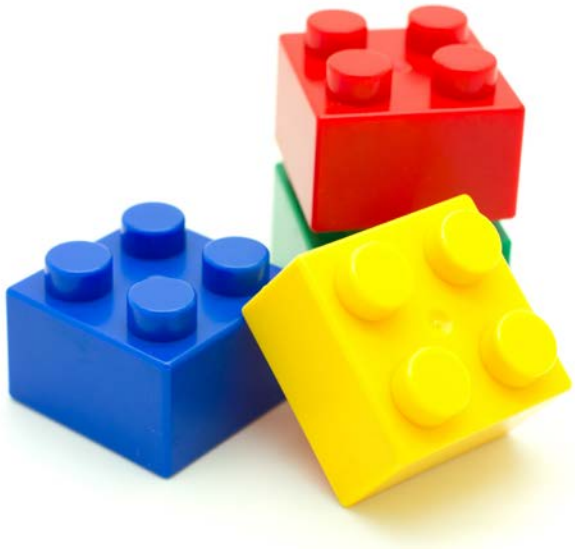
4-H LEGO®
Engineering Club
Enchanted Builds • Volume 3

MISSISSIPPI STATE UNIVERSITY™
EXTENSION

CONTENTS

Visit **http://extension.msstate.edu/publications/4-h-lego-engineering-club-enchanted-builds-volume-3** to download 4-H LEGO Engineering Club certificates and name tags!



INTRODUCTION

Welcome to Volume 3 of the 4-H LEGO Engineering Club. In this curriculum, we will use the engineering design process to build enchanted objects using building blocks. Each of the six lessons includes an enchanted build activity as well as a book that frames the lesson. This curriculum works well for spring break or summer camps. Another option might be to provide the program at an after-school program hosted by the local library. Wherever the program is delivered, allow participants to experience enchanted worlds where the magic of learning is theirs to create!

There are six lessons in this curriculum. Each lesson, where appropriate, is aligned with the following national and state standards:

- 4-H Common Measures 2.0
- National Ag Literacy Pillar
- National Ag Literacy Outcomes
- Next Generation Science Standards
- Mississippi College and Career Readiness Standards for Science
- Mississippi College and Career Readiness Standards for English Language Arts

After each lesson, adults who worked directly with Cloverbuds on the lesson should complete the evaluation found at the back of this book. Return evaluations to your Extension agent.

These lessons are designed around the experiential learning model and the 4-H philosophy of learning by doing. This allows youth to experience a new idea and have a hands-on opportunity to construct something new. Lessons can be done in two half-day lessons or six 1-hour lessons, depending on the needs of your group. At the conclusion, print a certificate for each participant. Consider hosting a parent showcase so that youth can show their parents what they have been working on. Or, take photos of their projects to email to parents or post to social media. Be sure to have a written photo release for each child before taking their photo.

Experiential Learning Model

Image from University of Minnesota Extension 4-H. Adapted from D.A. Kolb, 1984.

4-H CLOVERBUD AGES AND STAGES

Adapted from Scott D. Scheer, PhD, State 4-H Extension Specialist, The Ohio State University.

Characteristics of 5- and 6-year-olds

Physical

- Energetic
- Learn to cut with scissors

Social

- Like to play with other children; are generally sociable
- Cooperate
- Usually obey rules
- Enjoy the process; end product not important

Emotional

- Desire affection and adult attention
- See situations from own point of view
- Learn self-control in groups
- Begin "selective hearing"

Intellectual

- Need clear and simple directions
- Have 10- to 15-minute attention span (if really interested)
- Learn best by exploring "real" materials

What You Can Do with 5- and 6-year-olds

- Help them work together on 4-H Cloverbud activities.
- Plan activities with materials that are hands-on.
- Provide instructions both visually and verbally.
- Keep activities short.
- Engage them in cooperative-learning activities.
- Plan activities that include large motor skills (jumping, running).
- Plan activities that introduce fine motor skills (writing, cutting, drawing).
- Encourage sharing and listening.
- Provide opportunities for adult-child interaction.
- Plan activities that are broken up by physical movement/exercise.
- Let them know you care.

Characteristics of 7-year-olds

Physical

- Usually grow slowly and steadily
- Like repetitious activities, such as bouncing a ball or jumping rope

Social

- Want to join clubs
- Think about the future and other people

Emotional

- Sensitive to personal criticism and get upset easily
- Want to help with decisions
- Fear school failures and peer rejection
- Friends are important; family is still tops
- Begin to empathize with others' feelings

Intellectual

- Develop a sense of right and wrong
- Assert individuality
- Are very concerned about the rules
- Love to collect things

What You Can Do with 7-year-olds

- Provide encouragement in noncompetitive settings.
- Give them simple responsibilities and the option of choosing their activities.
- Select activities that stimulate their curiosity and creative abilities.
- Explore future career possibilities.
- Promote active involvement in 4-H Cloverbuds.
- Be sensitive to their needs and promote social activities with other children.
- Provide physical activities to meet their skill levels.
- Give clear descriptions about how to be involved in 4-H Cloverbuds.
- Help them to develop friendships.
- Encourage them to develop and make collections of things.

GUIDELINES FOR THE 4-H CLOVERBUD PROGRAM

Activity-Based

- A variety of short-term experiences is required for this age group. Young children have short attention spans, especially if there are distractions around them.

Cooperative-Learning Centered

- Activities and lessons are done in small groups.

Noncompetitive

- Children are engaged in activities that are noncompetitive and do not set up categories or classes that create inequities.

Safety

- Special consideration must be given to ensure the safety of 4-H Cloverbud-aged children.

Age-Appropriate

- The activity should be designed at the Cloverbud age level—5–7 years old.

Specialized Activities

- Activities for 4-H Cloverbuds should be different from activities designed for older members.

	4-H CLOVERBUDS	OLDER 4-H MEMBERS (8–18 YEARS OLD)
TYPE OF LEARNING	activity-centered	project-centered
TYPE OF INSTRUCTION	leader-directed	self-study; individual or leader-directed
RECOGNITION	participation	competitions, achievement of standards, achievement of goals, and participation
LEARNING RESOURCES	activity manuals	project manuals

Oriented for Success

- Allow children to gain confidence and promote self-esteem by mastering 4-H Cloverbud activities.
- Any activity must meet the above parameters and 4-H Cloverbud objectives, such as promoting self-understanding (self-esteem) by mastering 4-H Cloverbud activities.

Opportunities

- Cloverbuds should discuss opportunities to showcase their abilities with their local Extension agent.

Experiential Learning Cycle

- Activities should be fun, positive, and focused on the five general life skill areas that the experiential learning model highlights. See the Experiential Learning Model on page 3.

4-H PLEDGE AND TRADITIONS

4-H Emblem . . .

- The 4-H Emblem is a green four-leaf clover with a white H on each leaf. The Hs stand for HEAD, HEART, HANDS, and HEALTH.

4-H Pledge . . .

- "I pledge —

  My HEAD to clearer thinking,

  My HEART to greater loyalty,

  My HANDS to larger service,

  My HEALTH to better living,

  for my club, my community, my country, and my world.

4-H Motto . . .

- "To Make the Best Better"

  Around the country, 4-H'ers have set their goals for 4-H club work by this motto.

4-H Slogan . . .

- "Learn by Doing"

  The "Learn by Doing" slogan encourages 4-H members to learn new skills, be responsible for their actions, and express their own creativity.

4-H Colors . . .

- The white in the 4-H flag symbolizes purity and high ideals. The green, nature's most common color, represents life, springtime, and youth.

