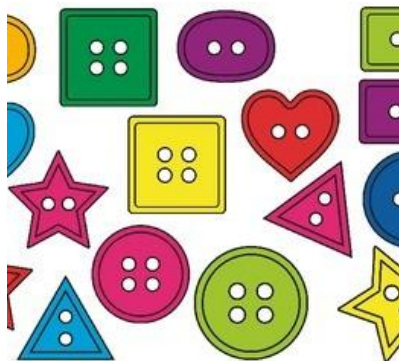
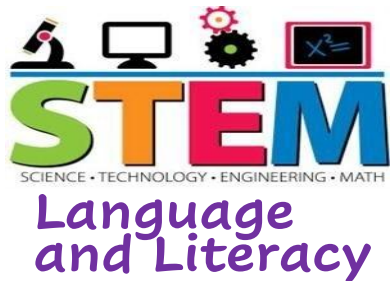


# Preschool Home & School Learning Activities





## STEM stands for Science, Technology, Engineering and Math

All four of these subjects share a common approach and focus.

They require gathering and using information to create knowledge or solve problems.

STEM happens everyday as children explore, play, and try new things.

Research shows that there is a positive relationship between STEM experiences and future success in school.

### S is for Science

National Science Teachers Association position states:

- Young children have the ability to engage in scientific practices
- Children need varied opportunities
- Children learn from hands-on, touch and feel

Children are natural scientists. They try to figure out the world by observing, forming questions, making predictions, designing and carrying out experiments and discussing. Like scientists, children learn by watching others, repeating what they've seen or by asking questions and seeing results.

### T is for Technology

More than cell phones and computers the "T" in technology stands for any type of man-made object that helps people complete tasks.

Tools such as, pulleys, wheels, levers, scissors and ramps. When children use these simple tools they observe and learn about cause and effect.

These technologies allow children to understand how tools help us accomplish tasks. They see how adding wheels below a large object makes it easier to move or how raising a ramp makes a ball roll faster.

### E is for Engineering

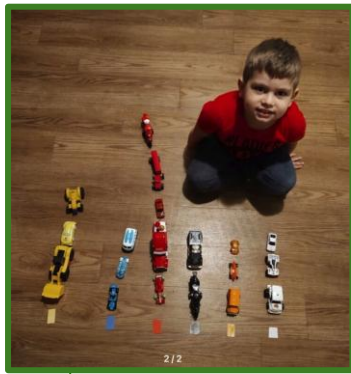
Engineering applies science, math and technology to solving problems. It is using materials, designing, crafting, and building--it helps us understand how things work.

When children design and build with blocks or put together railroad tracts they are acting as engineers. When they construct a fort out of pillows or cardboard they are solving structural problems. When they figure out how to pile sticks and rocks to block a stream of water or how objects fit together they are engineering.

### M is for Math

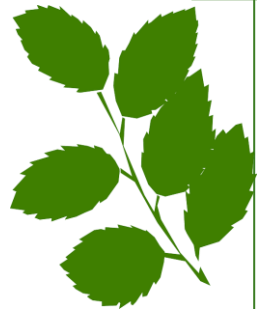
Math is number and operations, measurement, patterns, geometry and special sense. Very young children explore mathematics; of "more" and "less," shape, size, sequencing, volume, and distance. Math is an everyday tool.

Play often involves math language and thinking, even though math isn't the focus of their activity. "How much is a lot?" "How big/little?" This early play with math ideas and concepts lay the foundation for the development of more complex math and science skills later on.



## Setting the Stage for STEM

- **Use** materials that engage the senses: textures, smells, tastes, sounds and sight.
- **Provide** activities that include counting, measuring and weighing. Putting items in sequence, identifying steps in a process or putting objects in order by size or weight.
- **Play** games that use higher level thinking; simple clapping patterns, sorting tasks or motions games like Simon Says.
- **Speak** STEM; Incorporate problem solving and math rich language in all kinds of activities.
- **Explore** the outdoors and nature; spend time outdoors and ask questions about colors, shapes and textures. Compare and contrast things you can touch and feel.
- **Read** fiction and non-fiction books that provides a springboard for discussions and activities.
- **Schedule** free choice and extended time for children to fully engage in exploration and investigation. Children may need several days or weeks to fully explore some concepts.



# Materials that Support STEM

Family and friends can help gather materials for home or school activities.

