

Daily 4-H @ Home Lesson Idea

4-H Program Area: STEM



Building a Penny Boat

Objective: To explore the concept of buoyancy

Age Range: All Ages

Hands-on Activity: To build a boat from common household materials

4-H Life Skills: Problem Solving, Critical thinking



Introduction

Boats, canoes, ships, kayaks, and rafts all have one thing in common- they are used for transport on seas and rivers, because they float. It's easy to figure out that if they are made out of wood they will float, because wood floats in water. However, when you see a huge cargo ship or a cruise-liner that looks like a floating building on the water, you can't help but wonder why this massive chunk of metal doesn't sink.

A long time ago in ancient Greece, a mathematician named Archimedes was taking a bath. When he got in, water was displaced and overflowed over the rim of the tub. Archimedes figured out that if the weight of the object being placed in the water is less than the weight of the water displaced, the object will float. This is known as *buoyancy* or the *Archimedes principle*.

A ship made out of metal is able to remain lighter than the amount of water it displaces, because it is not a complete solid. The very bottom of the ship, called the hull, is hollow and therefore adds support to the ship without adding any mass. When a ship is fully loaded, there is a maximum amount of weight it can carry before the weight of the ship increases past the amount of water it displaces. If a ship has excess water during a storm, it is simply pumped back out into the ocean and it's once again safe from sinking.

Source: Mucomi.com

Materials

Two 12 x 12 in. squares of aluminum foil

50 Pennies

Optional Building Materials: Paper cups, tape, craft sticks, plastic wrap, sponges, Styrofoam cups, etc.

Continued on next page

Activity Instructions

Tell the children “You have been hired as a shipwright (a shipbuilder) for a new company. The company ships pennies from port to port. Your job is to design and build a new ship that will be able to carry the most pennies it can without sinking.”

Encourage children to use words related to sinking and floating such as tip, tilt, shape, weight, leak, and waves, along with science process words such as observe, notice, compare, same, different, change, test, and predict.

1. Have the children brainstorm and draw a picture of their boat on the group record sheet. Then, have children make boats by bending and molding the aluminum foil.
2. Make a prediction of how many pennies their boat will hold and record on record sheet. Then, have them put pennies in their boat, one at a time. Tell them to keep going until the boat sinks.
3. Record the number of pennies their boat held on the chart and find the difference between their prediction and actual result.

Reflective questions

- What do you think made this boat hold more pennies?
- Where did you put the pennies in the boat?
- Did anyone’s boat tilt and sink because of where you put the pennies?

Optional: Have children build a second boat using the optional building materials



Additional Resources:

Will it Sink or Float? <https://tinkerlab.com/buoyancy-for-kids-will-it-sink-or-float/>

Why Do Boats Float? - <https://pbskids.org/designsquad/blog/why-do-boats-float/>

4-H STEM Lab - <https://4-h.org/parents/stem-agriculture/youth-stem-activities/>

Daily 4-H @ Home Lesson Idea

a Financial Literacy Activity,
adapted from *Reading Makes Cents* by Penn State University



Coin Rubbings

Objective: To learn about various coins through observation using sight and touch.

Age Range: Elementary

Hands-on Activity: To observe the differences in various coins through coin rubbings, done with the hands and with writing utensils.

Life Skills: HEAD - experience history through money
HANDS - observation



Introduction

We use some form of currency every day. Coins and paper bills are so commonplace we don't usually pay much attention to their details. This lesson allows us to focus on being more observant to the money that represents America by using our senses: sight and touch.

What information can you find on a coin?

The US Mint is where coins are made. (Paper money is made by the US Bureau of Printing and Engraving.) Use the US Mint's website to explore our coins: <https://www.usmint.gov/learn/kids/coins>.

Materials

Various weights of paper (foil, tissue, construction, etc.)
Various writing utensils (pencil, marker, crayon, etc.)
Various coins
Blindfold
Magnifying Glass

Activity Instructions

1. Start by asking, "How many of you have spent money in the past week? In a vending machine, at a store, to



Materials needed to conduct the Coin Rubbings activity.

- pay for school lunch. Did you notice where your coin was made? Or whose face was on it?"
2. Blindfold participant(s). Place one type of coin in one hand of the participant and another type of coin in the other. Then ask, "Can you tell which one is the quarter/dime/nickel/penny?" Continue by switching out the coins in each hand. Refrain from telling the participant if they are correct or what coin is in each hand.