Lesson 1: Building Shelters with the Three Little Pigs

Goal

In this lesson, 4-H'ers will learn about various types of shelter and why shelters are important.

Objective

Students will design and construct a sturdy shelter.

Students will identify shelters as a basic human need.

Students will identify common features of various types of shelters.

Prepare

Gather the materials listed below and print the shelter pictures provided. Laminating the pictures is recommended. Set up table stations that will allow partners enough room to work together. Tables can be arranged in rows side-by-side or standing alone.

Materials

- A copy of *The Three Little Pigs: An Architectural Tale* by Steven Guarnaccia (2010; ISBN: 978-0-81098-941-2)
- Pictures of shelter types
- LEGO 10x10 baseplates, one for every pair of children
- LEGOs, 100 for every pair of children
- Transparent LEGO bricks (optional)
- Stick pretzels, 50 per pair of children
- Marshmallows, 50 per pair of children

Getting Started

Greet children and their parents/guardians as they arrive. Be sure each participant has a name tag, and direct children to wash their hands before going to their stations. Each child should have a partner.

Introduction

Welcome to our 4-H club meeting! Let's begin by saying the 4-H Pledge:

I pledge
My head to clearer thinking,
My heart to greater loyalty,
My hands to larger service, and
My health to better living,
For my club, my community,
My country, and my world.

Say: "Today, we will be learning about shelters. Shelters are a basic human need. There are many types of shelters throughout the world. Why does everyone need a shelter to live in?"

Allow students time to respond. Take three to five responses. Add to student answers as needed. (A shelter protects us from the outside environment. It keeps us dry, warm in the winter, and cool in the summer.)

Ask: "What are some common features that all shelters have?"

Allow students time to respond. Take three to five responses. Add to student answers as needed. (doors, windows, roof, floor, walls)

Experiencing

Show the children posters of different styles of shelters from around the world (igloo, tipi, hanok, etc.) and discuss them.

Tell the students that they will work with a partner to model one of these types of shelters with LEGOs. Assign each pair a shelter type to make sure everyone doesn't build the same thing. Tell the students to make the shelter as sturdy as possible.

Alert children when they have 5 minutes of build time remaining.

Sharing

Have each pair share about the design of their LEGO shelter. To prompt this sharing, ask the following questions:

- What was the hardest part of building your shelter?
- What is unique about the shelter you built?
- What is your favorite part of your build?

Processing

Next, participants will reflect on what was important about their experience and on the process of completing the challenge. Prompt them to process their experience with the following questions:

- How did you and your partner communicate your ideas of how to build the structure?
- Is there anything about your shelter you wish you had done differently?
- What parts of the shelter did you have to consider before building it?

Generalizing

Tell participants to think about what was important while designing and building their shelter. Prompt them to think about what the experience meant to them and what they learned by asking the following questions:

- Why is it important to learn about the different shelters around the world?
- What would be a benefit or disadvantage of living in your type of shelter?
- How is your shelter different from shelters we have in our culture? How is it similar?

Applying

Read *The Three Little Pigs: An Architectural Tale* aloud, pausing throughout to discuss characters, setting, and plot.

After the reading, ask the following reflection questions:

- Which shelters in the story were the least sturdy? Which were the sturdiest? Why?
- Did agriculture help provide any of these shelters?
- Why is it important to have a shelter? Why do these shelters need to be sturdy?

Assessment

As the children are wrapping up, have 4-H volunteers, teachers, or parents who stayed for the lesson complete the evaluation on page 42.

Conclusion

Let each pair of students demonstrate their knowledge of how to build a shelter by constructing a structure out of pretzels and marshmallows.

Educational Standards

4-H Common Measures 2.0

4-H Experience: Positive relationship with a caring adult; inclusive environment; safe environment; engagement in learning; opportunity for mastery; opportunity to see oneself as an active participant in the future; opportunity for self-determination; opportunity to value and practice service to others.

4-H Universal: Personal mindset; social skills; universal skills.

National Ag Literacy Pillar

EC Awareness (4a): Recognize that agriculture provides our most basic necessities: food, fiber, energy, and shelter.

Next Generation Science Standards

K-2-ETS1-2: Engineering Design: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Mississippi College and Career Readiness Standards for Science

L.K.3B: Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.

P.K.5B.1: Use basic shapes and spatial reasoning to model large objects in the environment using a set of small objects (e.g., blocks, construction sets).

L.2.3A: Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.

Mississippi College and Career Readiness Standards for Language Arts

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

SL.K.1a: Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

SL.1.1a: Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

RL.2.7: Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

An igloo shelter is made out of blocks of snow.

Some shelters are made out of recycled materials.

Some shelters are made of wood and stone.

A tipi shelter is a tent made with a canvas covering and wooden poles.
Some are built with animal skins instead of canvas.

A hanok shelter is traditionally built in the cold regions of Korea. It is built in a square shape with a courtyard in the middle so that it retains heat better.

Some shelters are made of glass.

Lesson 2: Simple Machines with Rapunzel

Goal

In this lesson, 4-H'ers will learn about simple machines and how they help make everyday tasks easier.

Objective

Students will design and construct a simple pulley.

Students will identify six types of simple machines.

Students will state how simple machines can be used.

Prepare

Gather the materials listed below. Set up stations that will allow partners enough room to work together. Tables can be arranged in rows side-by-side or standing alone.

Materials

- A copy of the book *Keep it Simple, Rapunzel! The Fairy-Tale Physics of Simple Machines* by Thomas Kingsley Troupe (2018; ISBN: 978-1-51582-899-0)
- String cut into approximately 20-inch pieces, 1 per pair of children
- Printed pictures of simple machines
- YouTube video: "Need a Lift? Try a Pulley!" by SciShow Kids **https://www.youtube.com/watch?v=Nj4J7QNeBNk**
- YouTube video: "What Is a Pulley?" by Mocomi Kids **https://www.youtube.com/watch?v=LiBcur1aqcg**
- Projector screen and computer for YouTube videos (optional)
- LEGO 10x10 baseplates, one for every pair of children
- LEGOs, 100 for every pair of children
- Wheel LEGO pieces, three per pair of children
- Axle LEGO pieces, three per pair of children
- Marbles, pennies, rocks, or any other weighted item to lift with a pulley
- Stick pretzels, 20 per pair of children
- Twizzlers, 10 per pair of children
- Assorted sandwich cookies, 10 per pair of children
- Graham crackers, 10 per pair of children

Getting Started

Greet children and their parents/guardians as they arrive. Be sure each participant has a name tag, and direct children to wash their hands before going to their stations. Each child should have a partner.

Introduction

Welcome to our 4-H club meeting! Let's begin by saying the 4-H Pledge:

I pledge

My head to clearer thinking,

My heart to greater loyalty,

My hands to larger service, and

My health to better living,

For my club, my community,

My country, and my world.

Say: "Today, we are going to learn about the types of simple machines and how they help us. A simple machine is a tool with one or no moving parts that moves an object when you push or pull. Can anyone name the types of simple machines?"

Allow students time to respond. Take three to five responses. Add to student answers if needed. (screw, pulley, lever, wedge, inclined plane, and wheel and axle)

Ask: "How do you think these simple machines help us in our everyday lives?"

Allow students time to respond. Take three to five responses. Add to student answers as needed. (They can help us move or lift things more easily. They can help us speed up some tasks.)