Buttons  
Boxes (all sizes)  
Bread Bag Clips  
Bottle Caps/Lids



Cans  
Cardboard  
Caps/Lids  
Cups



Egg Carton



Fabric  
Food Boxes  
Food Containers



Household Items  
(ice trays,  
cups, spoons)



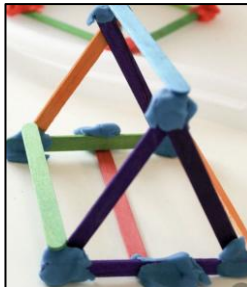
Junk Mail



Magazines  
Milk Cartons

Natural Items;

Paper Bags  
Paper Plates  
Paper Rolls  
Paper Scraps  
Plastic Bottles  
Popsicle Sticks



Recycled Wrapping Paper/ Cards  
Ribbon  
Rocks



Scrapes of paper  
Shells  
Snacks  
Sponges  
Sticks



Store Flyers  
Straws  
Small Toys (sort,  
classify, graph)



Tape

Yarn





A note to teacher's about science journals; they do not need to be used in the beginning of the school year, you are the best judge whether your students are ready for journals or not, if a journal does not work with a particular activity, wait and try again with another activity.

Once children are familiar with basic journals teachers can introduce Science Journals by using the following strategies:

- Introduce science journals by explaining to children that they are tools for recording ideas and information.
- Provide each child with a spiral notebook or steno pad and personalize the cover.
- Explain to children that these journals are to be used for science activities and not other kinds of drawing.
- Encourage children to use their drawing skills for a purpose.
- Explain that representational drawing is a way to convey specific information.  
*(Children are not merely asked to "draw an apple" rather to draw this apple that we will cut open today. This directs their attention to translate what they notice about a real object-its color, shape and parts-when representing it in a journal drawing).*
- Accept children's drawings in a non-judgmental way, by asking them to describe their entries to shed light on children's goals.  
*(A drawing of an insect may look like scribbling, but when asked to describe it the child said she had recorded the "path of the bug)."*
- Support the process by; prompting children to look for the right color crayon to draw an object or to describe the shape of an object before they begin a journal entry.
- Ask children to discuss their journals entries;  
*"You had a lot to say about that. May I write it next to your drawing?"*
- Observe that after a few months of journaling children begin to make the connection between written text and language and some children may begin to write words themselves.



## Science Journal Topics

<b>Seeds Sprouting</b> <b>Plants Growing</b> <b>Weather Changes</b> <b>Construction/Building</b> <b>Machines with Wheels,</b> <b>Ramps, Pulleys</b>	<b>Trees/Leaf Changes</b> <b>Flowers</b> <b>Clouds</b> <b>Insects</b> <b>Worms/Silkworms</b>	<b>Shadows</b> <b>Rain and Puddles</b> <b>Sink and Float</b> <b>Describing Coconuts</b> <b>Fruits and Vegetables</b>	<b>Pumpkins</b> <b>Our Five Senses</b> <b>Birds and Squirrels</b> <b>Weighing</b> <b>Objects/Balance Scale</b> <b>Using Magnify Glasses</b>
--	--	--	--



# My Weather Journal

**Name:**

Copy page, fold in half to make cover and back page, insert paper and staple to make journal.

**Go outside, look at the weather and draw a picture of what you see on different days. Talk about the the weather you've seen and if needed ask for help writing your observations on the pages in your journal.**



### My Five Senses:

Use a song, a book or make a poster of eyes, ears, hands, nose, & mouth to introduce the five senses. Explain that they are going to be using their five sense to explore their neighborhood over the next few weeks.



**Read:** *Brown Bear, Brown Bear* to introduce sense of sight.



### Inspired by Nature

Provide a variety of materials for children to recreate what they see in nature. This little girl from Galt Head Start used watercolors to paint the flower she saw outdoors.

*(Cognition; Documentation & Communication of Inquiry)*

### Nature's Treasure Box

Gather a variety of small items from nature.

