Unfortunately, Leonardo was known for beginning many impressive works, but before they were completed, he would become bored and move on to something else.

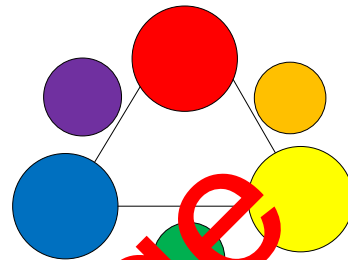
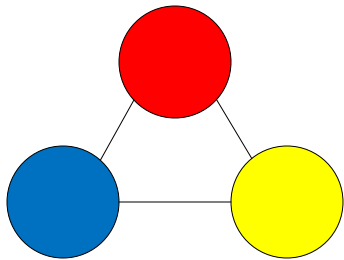
As a scientist, Leonardo was considered a true **genius**. His scientific theories were based on careful observation and precise documentation. Unfortunately, just as he frequently failed to finish paintings, many of his inventions remained incomplete. Leonardo left numerous notebooks with theories and ideas of fantastic inventions. Afraid that someone may discover his ideas, Leonardo wrote everything in mirror script. No one could decipher his ideas because of this. Had he acted on his inventions, he would have revolutionized the science of the 16th century.

Once his manuscripts were decoded, it was discovered that Leonardo had actually discovered many of the future inventions of our time. In anatomy, he had studied the circulation of blood and studied how the eye works. He had figured out the effect that the moon has on the tides and how fossils are formed in shells. He had invented an underwater diving suit and a hydrometer. He also explained how to dig canals to redirect rivers. In addition, drawings of the first war tank and a flying device that showed sound principles of aerodynamics were found. Many of these ideas we still use today.

The color wheel shows us how colors are related. The color wheel helps artists to be able to mix colors together to achieve new colors.

The primary colors are: red blue yellow

Primary colors cannot be made from any other colors. Artists create all the other colors of the rainbow by mixing together the primary colors.



The secondary colors are:

Purple, orange and green. Secondary colors are made by mixing two primary colors. Each secondary color is made from the two primary colors closest to it on the color wheel

Just by mixing these colors, you can get all the colors of the rainbow:

Create a Rainbow

- Pour 1 cup of milk into a bowl
- Add 3 drops of red food color to one edge of the bowl
- 1/3 of the way away, add 3 drops of blue food color
- 1/3 of the way away add 3 drops of yellow
- don't mix or jiggle the bowl
- Squeeze a drop of dish soap in the center of the bowl

What happen? _____

Why do you think it happened? _____

Galileo Galilei

Galileo Galilei was born in 1564. He was an Italian **physicist** and astronomer. In 1581, Galileo was sent to the University of Pisa to study medicine. While a student at the university, Galileo discovered he had a talent for mathematics. He later became a professor of mathematics.

In 1609, Galileo heard about the invention of the spyglass, a device that made distant objects appear closer. Galileo used his mathematics knowledge and technical skills to improve upon the spyglass and build a telescope. Later that same year, he became the first person to look at the moon through a **telescope** and make his first astronomical discovery. He found that the moon was not smooth, but mountainous and pitted - just like the earth! He subsequently used his newly invented telescope to discover four of the moons circling Jupiter, to study Saturn, to observe the phases of Venus, and to study sunspots on the Sun.

Galileo's **observations** strengthened his belief in Copernicus' theory that Earth and all other planets revolve around the Sun. Most people in Galileo's time believed that the earth was the center of the universe and that the sun and planets revolved around it. The Catholic Church, which was very powerful and influential in Galileo's day, strongly supported the theory of an earth-centered universe. After Galileo began publishing papers about his astronomical discoveries, he was called to Rome to answer charges brought against him by the Church. Early in 1616, Galileo was accused of being a heretic. Galileo was cleared of the charges, but was told he should no longer publicly state his beliefs. Galileo continued his study and became even more convinced that all planets revolve around the sun.

In 1632, he published a book that stated the theory of Copernicus was correct. Galileo was once again called before the Church and this time was found guilty of heresy. Galileo was sentenced to life imprisonment in 1633. Because of his age and poor health, he was allowed to serve his imprisonment under house arrest. Galileo died on January 8, 1642.

Make a Galactic Mobile

A galaxy is a grouping of stars. All but a few stars in the universe live in galaxies. Our sun is just one of at least 200 billion stars in our own Milky Way Galaxy. With our best telescopes, we can look deep into space and see billions of galaxies. Galaxies come in all different shapes. Some are spiral shaped like our own Milky Way. Some are like a circle or a flattened circle. Others seem to have no particular shape at all.

What you need:

- 12" or 7" round cardboard circle from a frozen pizza box. (Or cut circle from a cardboard box.)
- 4- 11" x 17" black construction paper
- Glitter--gold, silver, red, orange, yellow, blue, purple
- White glue
- Small paintbrush
- Scissors
- Thread (black is best) or fine nylon fishing line
- Small, 4-holed button
- Large, sturdy sewing needle
- 16 sequins or very small beads, black is best
- Tape measure or yard (meter) stick



Make the Galaxies: See next page for pattern.

Make the frame for the mobile:

Use the round cardboard as a pattern to draw a circle in the center of each of two pieces of construction paper.

Glue the paper circles to the top and bottom of the cardboard.

Make three pencil marks equally spaced around the edge of the circle, about 1 inch in from the edge.

Cut a length of thread about 2 feet long. Thread the needle, and either tie a fat knot in the end or tie a sequin or small bead to the end.

Poke the needle through one of the pencil marks on the edge of the cardboard circle. Pull the thread through to the knot, sequin, or bead.

Take the 4-holed button and poke the needle up through one hole in the button and down through another. Now poke the needle back down through another pencil mark on the circle. Unthread the needle and tie a fat knot, sequin, or bead in the end of the thread. Now, cut a length of thread about 3 feet long and rethread the needle. Again, tie a fat knot, sequin, or bead in the end. Poke the needle up through the remaining pencil mark on the circle. Poke the needle up through one of the remaining holes in the button and then down through the last hole. Unthread the needle and tie a loop in the end of the thread for hanging the mobile from the ceiling.

Hang the galaxies from the mobile frame: Make pencil marks on the bottom of the cardboard circle where you will be attaching each galaxy. For a 12-inch mobile, you could put eight evenly spaced marks around the edges and four evenly spaced in the center area.

For each galaxy: Cut a length of thread and thread the needle. Tie a knot, sequin, or bead to the end. Draw the needle through the center of the galaxy. Now poke the needle through one of the marks on the circle. Adjust the length of the thread so the galaxy hangs nicely, then cut the thread and tie a knot, sequin, or bead in the end.

Make the galaxies hang at different levels, so they can turn freely without hitting each other.

Hang your Galactic Mobile from the ceiling.



Cut out a small square of construction paper a little larger than the pattern paper. Tape the edges of the pattern to the construction paper so it doesn't slip when you cut. Cut out the galaxy, cutting through both the pattern and the construction paper. Now decorate the galaxies with glitter. Imagine each speck of glitter is a star!

Use a brush to spread glue on one side of one galaxy. Sprinkle one or two colors of glitter on each. Remember, galaxies are brighter in the center (where the stars are younger and hotter), becoming fainter at the edges or on the spiral arms.

When you have decorated one side, set the galaxy on something it won't stick to when the glue is dry! (Like a cookie sheet, for example.) When you have decorated one side of each galaxy, let the glue dry. Then turn them over and decorate the other side. Be sure to leave them laying flat until the glue is completely dry.