Experiencing

Show the children pictures of the different simple machines and examples of how they are used in everyday life (bottle cap as a screw, elevator as a pulley, stapler as a lever, ax as a wedge, slide as an inclined plane, bicycle as a wheel and axle). Tell the students that they will work with a partner to build a pulley using LEGOs. Before building time begins, play the video "Need a Lift? Try a Pulley!" by SciShow Kids to teach students more about pulleys: **https://www.youtube.com/watch?v=Nj4J7QNeBNk**.

After the video, allow students to start building their pulleys. Students will build a pulley to lift a LEGO basket full of marbles (or any other weighted object). After they have attempted their build, you can play the video "What Is a Pulley?" by MocomiKids to give ideas on how to build their pulley: **https://www.youtube.com/watch?v=LiBcur1aqcg**. You can repeat either video to help students.

Instruct students to try their pulley using one pulley. Then, encourage them to try out a two- or three-pulley system. Have them observe the difference between them. Does the bigger pulley system make it easier to lift the objects?

Alert children when they have 5 minutes of build time remaining.

Sharing

Have each pair of students share about the design of their pulley. To prompt this sharing, ask the following questions:

- What was the hardest part of building your pulley?
- What surprised you the most about building the pulley?
- What steps did you use to design your pulley?

Processing

Next, participants will reflect on what was important about their experience and on the process of completing the challenge. Prompt them to process their experience with the following questions:

- Why is it important to learn how to build a pulley?
- How did you and your partner communicate your ideas of how to build a pulley?
- Is there a way that you could have built your pulley better?

Generalizing

Have students think about what was important while designing and building their pulley systems. Prompt them to think about what the experience meant to them and what they learned by asking the following questions:

- What task would you use your pulley for to help you in your life?
- How could you take what you learned about building a pulley and use that knowledge to build something else? What would you build?
- What are some ideas or suggestions you would give someone who had never built a pulley before but wanted to try?

Applying

Read the book *Keep it Simple, Rapunzel! The Fairy-Tale Physics of Simple Machines*. Choose one or two of the following questions to help children determine how they can best use the knowledge they have gained:

- What different types of simple machines did Prince Dave use to reach Rapunzel at the top of the tower? Why did many of them not work?
- Which simple machine helped Prince Dave get to the top of the tower the easiest? Why was it the easiest?
- Why was it important for Prince Dave to use a simple machine?

Assessment

As the children are wrapping up, have 4-H volunteers, teachers, or parents who stayed for the lesson complete the evaluation on page 42.

Conclusion

Let each pair of students demonstrate their knowledge of simple machines by constructing a type of simple machine out of assorted snack items such as Twizzlers, graham crackers, pretzel sticks, and assorted sandwich cookies (like Oreos). Students can refer back to the pictures of simple machines for ideas.

References

Activity adapted from Dees, S. (2016, March 31). Simple Machines for Kids: LEGO Pulleys STEM Building Challenge. Frugal Fun for Boys and Girls. **https://frugalfun4boys.com/simple-machines-kids-lego-pulleys-stem-building-challenge/**

MocomiKids. (2012, February 14). What Is a Pulley? [Video file]. Retrieved from **https://www.youtube.com/watch?v=LiBcur1aqcg**

SciShow Kids. (2016, September 8). Need a Lift? Try a Pulley! [Video file]. Retrieved from **https://www.youtube.com/watch?v=Nj4J7QNeBNk**

Educational Standards

4-H Common Measures 2.0

4-H Experience: Positive relationship with a caring adult; inclusive environment; safe environment; engagement in learning; opportunity for mastery; opportunity to see oneself as an active participant in the future; opportunity for self-determination; opportunity to value and practice service to others.

4-H Universal: Personal mindset; social skills; universal skills.

Next Generation Science Standards

K-PS2-1: Motion and Stability: Forces and Interactions: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

Mississippi College and Career Readiness Standards for Science

P.2.6: Students will demonstrate an understanding of how the motion of objects is affected by pushes, pulls, and friction on an object.

Mississippi College and Career Readiness Standards for Language Arts

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

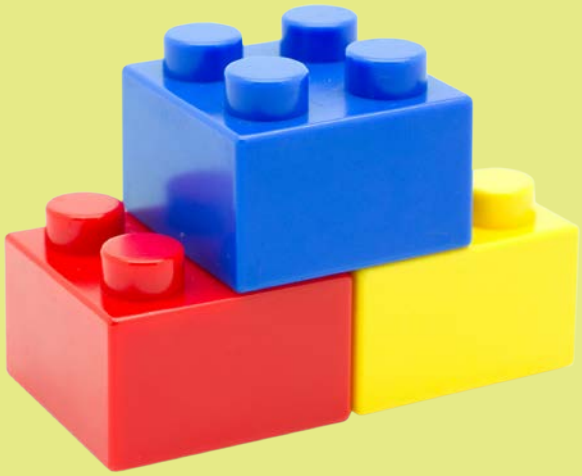
SL.K.1a: Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

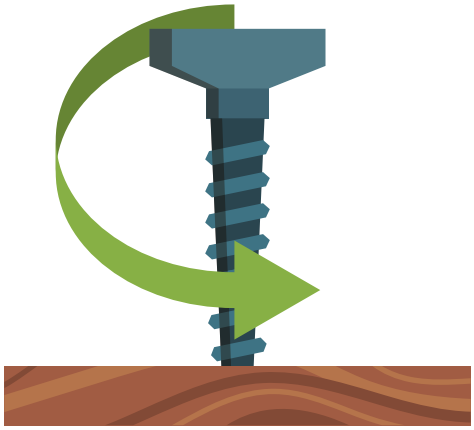
SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

SL.1.1a: Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

RL.2.7: Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.





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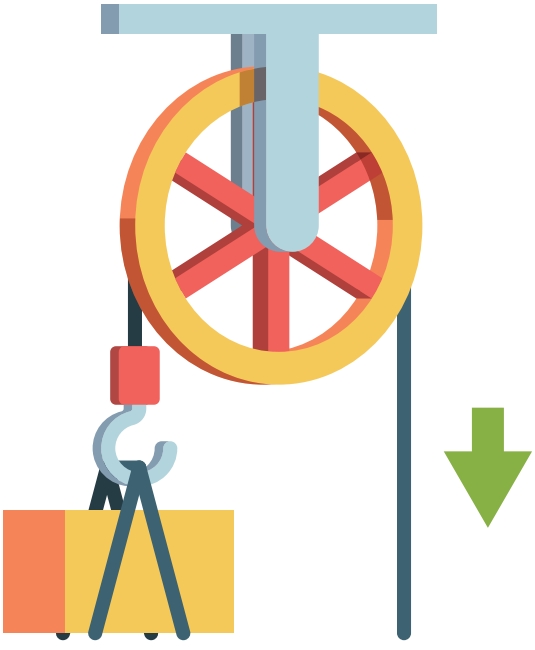
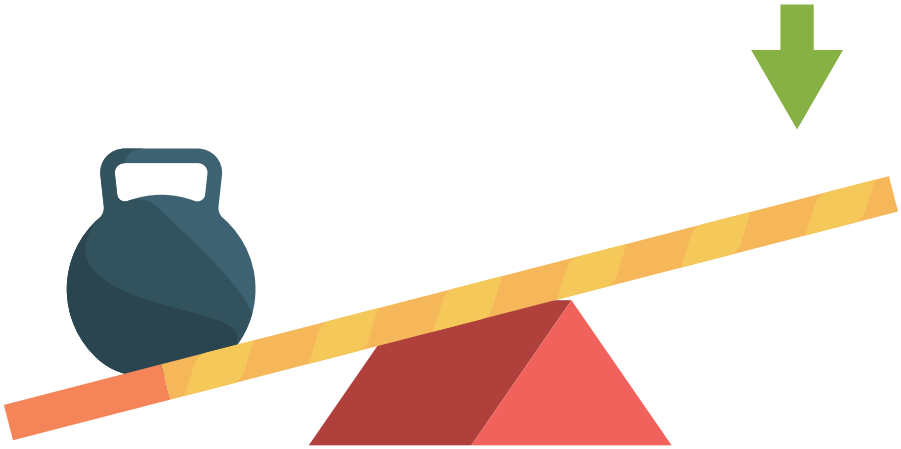
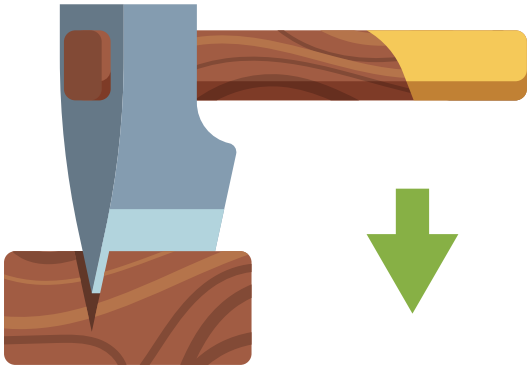