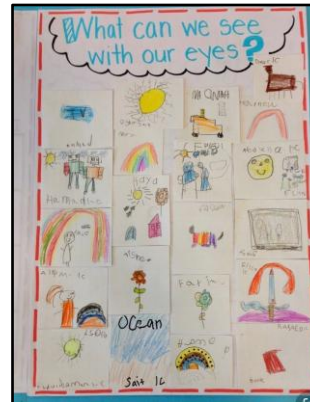
Using an egg carton is a fun and simple way to prompt children to sort and classify by color, shape and size. *(Classification)*



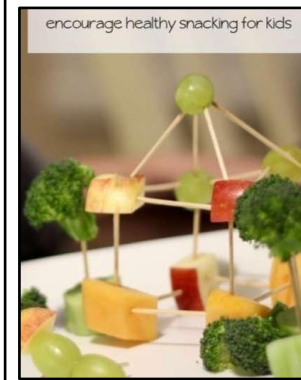
**Sensory Walk:** Take a sensory walk with the children every week. On the first walk focus on the things you see. Explain that the word "prediction" means to make a guess about something. Ask "What do you "predict" you will see today?" List their predictions. Encourage the children to observe their surroundings during your walk. Record their observations and compare these with their predictions when the walk is over. *(Cognition; Inquiry through Observation, Knowledge of the Natural World)*

### What We Saw?

After the walk children will draw pictures of what they saw. Another option is to take photos of children with something they can "see" on their walk. Discuss, display and make class books using drawings and photos. These can also be used to make a group graph.



*Inquiry through Observation, Documentation. Interest in Literacy.*



*(Cognition; Problem Solving, Cause and Effect, Physical Motor, hand-eye coordination)*

**Snack Structures**  
Provide pieces of cheese, apples, grapes, broccoli or other favorites. Some children may be able to use a butter or plastic knife to help cut the pieces. Explain and show how tooth picks or pretzel sticks can be used to attach the pieces. Ask children if they can figure out ways to make their structure stand up on it's own.

**Tasting Party:** Use your snacks structures to have a tasting party. Ask the children to describe how the food tastes, smells and discuss colors and textures. See how many words you can come up with to describe the food and list them on a piece of paper. (crunchy, salty, smooth, sweet, sour...etc.)

*(Language; Building Vocabulary, Literacy; Letter and Word Knowledge, Physical Health and Development)*

### Snack Math:

During snack times ask the children to show you with their fingers how many of each item they would like. Count their fingers then count out the same number of snacks.

Also use different types of snacks to copy, extend or make new patterns with children. *(Cognition; Counting, Patterning)*



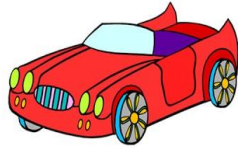
Child: \_\_\_\_\_

Teacher: \_\_\_\_\_

# Neighborhood Treasure Hunt



TREE



CAR



FLOWERS



MAIL BOX



AIRPLANE



NEST



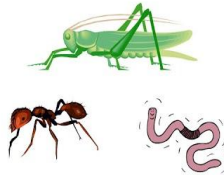
BUTTERFLY



CLOUDS



BUMBLE BEE



BUGS



BABY



BIRD

**Family Treasure Hunt:** Take a sensory walk with your child. Make a list of items found and ask child to draw pictures of what they discovered in their neighborhood. Turn these in to the teacher to discuss and display in class.

# Vegetable Re-Grow



## Caring for Plants

Plant some fast growing seeds into small cups of dirt.

Place them in a protected area where they get plenty of sun light.

Children can water with a spray bottle or a small watering can daily.

They can observe their growth and draw pictures of the changes they see. A small ruler can be used to also measure their growth regularly.

## Fast Growing Plants

- Radishes
- Bird Seeds
- Grass Seeds
- Cherry Tomatoes
- Cucumbers
- Kale
- Marigolds
- Carrots

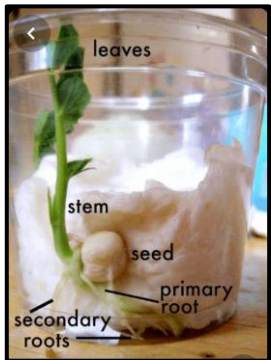


## Fastest Growing Beans

- Lima
- Pinto
- Mung
- Lentil

## Garden Windows

Children stuff clear plastic cups or bags with damp cotton or paper towels. They will place beans on the outside edge of the paper towel so that it can be easily seen. Cups can be placed near a window or bags can be taped directly on to a window. Children use spray bottles to dampen towels/cotton daily. Use magnify glasses to observe their early sprout. Draw pictures of the changes observed.