Continued on next page

3. Remove the blindfold. Lay all the coins on a flat surface. Have the participant sort through the coins explaining what design factor on each gave away its identity. Let participants use magnifying glasses as needed.
4. Using the variety of paper and writing utensils, have participants make coin rubbings. Start by placing coins on a hard, flat surface, some face up, some tails up. Cover a coin with a type of paper and begin lightly rubbing over the coin with a writing utensil. Try this activity with different papers and writing utensils.
5. Using aluminum foil, you can make the impression of a coin. Place coins on a hard, flat surface. Cover the coins with foil and press down. Using an eraser on a new pencil will make a nice impression.

Bonus Challenge for Older Youth: Have participants make change for each other totally by touch.



Reflective questions

- Are there people who must tell various coins apart by using their senses?
- Have you ever used something other than money to buy or trade something?
- What suggestions would you make to someone who wants to keep track of their coin rubbings collection?

Conclusion

Coin currency is a part of our everyday lives. Next time you dig through your pocket for a quarter to put in a bubble gum machine, take a second to notice the details.

Additional Activities and Resources

Crayola Coin Rubbing Activity: <https://www.crayola.com/lesson-plans/coin-rubbing-pictures-lesson-plan/>

Coin Rubbings Game: <https://www.funlittles.com/art-math-activities-coin-rubbings/>

Leedy, Loreen. (2002). *Follow the Money*. First Scholastic.

Harman, Hollis Page. (1999). *Barron's Money Sense for Kids*. Educational Series.

Cribb, Joe. (2005). *Eyewitness Money (Revised Edition)*. DK Publishing.

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.

Daily 4-H @ Home Lesson Idea

a 4-H Natural Resources Activity,
adapted from *All About Birds* © 2020 The Cornell Lab



Backyard Birding

Objective: To learn how to identify the birds that frequent your backyard. Once the basics of identifying are learned, using a field guide will be easier.

Age Range: All ages.

Hands-on Activity: To visually identify birds in your backyard and keep a log.

Life Skills: HEAD – learning to identify different bird with visual ID;
HEART – caring for birds in your backyard;
HANDS – acting as a citizen scientist;
HEALTH – self-responsibility and stress management.



Introduction

With more than 800 species of birds in the U.S. and Canada, it's easy for a beginning bird watcher to feel overwhelmed by possibilities. Field guides seem crammed with similar-looking birds arranged in seemingly haphazard order. We can help you figure out where to begin.

Materials

Pen/Pencil
Notepad
Binoculars (if available)
Window or spot outdoors for viewing
Internet Access for checking your identifications
Phone or camera for taking photographs
Bird Watching App (This is optional, see *bonus fun* below for app suggestions)



Activity Instructions

1. Start by asking the kids, "How many of you can identify at least one type of bird in your backyard? Have you ever thought of how many other birds look like the one you know?"
2. Take a look at the pictures at the bottom of the activity guide to see some of the most common bird species in your backyard. Spend 2-3 minutes discussing how the birds compare and contrast. Discuss birds you might see in the mountains, then birds along the coast.
3. Have kids pick a spot where they can observe birds (inside or outside).
4. Now be as quiet and still as possible and keep your eyes peeled! The goal is to sketch or make a list of as many birds as possible! *For older youth, check out the bonus fun.
5. Use the following keys when observing:

Continued on page 3

- a. Size & Shape (Don't just look at the body, look at other features like beak and feet!)
- b. Color Pattern (Look for light & dark, bold & faint, crazy colors)
- c. Behavior (Posture, Movement, Flight Pattern, Feeding style, Flocking)
- d. Habitat (What plants are around the bird? Is there water? In a tree?)

Bonus Fun:

- o Challenge older youth to complete their logs using scientific names (you might want to consult the internet)!
- o If your family has access to a smartphone, download a free birdwatching app. Below are a few suggestions.

Cornell Lab - Merlin Bird App - <https://merlin.allaboutbirds.org/>

Audubon Bird Guide - <https://www.audubon.org/app>

Reflective questions

- o After observing birds, would you change your location?
- o What are some things you learned about bird behavior?
- o In what ways can you use backyard birding in your life?