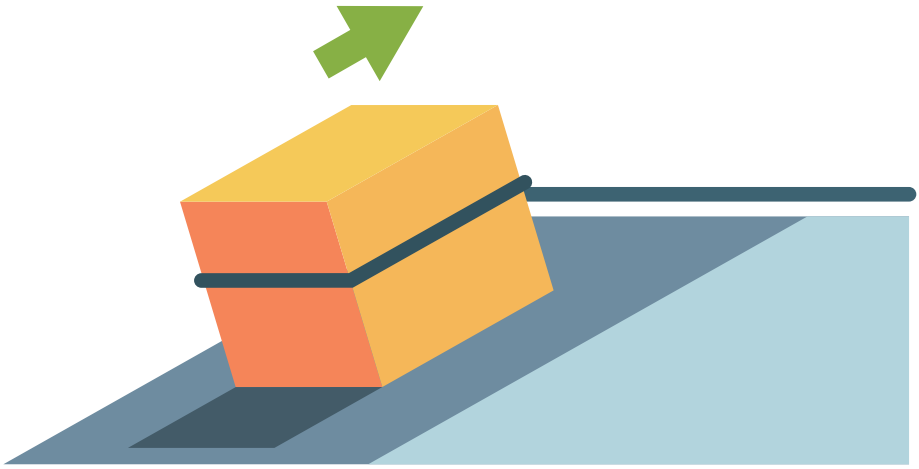
Pulley



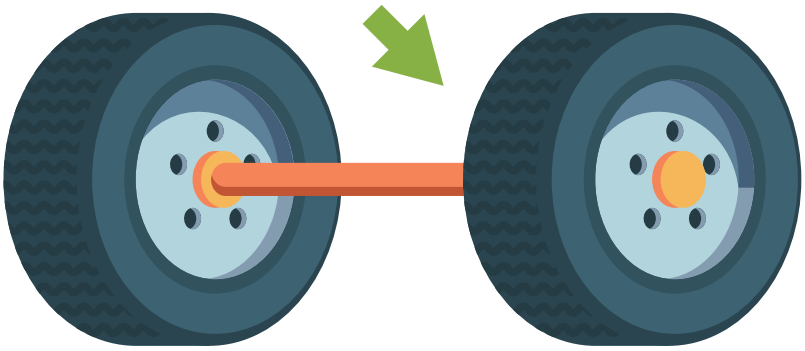
Lever



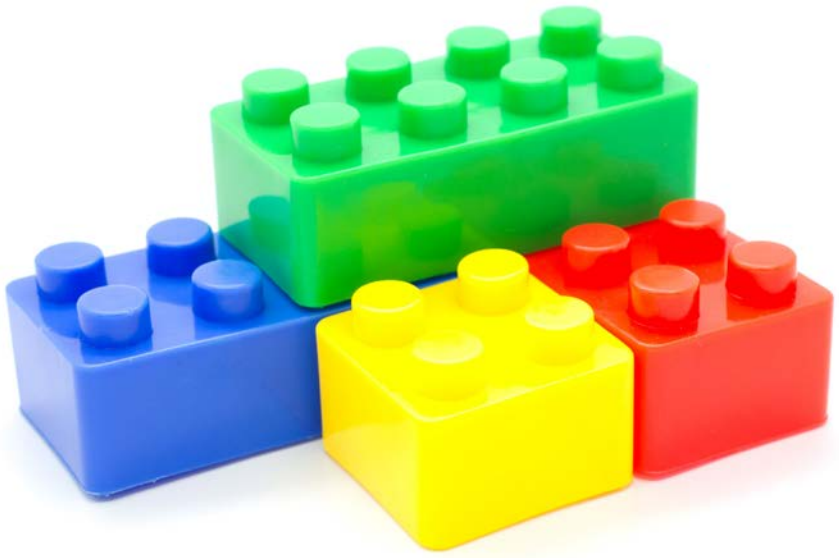
Wedge



Inclined plane



Wheel and axle



Lesson 3: Measuring with Jim and the Beanstalk

Goal

In this lesson, 4-H'ers will learn that the length of an object is how long or wide it is. Students will learn how to measure with nonstandard units (LEGOs) and standard units (inches).

Objective

Students will construct measurements in nonstandard units.

Students will construct measurements in inches.

Students will compare nonstandard and standard units of measurement.

Prepare

Gather the materials listed below. Set up table stations that allow partners enough room to work together. Tables can be arranged in rows side-by-side or standing alone.

Materials

- A copy of the book *Jim and the Beanstalk* by Raymond Briggs (1997; ISBN: 978-0698115774)
- YouTube video: "Longer or Shorter Song, Comparing Measurements, Kindergarten to Second Grade" by NUMBEROCK (optional) **https://www.youtube.com/watch?v=X_97AO2SkGU**
- Projector and computer to play YouTube video (optional)
- Ruler, one per pair of children
- Standard rectangular LEGOs, 100 for each pair of children
- Measurement Recording Sheet (page 25), one for each child
- Pencil, one per pair of children
- Food items: pickles, pretzels, string cheese, Twizzlers, crackers, carrots, etc.

Getting Started

Greet children and their parents/guardians as they arrive. Be sure each participant has a name tag, and direct children to wash their hands before going to their stations. Each child should have a partner.

Introduction

Welcome to our 4-H club meeting! Let's begin by saying the 4-H Pledge:

I pledge
My head to clearer thinking,
My heart to greater loyalty,
My hands to larger service, and
My health to better living,
For my club, my community,
My country, and my world.

Say: "Today, we are going to learn about measurement. When we measure an object, we are figuring out the size of that object. When we measure an object from one end to the other, we are finding the object's length. We can use many different

tools to measure length. Today, we are going to use LEGOs and rulers to measure some of our body parts. Have any of you ever measured anything before? If so, what did you measure, and what did you use to measure it?"

Allow students time to respond. Take three to five responses.

Ask: "Why do you think it might be important for us to be able to measure the length of objects? Can you think of a time where measuring would be needed?"

Allow students time to respond. Take three to five responses. Add to student answers as needed. (We can measure length to find how tall we are. If we are building a house, we need to know how long our materials should be. We can use length to figure out how big a room is or how far we need to run in a race.)