*Cognition; Documentation and Communication of Inquiry, Knowledge of the Natural World).*

## Nature Cutting Tray



Children practice cutting skill while they engage in conversations about; texture, scent, colors and shapes.

## Pineapple Observations



*(Cognition; Documentation and Communication of Inquiry)*

Explore a pineapple using the sense of sight, smell, texture, and taste. Encourage children to look at it carefully, provide paint for children to create a still life of it. Use the skin for texture prints and point out the patterns. Cut it up for the children to smell, taste and describe.

Cut the top off of it and place it in a jar of water and watch the roots grow. Children can draw the changes they observe over time.



Cut the bottom off of carrots, lettuce and/or onion. Place these into a shallow tray of water (1/2 inch). Put it in a place where it receives plenty of sunlight. Encourage children to draw pictures of the changes they see in the plants daily. Continue to observe, discuss and record children's comments



## Grow an Avocado Plant

Cut up and taste an avocado. Take the pit out of the center. Use toothpicks to balance the pit onto a clear cup with water in it. Have your child do as many steps as possible. Children will also observe, draw, and make notes (w/ adult help) about the changes over time. Next step is to plant it in a flower pot and continue to care for it and measure it's growth, observe and draw pictures of changes.

*Cognition; Documentation & Communication of Inquiry)*

# Simple Ways to Introduce STEM

## Vocabulary, Discourse and Language









Children should be given the chance to learn the appropriate scientific words that go along with their investigations. Science vocabulary allows children to discuss their discoveries and questions in deeper, richer ways than are possible with everyday language. At first, it may seem unrealistic to expect a 4-year old child to use and understand words like observe and research, but young children acquire vocabulary rapidly. Children use these terms when they are used repeatedly and in appropriate contexts. When teachers provide words for these processes their importance is highlighted. Children who engage in these processes also begin to reflect on what they are doing and to think and talk about their explorations.

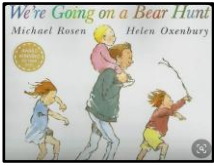
Words to use again and again...

Observe	Senses	Describe	Investigate	Shape	Count	Record
Observation	See	Compare	Investigation	Size	Measure	Journal
Predict	Touch	Contrast	Explore	Height	Measurement	
Prediction	Texture	Same	Discover	Length		
Check	Hear	Different	Experiment	Width		
Findings	Smell	Similarities	Test	Weigh		
Results	Taste	Differences		Weight		

### Observe-Predict-Check

Teachers and children can work together to make graphs and charts to support language, literacy, science and math skills.

	Observe outside	Predict inside	Check inside	
	Seeds are outside Red Green leaves on top	Different than yellow A little bit of dark yellow	White Red Hole in middle	
	Red skin "o" shaped 1 stem on top Skin has dots	Big inside Red inside It will look like a carrot	Looks like a butterfly White inside Hole for seeds 8 seeds	
	Orange skin Flowers grow on top Looks like a stick	It will have a truck inside It will look cracked inside	A little green inside Mostly orange	



**Let's Go on a Bear Hunt!**  
Introduce sense of hearing by telling the story with sound effects.

## Wind

Have streamers or scarves ready for a windy day to dance and experiences wind first-hand. Sing songs, fingerplays or tell poems about the wind. Talk about wind....Can you see it? How? Can you feel it/how? Can you hear it/how?



*Cognition: prediction, observation, increase knowledge of the natural world.*

**Caring for Birds:** Make bird feeders out of milk cartons or other small boxes. Experiment; "What food do birds like to eat the most?" Provide different kinds of food; bird seed, pumpkin seeds, bread crumbs, grapes, etc. Observe what foods are gone after a day and discuss what they ate, what they didn't eat, how do you know?

**Family Search:** 1. Ask families to look for items that are "sound-makers" from home. Request that they bring these item (quietly) to school in a paper bag to play sound guessing games. 2. Bring (small, junk drawer) items from home to make different sounding wind chimes.



*Cognition: Observation, Knowledge of the Natural World.*

### DIY Musical Instruments

Use a variety of small items (bells, paper clips, erasers, etc.) to make maracas out of water bottles. Use coffee or oatmeal canisters to make drums. Play prediction games which will make the loudest sound, the softest. Change the rhythm and discuss the different sounds you hear. Cover your eyes and play guess the instrument games. Make a band or have a parade for children to play their instruments together.