Conclusion

Birds have been around for over 60 million years. Shapes, sizes, types, and sounds have changed so much over those 60 million years! Different birds appear at different times of year; think about how your observations can change depending on when you observe. By learning different types of birds in your own backyard, you can make changes to your backyard to attract new or different species.



Carolina Wren, SC's State Bird



Northern Cardinal (male)



Northern Mockingbird

Additional Resources:

The Cornell Lab. 2020. Building Skills: The Four Keys to Bird Identification.

<https://www.allaboutbirds.org/news/building-skills-the-4-keys-to-bird-identification/>

The Cornell Lab. 2020. Bird Guide. <https://www.allaboutbirds.org/guide/>

7 Crafts to Get Kids into Birding - <https://www.birdlife.org/worldwide/news/kids-birding>

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.

Daily 4-H @ Home Lesson Idea

4-H Leadership and Civic Engagement
Adapted from Natural Beach Living and
Michigan State University Extension



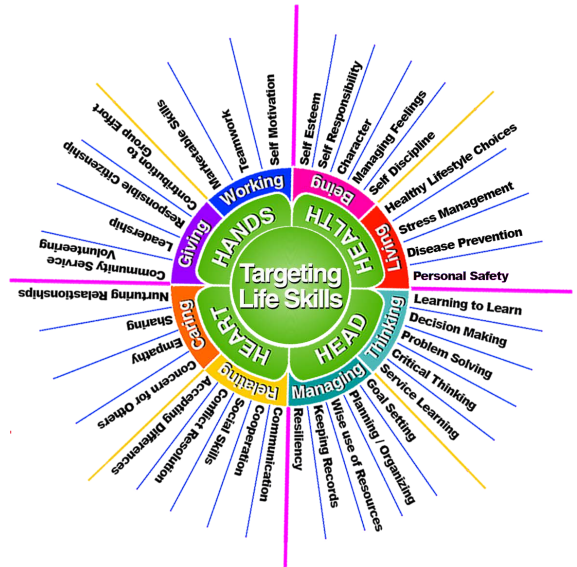
Gratitude Scavenger Hunt

Objective: To identify ways to show gratitude in daily life

Age Range: All ages.

Hands-on Activity: Indoor scavenger hunt to identify things for which you are thankful

Life Skills: HEALTH – Managing Feelings, Stress Management



Introduction

In 4-H, one of our primary objectives of programming is to develop life skills in youth. In order to challenge the imagination, train the brain to use decision making and planning skills and inspire youth to be grateful; have the youth explore the things around them that would help them show gratitude. The exercise is a time to self-reflect and have fun. If you are in a group setting have each youth share what they have chosen for the answers to each question.

Materials

- Scavenger Hunt List
- Items around the house



Gratitude

Activity Instructions

1. Start by asking the kids, "What do you think gratitude is? How can you show gratitude?"
Gratitude is being aware of and thankful for the good things that happen in your life and taking the time to express appreciation and return kindness. Being grateful is more than saying thank you.
2. Explain to the kids that they are going to go on a scavenger hunt. During the scavenger hunt they are going to find things around their home for which they are thankful.
3. If they do not have something at home that represents their answer, they can draw it, act it out, or find a photo of it.
4. Have fun!
5. When you finish the hunt reflect on the items you have chosen.

See additional resources to extend this activity.

Continue on next page

Gratitude Scavenger Hunt

1. Find something outside you enjoy looking at
2. Find something that is useful for you
3. Find something that is your favorite color
4. Find something you know someone else will enjoy
5. Find something that makes you happy
6. Find something that tastes good
7. Find something that smells amazing
8. Discover something new
9. Find something that makes you feel safe
10. Find something that makes a beautiful sound
11. Find someone you are grateful for
12. Find something that is unique to you
13. Find something that makes you laugh
14. Find something in the night that you enjoy
15. Find something in the morning that you enjoy
16. Find a friend/pet that you love spending time with
17. Find your favorite place to spend alone time
18. Find something that reminds you of the people you love
19. Find something that you enjoy doing outside with friends
20. Find a place that you love

Conclusion:

Research shows that practicing gratitude has many positive impacts on our health and well-being. See the tips on the next page for incorporating showing gratitude into your daily routine.