Experiencing

Begin by showing students the ruler. Demonstrate to students that rulers can measure an object and tell us how long the object is. Then, line up the rectangle LEGOs along the ruler to demonstrate to students that LEGOs can be used for measurement, too. Identify how many LEGOs make up one ruler.

Tell the students to use LEGOs to measure the length of their partner's hand, forearm, and foot. (If a student is uncomfortable with measuring someone else's body parts, they may measure their own.) Have students record their totals. Then, use rulers to measure feet, arms, and legs and record how many inches they measure out to be. Have students record all data and answer all questions on the Measurement Recording Sheet provided (page 25).

While students are measuring, play the video "Longer or Shorter Song" by NUMBEROCK to remind them how to compare measurements: **https://www.youtube.com/watch?v=X_97AO2SkGU**. It is also a fun song to play in the background while they work.

Alert children when they have 5 minutes of measure time remaining.

Sharing

Have each pair share their recorded data. If prompting is needed, ask the following questions:

- What was the hardest part of measuring parts of your body?
- Did you find anything surprising about your data?
- How do your body measurements compare to your partner's measurements?

Processing

Next, children will reflect on what was important about their experience and on the process of completing the challenge. Prompt them to process their experience with the following questions:

- How did you and your partner help each other learn new things?
- Did you like measuring with the LEGOs or the ruler better? Why?
- What made this a good activity?

Generalizing

Tell children to think about what was important while measuring the length of their body parts. Prompt them to think about what the experience meant to them and what they learned by asking them the following questions:

- Why is it important to know how to measure the length of an object?
- What did you learn about yourself through doing this activity?
- How did you and your partner decide how to measure your body parts?

Applying

Read the book *Jim and the Beanstalk* by Raymond Briggs. Choose one or two of the following questions to help children determine how they can best use the knowledge they have gained:

- Why did Jim have to measure the giant's head before making him some new glasses?
- Do you think the giant's new glasses would fit you? Why or why not?
- Can you think of any other items that Jim might need to make bigger for the giant?

Assessment

As the children are wrapping up, have 4-H volunteers, teachers, or parents who stayed for the lesson complete the evaluation on page 42.

Conclusion

Let students demonstrate their knowledge of measuring with LEGOs or a ruler by recording the measurement of various snack items. These items can consist of any long snack food, such as pickles, pretzels, string cheese, Twizzlers, and crackers.

References

Math Songs by NUMBEROCK. (2019, December 23). Longer or Shorter Song, Comparing Measurements, Kindergarten to Second Grade [Video file]. Retrieved from **https://www.youtube.com/watch?v=X_97AO2SkGU**

Educational Standards

4-H Common Measures 2.0

4-H Experience: Positive relationship with a caring adult; inclusive environment; safe environment; engagement in learning; opportunity for mastery; opportunity to see oneself as an active participant in the future; opportunity for self-determination; opportunity to value and practice service to others.

4-H Universal: Personal mindset; social skills; universal skills.

NCTM Process Standards

Reasoning and Proof; Communication; Connections; Representations.

Mississippi College and Career Readiness Standards for Mathematics

K.MD.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.MD.2: Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

2.MD.2: Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.3: Estimate lengths using units of inches, feet, centimeters, and meters.

Mississippi College and Career Readiness Standards for Language Arts

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

SL.K.1a: Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

SL.1.1a: Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

RL.2.7: Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

Partner One Name: _____

Partner Two Name: _____

MEASUREMENT RECORDING SHEET

Partner One's Measurements				
	Length in LEGOs		Length in inches (use ruler)	
Hand		LEGOs		inches
Forearm		LEGOs		inches
Foot		LEGOs		inches

Partner Two's Measurements				
	Length in LEGOs		Length in inches (use ruler)	
Hand		LEGOs		inches
Forearm		LEGOs		inches
Foot		LEGOs		inches

Which partner's hand was longer? _____

Which partner's forearm was longer? _____

Which partner's foot was longer? _____

How do you know whose measurements were longer? _____

_____

_____

_____

Lesson 4: Zipline Challenge with Humpty Dumpty

Goal

In this lesson, 4-H'ers will learn about slope and how speed is affected by the steepness of the slope.

Objective

Students will construct their own LEGO ziplines.

Students will demonstrate knowledge of the relationship between slope and speed through experimentation.

Prepare

Gather the materials listed below. Set up stations that will allow partners enough room to work together. Designate areas where the students will be able to attach their ziplines. These should be stationary and higher areas such as a doorknob or the back of a chair. You may have to get creative!

Materials

- A copy of the book *After the Fall: How Humpty Dumpty Got Back Up Again* by Dan Santat (2017; ISBN: 978-1626726826)
- YouTube video: "Zipline commute: Columbia kids cross canyon to reach school (Learning World: S1E04, part 1 of 3)" by WISE Channel (optional) **https://www.youtube.com/watch?v=Wh0o2zNOx8Y**
- Projector and computer to play YouTube video (optional)
- LEGO 10x10 baseplate, one per pair of children
- LEGO bricks, 50 per pair of children
- Parachute cord or thick string such as yarn
- Scissors
- Strong tape
- LEGO minifigure, one per pair of children
- Picture of child on zipline

Getting Started

Greet children and their parents/guardians as they arrive. Be sure each participant has a name tag, and direct children to wash their hands before going to their stations. Each child should have a partner.

Introduction

Welcome to our 4-H club meeting! Let's begin by saying the 4-H Pledge:

I pledge

My head to clearer thinking,

My heart to greater loyalty,

My hands to larger service, and

My health to better living,

For my club, my community,

My country, and my world.

Show students the picture of the child on a zipline.

Say: "Today, we will be learning about ziplines, and we will even create our own. Have any of you ever ridden a zipline before?"

Allow students time to respond. Take three to five responses. Add to student answers as needed.

Ask: "Can you tell me some reasons that someone might need to use a zipline?"

Allow students time to respond. Take three to five responses. Add to student answers as needed.

Say: Those are great answers. A zipline is a rope that allows people to slide down from a high area safely or to get to a place they can't walk to. Many people use them for fun. We will read about someone at the end of our lesson who could have used a zipline to help him!

We are also learning about the relationship between slope and speed today. Slope is how steep or straight down a line is. As you design your zipline, you will need to figure out how steep your slope should be to get your LEGO minifigure to the ground safely. You will need to slant your zipline to help your LEGO minifigure.

Experiencing

Before students begin their LEGO build, play the YouTube video "Zipline commute: Columbia kids cross canyon to reach school" to give students a visual of what a zipline is while also showing them that, in some places, a zipline can provide essential travel to school.

Tell the students that they will be designing and building their own zipline. They will build a basket/cage for their LEGO minifigure to ride down the zipline. The challenge is to get to the bottom of the zipline without crashing!

Alert children when they have 5 minutes of build time remaining.

After building, students will tie one end of their rope to a fixed, high point in the room and the other end to a lower point. Let students decide how steep their rope will be. Let them test their ziplines. Encourage them to try different heights for their ziplines. If their LEGO minifigure crashes, allow them to remodel their build or change the steepness of their rope.

Sharing

Have each pair share about the design of their zipline. If prompting is needed, ask the following questions:

- What was the most difficult part of getting the zipline to the bottom of the rope?
- Did your LEGO minifigure travel faster or slower when you made the rope steeper?
- Did your build break or did it stay together? Why do you think this happened?

Processing

Next, participants will reflect on what was important about their experience and on the process of completing the challenge. Prompt them to process their experience with the following questions:

- What suggestions would you give to someone who wanted to build a zipline?
- What would you do if your basket were to break?
- What types of communication helped you make your decisions? Why?