*(Cognition: observation, classification. Expressive language.*

**Neighborhood Listening Walk:** Talk about and practice listening carefully.. Tell the children that you're going to go on a walk to listen to sounds in the neighborhood. Make predictions; "What do you think we will hear outside?" During your walk talk about the sounds and list what you hear. Discuss and graph sounds when you return to class.



**Wind Chimes:** Use a variety of items as shown here; tin cans, wood, keys or other things from a "junk drawer" to make wind chimes. Listen to the different sounds they each make. Have quiet times outdoors to listen, discuss and compare the sounds they hear.  
*(Observation)*



*(Expressive Language. Cog. Classification)*

**Senses: List & Graph**  
Talk with children about what they "saw" or "heard" on a walk and start your list of sensory words. Continue to add new things to the list that children hear, smell or touch on their walks over the next few

weeks.



### Weather Report

Provide children with a Weather Journal (see attached) to watch and record what they observe at home or school. Discuss their observations. "How could you tell it was raining last night?" "How did you know the wind was blowing?"

**Graph It:** Daily take a walk, play outdoors and check the weather.

Make individual or a group graph. Color in one square of the graph that represents the weather for that day. After a week count how many days had each type of weather.

*(Cognition: Observation, Increase Knowledge of the Natural World. Counting, Number Sense of Operations)*

Name: \_\_\_\_\_ Date: (s) \_\_\_\_\_

My Weather Graph


Cloudy Partly Cloudy Rainy Snowy Sunny Windy



**Wind Watching:** Wait for a perfect windy day to tell the children about your experiment. They can gather small items to predict which will get carried in the wind and what will "stay put". Then observe what happens when you place the items outdoors. *(Cognition: Cause and Effect, Inquiry Through Observation and Investigation)*

### Weather Calendar

Ask the "Weather Helper" to report about the weather outside. The Helper, also draws a picture of what he sees to display on the class calendar. Use it to prompt discussions. "Do you remember what we did on rainy days?" "How many days did it rain?" "How many did we have sun?" *(Cognition: Observation and Documentation).*



**Winter Days:** Take a winter walk and talk about how the weather feels; is it cold? Windy? Raining? Point out the things you see. Have the children draw a picture of what they remember. Ask questions: "What things did you see/hear or like best?" Do a language dictation.



*Cognition: Observation; Increasing Knowledge of the Natural World. Calming Experience.*

### Wind Socks

Take a walk, look at picture books or websites that show different kinds of windsocks. Ask children to come up with their own ideas of how to make a wind sock or kite. Provide a variety of materials; construction paper, tissue paper, glue, cardboard, yarn, etc. Hang outdoors and observe the wind as it moves the sock.









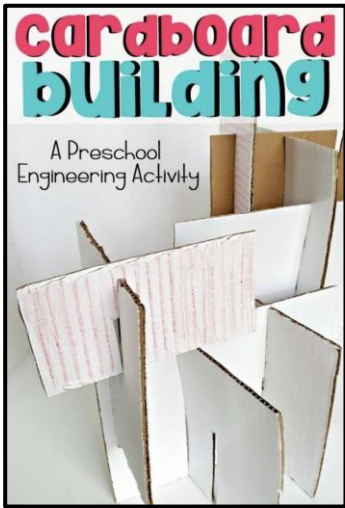
### Rain Experiments

Provide tissue paper in different colors to tear into small pieces. Place on top of finger paint paper. Explain that the word prediction is like "making a guess". Then "predict" what would happen if you put the paper in the rain. Take it outdoors and watch the changes happen. (Rain is best, but a spray bottle can be used to get the paper wet and observe changes). *(Cognition: Cause and Effect, Observation, Investigation and Knowledge of the Natural World)*

Name \_\_\_\_\_ Date (s) \_\_\_\_\_

# My Weather Graph

								Cloudy 
								Partly Cloudy 
								Rainy 
								Snowy 
								Sunny 
								Windy 



Cardboard, Scissors and Crayons

# My STEM Challenge

Today My Challenge is:  
*Building a house for the Three Little Pigs*

What problem to I need to solve?  
*Making it sturdy so the wolf can't blow it down.*

What supplies will I use? *List them*  
What is my plan? *Draw it and create it.*  
What worked for me?  
What did not work for me?