Additional Resources:

Writing Thank You Notes - https://licking.osu.edu/sites/licking/files/imce/Program_Pages/4H/Saying%20Thanks-1.pdf

Ways for Youth to Express Appreciation - https://www.canr.msu.edu/news/the_power_of_gratitude_1

Continue on next page

The [University of Minnesota](#) offers [ten tips](#) to fit gratitude into your life.

- **Every day say aloud three good things that happened.** This can be a fun activity to do with your kids when you tuck them in, or around the dinner table with family, but it's also extremely powerful to express gratitude aloud when you're alone.
- **Keep a gratitude journal.** Jot down the small things from your day that mattered to you, like the few minutes of quiet time you had on your drive to work, or the fact that this afternoon's rainstorm didn't flood your basement. If you're having a particularly rough day, you can look back through the pages of accumulated blessings in your life.
- **Say thanks to your partner.** Couples who express gratitude toward one another set up a powerful feedback loop of intimacy and trust, where both partners feel as if their needs are being met.
- **Cool a hot temper with a quick gratitude inventory.** One of the quickest ways to dispel the energy of a stormy mood is to focus your attention on what's good. So, when you're about to lash out at someone, take a moment to do a quick inventory of five things you're thankful for in the moment. It could be your good health, clean air, or even the recent switch to a cheaper cell-phone bill—these details will help you relax and avoid saying something you'll later regret.
- **Thank yourself.** Gratitude doesn't always need to be focused on what other people have done for you! Make sure you give yourself a thank-you for the healthy habits you've cultivated in your own life, such as eating plenty of veggies or giving yourself enough time for rest each night.
- **Use technology to send three gratitude messages a week.** Find yourself tethered to your cell phone or the internet for hours each day? Harness the power of this technology to send out some good vibes, such as a text or Facebook comment, to tell your friends why you appreciate them.
- **Savor the good moments.** If you notice you're feeling happy, stop what you're doing and pay attention for a few minutes. Notice exactly how you feel, including the sensations in your body and the thoughts you're having. Later, when you're trying to inspire gratitude, you can remember this moment and experience the benefits all over again.
- **Check for silver linings.** Even the most difficult life challenges come with some benefit—you just have to look to find them. Being sick draws the compassion of friends. Making a mistake teaches you a lesson. When things feel hard, ask yourself: What's good here?
- **Look outward, not inward.** Robert Emmons says people are more likely to feel grateful when they put their focus on others, rather than getting caught up in their own inner narratives about how things should have gone. Empathy for others can trigger a sense of gratitude, and people who have an outward focus tend to experience stronger benefits.
- **Change your perspective.** If you struggle to come up with something to feel grateful for, put yourself in the shoes of someone who is experiencing misfortunes greater than your own. Recalling a colleague who has a debilitating physical condition, for example, will inspire gratitude for your own healthy body, which you may have taken for granted otherwise.

Daily 4-H @ Home Lesson Idea

a 4-H Natural Resource Recycling Idea



Upcycled Plastic Bottle Bird Feeders

Objective: To learn how to upcycle household materials to benefit your neighborhood birds

Age Range: All ages.

Hands-on Activity: Upcycle plastic bottles into bird feeders.

Life Skills: HEAD – wise use of resources
HANDS – responsible citizenship

Introduction

Welcome birds into your yard this spring! Use household materials to construct an upcycled bird feeder. Hang this bird feeder near a window to observe and identify a variety of bird species that may visit your yard.

You've heard the word recycle, but how is *up*cycling different than *re*cycling?

- Upcycle means to reuse discarded objects or materials in such a way as to create a product of higher quality or value than the original.
- Recycle means to convert trash into reusable material to be used again.

Once you have your upcycled feeder hung and attracting feathered visitors, don't forget about identifying those visitors using the bird watching apps from 4-H @ Home: Day 3 Backyard Birding lesson.

- Cornell Lab -Merlin Bird App - <https://merlin.allaboutbirds.org/>
- Audubon Bird Guide - <https://www.audubon.org/app>

Materials

Plastic bottle	Twine
Pencils or wooden spoons	Funnel
Knife, blade, or drill	Bird Seed
Paint or stickers to decorate	



Figure 1: Materials needed to construct a plastic bottle bird feeder.

