



Engineering Adventure

Plan 3

TK-3RD GRADE

READING TIME READ MOON BASKETBALL

(10-15 min)

Read the story and lead a class discussion.

Ask: **What did Sally want to do?**Example: **She wanted to dunk a basketball but couldn't jump high enough.**Ask: **What things did Sally use for her adventure?**Example: **Plastic bottles, gloves, a box.**Ask: **How was being on the moon different from being on Earth?** Example: **Sally could jump up really high, just like astronauts!**Say: **Sally's creative adventure teaches us that we can solve problems (like her being unable to dunk a basketball) through creative thinking and imagination! Talk about a time you did something similar!**

GAME TIME

(30 min)

Materials:

- Chalk
- Beanbag or something else



PLAY SPACESHIP HOPSCOTCH

Ask: **What do you think a spaceship looks like?**Say: **Engineers imagine, build, and check spaceships carefully so astronauts can travel safely. They can also build rovers like Curiosity.**

How to play:

1. Take the students out to an area where they can use chalk.
2. Let them pair up with friends, or make their own space-themed hopscotch patterns, like a spaceship, rocket, rover or anything else they think of.
3. When the students have completed their hopscotch patterns, invite them to try each other's hopscotch patterns!
4. Next, the STEM Coach writes numbers on the hopscotch patterns, or draws a new one with numbers 1-10. Review odd and even numbers with your students.
5. Students throw a beanbag or something similar onto the pattern two times. They add the numbers. If the answer is an odd number, they must hop through the pattern on one foot. If the answer is an even number, they can jump through with both feet.
6. Add a twist: If the answer is 10, the student has to try jumping through the pattern backwards!

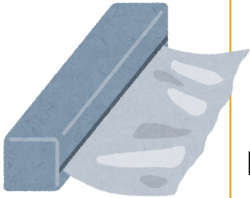


STEM CRAFT MAKE TIN FOIL IMPRESSION ART

(40 min)

Materials:

- Tin foil
- Cardstock
- Scissors



Ask: **What do spaceships look like? What do you think they are made of?**
Call on student volunteers to share their ideas.

Ask: **Have you ever noticed something shiny and silver on a spaceship?**

Example: **Yes, like kitchen foil!**

Explain: **The foil used on a spacecraft helps protect it from the blazing heat of the Sun and the freezing cold of space. One important quality of this space foil is that it is bendy. Engineers can fold it, wrap it, and shape it around different parts of the spacecraft. Today, we will use foil with that same bendy quality to create our own art!**

Instructions:

1. Students get a piece of cardstock paper and wrap foil around it
2. They take a pencil (not too sharp) as a stylus, they start etching a picture related to space or engineering directly into the foil. They can make a space ship, a robot, a rover, an astronaut, an engineer, a machine, write their name or a message, or anything else they like.

Say: **Different metals have their own special qualities. Engineers pay attention these qualities, like what materials are bendy.** Explain: **Tin foil (aluminum foil) is a special material because it is soft and easy to shape. You can press, scratch, or etch designs into it without breaking it.**

PUZZLE TIME PLAY A MATCHING GAME

(20 -30 min)

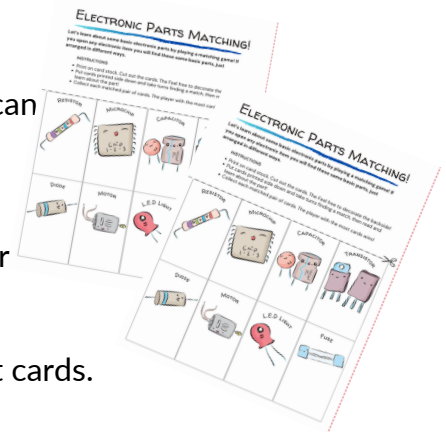
Materials:

- Matching cards
- Scissors

Say: **Engineers need to remember lots of important details. Today we get to play a game where we do the same.**

What you'll do:

- Students cut out the cards. Older students can help younger students.
- They place the cards face down. They can decorate them if they like.
- In pairs, they take turns turning over two cards. Remember where the cards are. Keep the matching pair.
- At the end, count and see who has the most cards. He or she will be the winner!

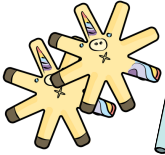


STEM TIME

(60 min)

Materials:

- Barbs
- Straws



BUILD AN INVENTION WITH BARBS

Say: **Just like Sally in the story, engineers use their imagination to dream up ways to solve a problem. Today, you get to use building barbs and straws to create your own spaceship—or anything you can imagine. You will plan, test, and improve your designs as you go. Engineers know that making something strong takes time, creativity, and careful thinking.**

What you'll do:

- Students get straws and building barbs to invent their own creations. Show students how to attach the barbs if they need help. Students can cut the straw if they need to.
- Students have fun creatively making their inventions! You may be surprised at the amazing things they come up with. They can draw their creation if they like.
- Ask each student or team to share their invention with the class and talk about it. Take apart the building barbs and pack away for another day.

ENGINEERING CHALLENGE

(60 min)

Materials:

- Paper/cardboard
- Crayons or markers
- Rocks



ROCK HUNT NATURE WALK + MAKE A ROCK PUZZLE

What you'll do:

Say: **Engineers need to understand how things fit together and they spend a lot of time sorting things into piles and studying them. Let's go outside and look for rocks!**

- Take students outside to go on a rock scavenger hunt! Look around school to see if you can find any rocks. You can also use the rock samples provided.
- Each group gets a few rocks and a piece of paper or cardboard. Say: **Look at your rocks carefully. Do any of them have flat sides?**
- Students work in groups to arrange their group's rocks in a puzzle and trace an outline of the rocks.
- Then, they remove the rocks and swap puzzles with the other group/s.
- Students spend time puzzling over the rocks and rotating them to see how they will fit in the outlines.
- Say: **When you rotated the rocks to help them fit in the puzzle, you were problem-solving just like engineers!**

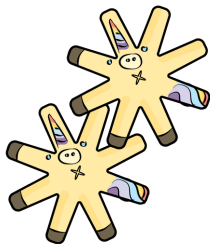




STEM STORY

GAME TIME

BUILD WITH BARBS



MAKE A ROCK PUZZLE

METRIC

K-2-ETS1-1.

Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Reading Foundation 3.2 Participating in Read-Aloud Activities

Engage in read-aloud activities with English- language books and communicate about the content of the books.

Foundation 1.7 Gross Motor Manipulative Skills

Show gross motor manipulative skills that involve using arms, hands, and feet to interact with objects.

Mathematics Foundation 2.3 Solving Addition and Subtraction Problems

Solve addition and subtraction problems with a larger number of objects (sums up to 10) in the context of everyday situations.

Foundation 1.7 Gross Motor Manipulative Skills

Show gross motor manipulative skills that involve using arms, hands, and feet to interact with objects.

Math Foundation 4.6 Mental Rotation

Rotate, flip, or slide objects to solve a problem without relying as much on physical trial and error (for example, rotate an object before fitting it into a hole).

Visual Arts Foundation 3.1 Engaging in Drama + Foundation 3.5

Engaging in Role-Play

Engage in extended and flexible pretend play scenarios, by themselves or with others, acting out scripts, some of which are familiar or reflect home and community cultural experiences and some of which are new.

Engages in role-play (representing a person, animal, or character) using a wider range of voices, movements, and gestures.

K-2-ETS1-2. + K-2-ETS1-1.

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.

Math Foundation 4.6 Mental Rotation

Rotate, flip, or slide objects to solve a problem without relying as much on physical trial and error (for example, rotate an object before fitting it into a hole).