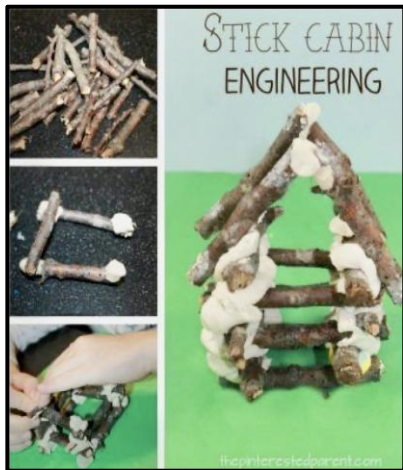


Straws, Tape, Popsicle Sticks



Milk Cartons, Hay, Sticks, Paint/Markers/Crayons

## More Construction Ideas!



Playdough and Sticks

Small Boxes/Milk Cartons and Paper Scraps



Three Little Pigs

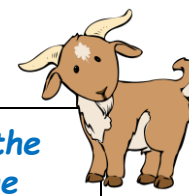


Toothpicks/Pretzel Sticks and Soft Candy/ Marshmallows, Fruit/Cheese



Cardboard, Pipe Cleaners, Straws and Playdough

# My STEM Challenge



Today My Challenge is: *Build a bridge for the Billy Goats to walk over and get away from the troll.*

What problem to I need to solve?  
*Making it strong enough to hold the biggest goat.*

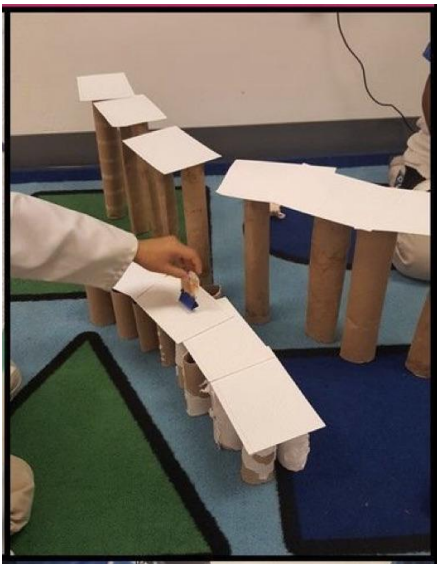
What supplies will I use? *List them:*

What is my plan? *Draw it and create it.*

What worked for me?

What did not work for me?

Test out it's strength.



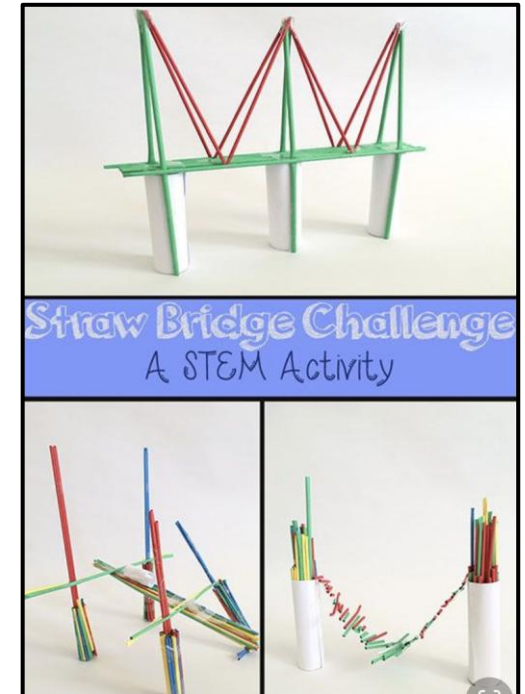
Paper Rolls and Cards



Popsicle Sticks, Tape, Yarn



Paper Cups, Craft/Popsicle Sticks



Straws, Yarn and Paper Rolls



# Little Engineers STEM Project

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

- 1. Read a book, look at pictures and point out different structures you see on car rides or walks. Make a plan (What do I want to build?) and draw a picture of it (a house, chair, bridge, etc.)**
- 2. List and collect the materials you want to use. (Recycled materials are great, cardboard, boxes, plastic containers, wood pieces, sticks, etc.)**
- 3. Start your project and add other materials as you need them. (tape, glue, hole punch, etc.)**
- 4. Take a picture of your project and send to the teacher.**