Continued on next page

Activity Instructions

1. Wash bottle and remove all labels. Dry it with a towel.
2. Drill 2 holes in the plastic bottle opposite of one another. The holes should be large enough to allow your pencils or spoon handles to go through.
3. Drill 2 more holes at a 90° angle from the first set.
4. Pierce small holes with a knife or blade (using adult help) above the perch holes. These holes should be a little larger than the size of the seeds.
5. Tie twine to the top of the bottle to hang it.
6. Insert your spoons or pencils through the drilled holes. (See Fig. 2)
7. Decorate your bottle.
8. Fill your bottle with bird seed using a funnel.
9. Hang your feeder on a branch or outside of a window to observe the birds that visit.

*Look in the *Additional Resources* section for another upcycled bird feeder project.

Reflective Questions

- Besides birdseed, what else do birds eat?
- How many different birds visited your feeder?
- Did you notice different bird species during different times of the day?
- Besides color, what are some other characteristics that you can look for when identifying birds?

Additional Resources:

Wildlife Projects: Milk Jug Bird Feeders: <https://www.greatstems.com/2013/05/wildlife-projects-for-kids-milk-jug-bird-feeders.html>

White, M. 2017. Birding in South Carolina. <https://www.audubon.org/news/birding-south-carolina>

How to Make a Plastic Bottle Bird Feeder. 2013. <https://www.artistshelpingchildren.org/kidscraftactivitiesblog/2012/02/how-to-make-a-plastic-bottle-bird-feeder>

How to Make a Plastic Bottle Birdfeeder. 2020. <https://www.pbs.org/parents/crafts-an-experiments/how-to-make-a-plastic-bottle-birdfeeder>



Figure 2: Image demonstrating step 6 of activity instructions.



Figure 3: Finished product.

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.

Daily 4-H @ Home Lesson Idea

a Financial Literacy Activity,
adapted from *Reading Makes Cents* by Penn State University



What Should We Order?

Objective: Understanding how to calculate the cost of dining out

Age Range: 3rd – 12th Grade (Can be adapted for younger youth)

Hands-on Activity: To calculate the cost of ordering out on a budget while including enough money for taxes and tip.

Life Skills: HEAD - decision making, wise use of resources

Introduction

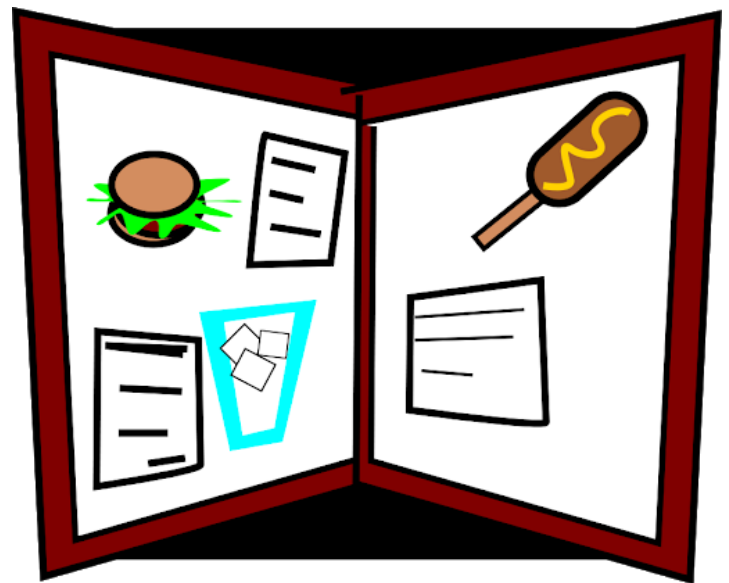
Dining out is a treat that many of take for granted. Many of us eat out more than once each week. This lesson will expose youth to ordering on a budget and reserving enough funds for taxes and a tip.

Materials

Menu from local restaurant (can be found online)
Pencil and Paper
Calculator
Play money (make it or imagine it)

Activity Instructions

1. Start by reading the book *Pigs Will Be Pigs* by Amy Axelrod. No need for you to head out to the library. It can be found online at this website: www.youtube.com/watch?v=skfZqiDgcOM.
2. As a family/group, plan an imaginary trip to a local restaurant. Assign each person in the group \$10. Everyone must order something to eat and something to drink. If the cost of drinks is not listed on the menu, assume they are \$1. While deciding what to order, participants must allocate 10% of their \$10 budget to tip and 5% to taxes.
3. After a few minutes to decide, someone in the group will take orders using the paper and pencil,



or even a whiteboard or poster board so everyone can see. Once the order is taken, calculate the total by adding a 10% tip and a 5% tax. How did you come out? Will you need to stay behind and wash dishes?