Generalizing

Tell students to think about what was important while designing and building their zipline. Prompt them to think about what the experience meant to them and what they learned by asking the following questions:

- Why is knowing about the relationship between slope and speed important?
- When have you had to improve your work before?
- What did you learn from this activity that you can apply to another activity?

Applying

Read *After the Fall: How Humpty Dumpty Got Back Up Again* aloud, pausing throughout to discuss characters, setting, and plot.

After the reading, ask the following reflection questions:

- If you were Humpty Dumpty, how would you overcome your fear of falling again?
- When are some other times that you may need a zipline?
- Can you think of another way that Humpty Dumpty could have been saved?

Assessment

As the children are wrapping up, have 4-H volunteers, teachers, or parents who stayed for the lesson complete the evaluation on page 42.

Conclusion

Allow students to keep experimenting with their ziplines at this time. When they are finished with that, have students build and design their own Humpty Dumpty. Tell them to get creative with their designs!

References

Activity adapted from Littlebins. (2019, May 11). Make a LEGO Zip Line. Little Bins for Little Hands. **https://littlebinsforlittlehands.com/lego-zip-line-homemade-toy-zip-line-kids/**

WISE Channel. (2011, May 26). Zipline commute: Columbia kids cross canyon to reach school (Learning World: S1E04, part 1 of 3) [Video file]. Retrieved from **https://www.youtube.com/watch?v=Wh0o2zNOx8Y**

Educational Standards

4-H Common Measures 2.0

4-H Experience: Positive relationship with a caring adult; inclusive environment; safe environment; engagement in learning; opportunity for mastery; opportunity to see oneself as an active participant in the future; opportunity for self-determination; opportunity to value and practice service to others.

4-H Universal: Personal mindset; social skills; universal skills.

Next Generation Science Standards

K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Mississippi College and Career Readiness Standards for Science

P.2.6: Students will demonstrate an understanding of how the motion of objects is affected by pushes, pulls, and friction on an object.

Mississippi College and Career Readiness Standards for Language Arts

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

SL.K.1a: Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

SL.1.1a: Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

RL.2.7: Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

Lesson 5: Force and Motion with Cinder-Elly

Goal

In this lesson, 4-H'ers will learn about the relationship between force and motion.

Objective

Students will design a balloon-powered car using LEGOs.

Students will experiment with putting objects in motion using force.

Students will explain the effects of force.

Prepare

Gather the materials listed below and print the push/pull images provided. Set up stations that will allow partners enough room to work together. Tables can be arranged in rows side-by-side or standing alone.

Materials

- A copy of the book *Cinder-Elly* by Frances Minters (1997; ISBN: 978-0140561265)
- YouTube video: "The Pushes and Pulls Song, Forces for Kids, Grades K-2 Science" by Generation Genius (optional) **https://www.youtube.com/watch?v=94zy9gF40pE**
- YouTube video: "Pushing and Pulling: What Is the Difference? Force and Energy for Kids, Kids Academy" by Kids Academy (optional) **https://www.youtube.com/watch?v=mEg5GOVpUlE**
- Projector and computer to play video (optional)
- LEGOs, 100 for every pair of children
- LEGO wheels and axles set, one for every pair of children
- LEGO 1x2 handle tile piece, one for every pair of children
  Note: This is used to hold the balloon on the car when children are ready to race.
- Balloons, one for each child
  Note: Extra balloons would be useful to have if students want to race more than once.
- Tape measure (or ruler)
- Push/pull pictures

Getting Started

Greet children and their parents/guardians as they arrive. Be sure each participant has a name tag, and direct children to wash their hands before going to their stations. Each child should have a partner.

Welcome

Welcome to our 4-H club meeting! Let's begin by saying the 4-H Pledge:

I pledge

My head to clearer thinking,

My heart to greater loyalty,

My hands to larger service, and

My health to better living,

For my club, my community,

My country, and my world

Say: "Today, we are going to learn what force is and how force puts an object into motion. A force is a push or pull on an object. When you pull or push on an object, the object moves. This means the object is in motion."

Select one or two of the following questions and allow children to respond:

- How do you make an object move at different speeds?
- Are some objects harder to move than others?
- Can you move objects without touching them with your hands?

Experiencing

Explain to students that a "push" is when you move an object away from you. A "pull" is when you move an object close to you. These forces can change the speed or direction of an object. They can also make an object stop or go. Show students the photo on page 33 and explain that one person is pulling the wagon and another is pushing it.

Next, to familiarize students with the concepts of pushing and pulling, hold up the pictures of push/pull activities—kicking a soccer ball (push), vacuuming (both), playing with a yo-yo (both), picking a flower (pull). For each picture, ask students what is happening in the picture. Then, ask if the action requires a push or pull force. Some of the actions can require both.

Next, ask students what other actions they can think of that require a push or pull. Take three to five responses.

Say: Today, we are going to build LEGO cars and put them into motion using force from a blown-up balloon. You will work in pairs to design your vehicle, and then we will race to see whose car goes the fastest and farthest.

As students build, play "The Pushes and Pulls Song" in the background.

Alert children when they have 5 minutes of build time remaining.

After building, give each student a balloon. Tell them to attach the balloon to their LEGO vehicle using the handle tile LEGO piece. Let students blow up their balloon as much or as little as they want while it is attached to their vehicle. Next, race the cars by letting go of the balloons. The force of the air leaving the balloon will push the vehicle forward. Have students measure the distance (in inches) traveled using the tape measure.

Sharing

Allow each pair of children to share about the design of their LEGO car. If needed to prompt sharing, ask the following questions:

- How did you model your vehicle?
- What is unique about the car you built?
- What was the hardest part of building your car?

Processing

Next, participants will reflect on what was important about their experience and on the process of completing the challenge. To prompt them to process their experience, choose from the following questions:

- What roles did you and your partner have when building together?
- Did you and your partner have any disagreements? What was your compromise?
- Is there something you could have done to make your design better?

Generalizing

In this step, students should think about what was important while designing and building their balloon-powered car. To prompt them to think about what the experience meant to them and what they learned from it, choose from the following questions:

- Do you think the size of your vehicle determined how far it traveled?
- How did your balloon impact how far your vehicle traveled?
- How could you take what you learned from building your balloon-powered car and use that knowledge to build something else and put it in motion? What would you build?

Applying

Read pages 1–12 of the book *Cinder-Elly* aloud. If your students are engaged and interested, you may read the entire book. Choose one or two of the following questions to help them determine how they can best use the knowledge they have gained:

- What did Godma teach us to add to something if you want to put it into motion? (wheels)
- What kind of force was moving the bicycle for Cinder-Elly? (a push force)
- What are some reasons that we need objects to be in motion?

Assessment

As the children are wrapping up, have 4-H volunteers, teachers, or parents who stayed for the lesson complete the evaluation on page 42.

Conclusion

Use this time to allow students to make adjustments to their LEGO cars. Then, hold another race to observe what impact the adjustments have on the race.

During this time, you may want to play the video "Pushing and Pulling: What Is the Difference?" (**https://www.youtube.com/watch?v=mEg5GOVpUlE**).