Continued on next page

Bonus Challenges:

1. Have the group combine their funds and place their order 'together', all on one ticket. Does the total turn out to be different than if we had added all the individual tickets together?
2. While the group is deciding what to order, announce that those with birthdays in August have lost their wallet (but still must eat) and that those with birthdays in May have received a \$5 coupon to use.
3. For more financial literacy activities, visit: <https://4h.org/parents/curriculum/reading-makes-cents/>

Reflective questions

- What did you learn about making purchase decisions?
- What skills and tools do you need in order to create a meal budget?
- Why is it important to have plenty of information before making purchase decisions?
- How much are taxes where you live? How do you think the government should use these taxes?
- How can you save money while dining out?

Conclusion

The next time you are dining out, by yourself or with a group, remember today's lesson before you place your order. There is more to consider than just "what should I order?"

Additional Resources:

4-H Reading Makes Cents - <https://4h.org/parents/curriculum/reading-makes-cents/>

Axelrod, Amy. (1997). *Pigs Will Be Pigs*. First Aladdin Paperbacks.

Youth Financial Education - <https://nifa.usda.gov/youth-financial-education>

Clemson University Cooperative Extension Service offers its programs to people of all ages, regardless of race, color, gender, religion, national origin, disability, political beliefs, sexual orientation, gender identity, marital or family status and is an equal opportunity employer.

Daily 4-H @ Home Lesson Idea

a 4-H STEM Lab Activity,



Straw Tower

Objective: To become familiar with the engineering design process while using concepts of physics and architecture

Age Range: 5-18 years

Hands-on Activity: To design, construct and measure a tower

Life Skills: HEAD-problem solving, decision making; creative thinking

Introduction

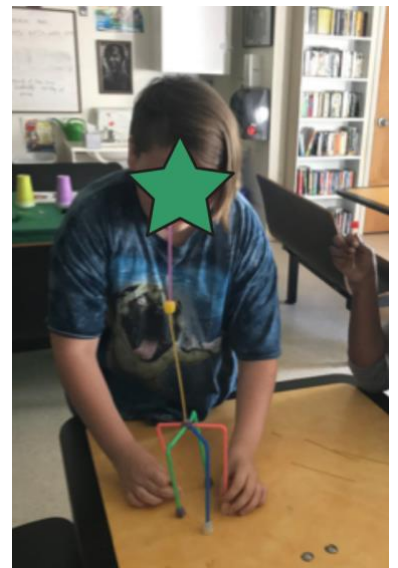
The Engineering Design Process is a process that engineers use in identifying solutions to problems. First, you gather information; brainstorm possible solutions; make a prototype; test the prototype and finally, improve the design. This is the process that engineers use for building infrastructure, like towers, bridges and highways.

Materials

- coffee stir sticks or drinking straws (Pasta can substitute)
- marshmallows or gumdrops
- yardstick or tape measure
- pencil and paper for sketching

Activity Instructions

- Explain that the goal of the activity is to construct the tallest standing structure possible.
- Supply each 4-H'er with a predetermined amount of materials.
- Ask them to sketch and name their tower
- Ask them to then construct the tallest tower possible using all of the materials provided within a predetermined time frame
- Allow 4-H'er to construct, test and make changes. Measure and record height after each test.



Reflective Questions:

- What made the process difficult?
- What would have made it easier?
- Did the process improve with testing?
- How does this activity relate to the real world?

Bonus Tips:

1. This activity can be used as an individual or group activity.
2. Older youth can challenge each other to see who can build the highest standing tower in the shortest time.
3. Search online for pictures of skylines and famous towers throughout the world.
4. Extend this activity by planning a future family outing to the tallest building in your area. How tall is it? How old is it? What materials were used in its construction?

Conclusion

This type of activity not only provides an understanding of the engineering process for young engineers but also sparks interest in the areas of Engineering and Architecture. Young learners can use critical thinking skills to form ideas, make decisions and to test theories and concepts.



Toyko Tower in Tokyo, Japan



Rialto Tower in Victoria, Australia