References

Activity adapted from Littlebins. (2019, June 15). Make a Lego Balloon Car. Little Bins for Little Hands. **https://littlebinsforlittlehands.com/lego-balloon-car-diy-lego-building-kit/**

GenerationGenius. (2019, December 11). The Pushes and Pulls Song, Forces for Kids, Grades K-2 Science [Video file]. Retrieved from **https://www.youtube.com/watch?v=94zy9gF40pE**

Kids Academy. (2018, October 24). Pushing and Pulling: What Is the Difference? Force and Energy for Kids, Kids Academy [Video file]. Retrieved from **https://www.youtube.com/watch?v=mEg5GOVpUlE**

Educational Standards

4-H Common Measures 2.0

4-H Experience: Positive relationship with a caring adult; inclusive environment; safe environment; engagement in learning; opportunity for mastery; opportunity to see oneself as an active participant in the future; opportunity for self-determination; opportunity to value and practice service to others.

4-H Universal: Personal mindset; social skills; universal skills.

Next Generation Science Standards

K-PS2-1: Motion and Stability: Forces and Interactions: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

PS2.A: Forces and Motion: Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

Mississippi College and Career Readiness Standards for Mathematics

2.MD.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

Mississippi College and Career Readiness Standards for Science

P.2.6: Students will demonstrate an understanding of how the motion of objects is affected by pushes, pulls, and friction on an object.

Mississippi College and Career Readiness Standards for English Language Arts

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

SL.K.1a: Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

SL.K.6: Speak audibly and express thoughts, feelings, and ideas clearly.

SL.1.1a: Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

RL.2.7: Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

SL.2.1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

Pulling and pushing a wagon

Kicking a soccer ball

Vacuuming

Playing with a yo-yo

Picking a flower

Lesson 6: Engineering Bridges with the Three Billy Goats Fluff

Goal

In this lesson, 4-H'ers will learn about the purpose and importance of bridges. They will also learn about different bridge designs.

Objective

Students will design a bridge using LEGOs.

Students will explain why bridges are important to society.

Prepare

Gather the materials listed below. Set up stations that will allow partners enough room to work together. Tables can be arranged in rows side-by-side or standing alone.

Materials

- A copy of the book *The Three Billy Goats Fluff* by Rachael Mortimer (2013; ISBN: 978-1589254398)
- YouTube video: "What Makes Bridges So Strong?" by SciShow Kids **https://www.youtube.com/watch?v=oVOnRPefcno**
- Projector and computer to play video (optional)
- LEGO 10x10 baseplate, one per pair of children
- LEGOs, 100 for each pair of children
- Copy paper, one sheet per pair of children
- Blue marker, one for each child
- One roll of string or yarn
- Scissors
- Clear tape
- Printed pictures of bridge types
- Paper or plastic cups
- Marbles or any other object to test the bridge's strength
- Toothpicks
- Popsicle sticks
- Gum drops, cheese, apple pieces, etc.

Getting Started

Greet children and their parents/guardians as they arrive. Be sure each participant has a name tag, and direct children to wash their hands before going to their stations. Table stations can be arranged in rows to allow students enough room to work. Each child should have a partner.

Introduction

Welcome to our 4-H club meeting! Let's begin by saying the 4-H Pledge:

I pledge

My head to clearer thinking,

My heart to greater loyalty,

My hands to larger service, and

My health to better living,

For my club, my community,

My country, and my world.

Say: "Today, we will be learning about bridges. You may not realize it, but bridges help people every day. Bridges allow people to cross over water or other obstacles quickly. Without bridges, we wouldn't be able to get where we need to go. Can you think of a time when you crossed a bridge to get somewhere?"

Allow students time to respond. Take three to five responses. Add to student answers as needed.

Ask: "Did you know that there are different types of bridges? How do you think some bridges could be different from other bridges?"

Allow students time to respond. Take three to five responses. Add to student answers as needed.

Experiencing

Show the printed pictures of three of the main bridge types (arch, beam, and suspension). Describe each bridge to the students. Ask students to describe the similarities and differences between the pictures. Pass the images around for students to view more closely if needed.

Next, tell students to draw a river on their piece of copy paper. Tell them that they will be building a bridge to cross over this river, and they will be testing the strength of their bridge. Tell students that they have an option to choose which of the three bridge designs they build. The string and clear tape can be used as cable for the suspension bridge.

Before or while students are building, play the video "What Makes Bridges So Strong?" to expand their knowledge of bridges.

Alert children when they have 5 minutes of build time remaining.

Tell each pair of students to place a cup in the middle of their bridge. Begin filling cups with the marbles to determine if the bridges are strong enough to support weight. Instead of marbles, you can use pennies or any other item that will test the strength of the bridge.

Sharing

Have each pair share about the design of their LEGO bridge. If prompting is needed, ask the following questions:

- What was the hardest part of building a bridge?
- Which design did you choose for your bridge? Why did you choose that design?
- How did you feel in your role of building the bridge?

Processing

Next, the students will reflect on what was important about their experience and on the process of completing the challenge. Prompt them to process their experience with the following questions:

- What did you learn about yourself when building your bridge?
- Why is it important to build a bridge that is stable and can hold weight?
- What suggestions would you give to someone who wanted to build their own LEGO bridge or even a real bridge?

Generalizing

Tell children to think about what was important while designing and building their bridge. To prompt them to think about what the experience meant to them and what they learned, ask the following questions:

- Why is it important to have different bridge designs?
- What other skills do you need in order to be good at designing a bridge?
- What other situations like this have you experienced?

Applying

Read *The Three Billy Goats Fluff* aloud, pausing throughout to discuss characters, setting, and plot.

Ask the following reflection questions:

- Was the bridge important for the billy goats? Why or why not?
- Describe a time when you might need to use the skills or information that you learned today.
- How would you choose to teach others about building bridges?

Assessment

As the children are wrapping up, have 4-H volunteers, teachers, or parents who stayed for the lesson complete the evaluation on page 42.

Conclusion

Give students time to edit their bridge design and test it again with the weight if needed. Let students build a bridge using toothpicks, popsicle sticks, and snack foods such as gumdrops, cheese squares, apple slices, marshmallows, or any other food that can be held together by a toothpick.

References

SciShow Kids. (2015, May 13). What Makes Bridges So Strong? [Video file]. Retrieved from **https://www.youtube.com/watch?v=oVOnRPefcno**

Educational Standards

4-H Common Measures 2.0

4-H Experience: Positive relationship with a caring adult; inclusive environment; safe environment; engagement in learning; opportunity for mastery; opportunity to see oneself as an active participant in the future; opportunity for self-determination; opportunity to value and practice service to others.

4-H Universal: Personal mindset; social skills; universal skills.

Next Generation Science Standards

K-2-ETS1-2: Engineering Design: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

MS-ETSI-4: Engineering Design: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Mississippi College and Career Readiness Standards for Science

P.K.5B.1: Use basic shapes and spatial reasoning to model large objects in the environment using a set of small objects (e.g., blocks, construction sets).

Mississippi College and Career Readiness Standards for Language Arts

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

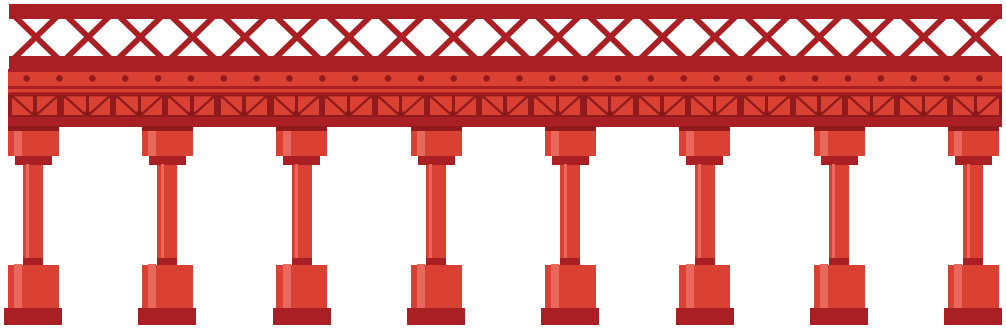
RF.K.2: Demonstrate understanding of spoken words, syllables, and sounds (phonemes).

SL.K.1a: Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).

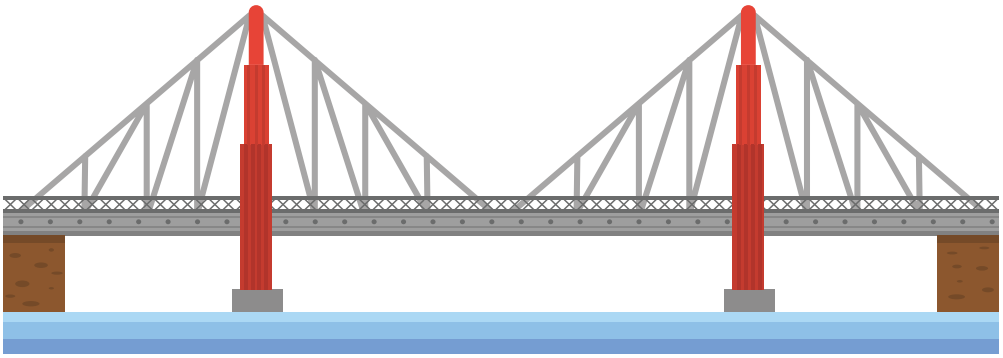
SL.1.1: Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Arch bridge



Beam bridge



Suspension bridge

EVALUATION

This is an observational instrument designed to measure the influence of the 4-H Cloverbud LEGO Engineering Club program on children who have actively participated in the program.

Extension agents and adults who worked directly with children to complete the lessons: Complete and return this paper form or scan the QR code to complete it online.

https://msudafvm.co1.qualtrics.com/jfe/form/SV_cO9B9APiMTZsR8O

Please indicate today's date and select which lesson(s) was (were) delivered today. _____/_____/_____

- ☐ Lesson 1: Building Shelters with the Three Little Pigs
- ☐ Lesson 2: Simple Machines with Rapunzel
- ☐ Lesson 3: Measuring with Jim and the Beanstalk
- ☐ Lesson 4: Zipline Challenge with Humpty Dumpty
- ☐ Lesson 5: Force and Motion with Cinder-Elly
- ☐ Lesson 6: Engineering Bridges with the Three Billy Goats Fluff

Instructions: For each item, use an X to indicate a response that represents the number of children who exhibit/experience the listed behavior/setting as a result of their involvement with the 4-H Cloverbud Program.

1. Because of participation in the 4-H Cloverbud LEGO Engineering Club program, I observed that the 4-H Cloverbud children:

	None of the children	Some of the children	Half of the children	Most of the children	All of the children
Gained self-confidence or self-esteem. Children displayed confidence and positive self-esteem as observed in their ability to participate in the 4-H Cloverbud activities, ask/answer questions, and interact with others.					
Improved their physical skills. Children exhibited fine (writing, cutting, drawing, etc.) and gross (jumping, arm and leg movement, body coordination, etc.) motor skills.					
Gained subject-matter knowledge. Children expressed verbal and nonverbal knowledge related to the subject-matter content of their 4-H Cloverbud activity involvement.					
Improved ability to get along with others. Children were able to share, communicate, and make friends with peers in the 4-H Cloverbud group.					

	None of the children	Some of the children	Half of the children	Most of the children	All of the children
Increased decision-making skills. Children were able to make decisions in regard to activity input and interaction with peers and adult leaders.					
Experienced positive relationships with caring adults. Children learned and developed in an adult-leader-directed environment; the learning environment was positive, caring, supportive, and fun.					
Experienced inclusive environments. Cooperative-learning techniques encouraged children to work on activities together; engaged the children in activities that were noncompetitive without setting up categories or classes; valued and respected the diversity of all participants.					
Experienced opportunities for mastery/competence. Children were allowed to be creative across eight different subject areas; used the experiential learning cycle through the activities as children experienced, shared, processed, and generalized; curriculum and activities met the needs of the children.					
Experienced opportunities to value and practice service to others. Children learned to appreciate community service through 4-H Cloverbud activities; cleaned up after activities and helped each other; shared materials and respected fellow 4-H Cloverbud members.					
Experienced an emotionally and physically safe environment. Children's needs were met on their emotional, physical, social, and cognitive level; low-risk, safe activities ensured the safety of 4-H Cloverbud children; ratio of children to adults was low (about 6 to 1).					

	None of the children	Some of the children	Half of the children	Most of the children	All of the children
Experienced opportunities for self-determination. Children gained confidence through success-oriented activities; noncompetitive activities fostered intrinsic motivation; activities focused on the process of doing activities, rather than the product.					
Experienced opportunities for engagement in learning. Children had fun, positive experiences; children had access to numerous subject areas that interested them; leaders were nurturing, enthusiastic, and sensitive role models.					
Experienced opportunities to see themselves as active participants in the future. Children were given choices in upcoming activities; explored a variety of future career options; discussed and role-played the reality that what one does today often determines what happens tomorrow.					
Experienced opportunities for leadership and independence. Children gained skills and confidence for leadership and self-discipline; learned responsibility for decisions made and actions taken; led simple tasks.					
Increased interest and engagement in STEM (Science, Technology, Engineering, and Math). Children expressed interest in science and were engaged by the science-based lessons and activities.					
Improved attitudes toward STEM. Children expressed positive attitudes and aspirations toward science.					

	None of the children	Some of the children	Half of the children	Most of the children	All of the children
Developed STEM skills and abilities. Children developed skills such as listening, observing, searching, asking questions, and gathering information.					
a. Asked questions about a problem					
b. Defined a problem					
c. Developed a simple model					
d. Used a simple model					
e. Constructed explanations					
f. Designed solutions					
g. Evaluated information					
h. Communicated information					
i. Answered questions about a problem					
j. Spoke audibly					
k. Expressed thoughts, feelings, and ideas clearly					
l. Used a combination of drawing, dictating, and writing to communicate about a topic					
m. Added drawings or other visual displays to descriptions to provide additional detail					
n. Participated in collaborative conversations with peers and adults					

Adapted from Scott D. Scheer, PhD, State 4-H Extension Specialist, The Ohio State University.

2. Number of children represented in this evaluation _____

3. Number of girls _____ and boys _____

4. How was this program delivered?

- ☐ 4-H club
- ☐ 4-H camp
- ☐ After-school program
- ☐ In-school program

5. Number of meetings this evaluation represents _____

6. Number of weeks over which this evaluation occurred _____

7. Person completing this evaluation _____

8. Which county does this evaluation represent?

9. What is your role?

- ☐ 4-H Cloverbud volunteer leader
- ☐ 4-H Cloverbud parent
- ☐ Youth worker
- ☐ Teacher
- ☐ Extension agent
- ☐ Other: _____

10. How long (e.g., months, years) have you served as a 4-H Cloverbud volunteer leader? _____

Thank you!

Please return this completed form to your 4-H Cloverbud leader or your Extension agent.

I Pledge:

My Head to Clearer Thinking

(Right hand touches forehead)

My Heart to Greater Loyalty

(Right hand over heart)

My Hands to Larger Service

(Arms slightly bent, palms up)

and My Health to Better Living

(Arms at sides)

For My Club, My Community, My Country, and My World

MISSISSIPPI STATE UNIVERSITY
EXTENSION

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