

Unit 10

Blast Off Into Space

A bright yellow starburst graphic with multiple sharp points, containing the text "PK4" in bold black letters.

PK4





Unit 10

Blast Off Into Space



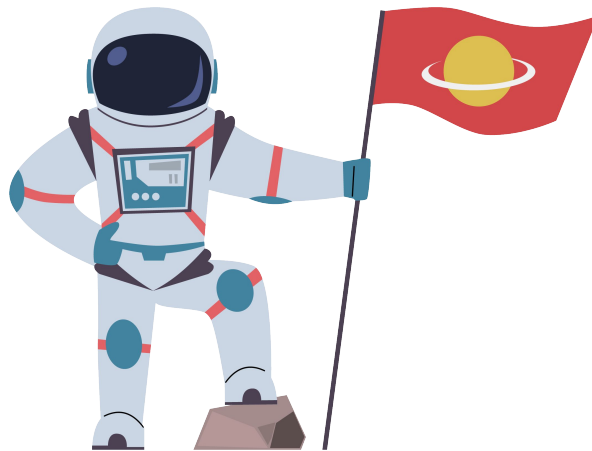
©2021

All rights reserved. Without limiting the rights under the copyright reserved below, no part of this publication may be reproduced, stored in, or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without prior written permission.

AppleTree Institute for Education Innovation
1801 Mississippi Ave SE, 3rd Floor
Washington, DC 20020

Copyright ©2021 Text and Illustrations. AppleTree Institute. All Rights Reserved

PK4 Unit 10 Overview



Dear Families,

Welcome to Unit 10, Blast Off Into Space! In this unit your child will learn about the moon, things found in space, astronauts, gravity, shadows, and reflections.

Unit 10 Books



- [Counting to 20 in Space](#) by Beryl Salinger Schmitt
- [Space](#) by Cathryn O'Sullivan
- [Sam the Astronaut](#) by Felicia R. Truong
- [My Grandma's Cats](#) by Beryl Salinger Schmitt

Pre-recorded readings of all books are also available on the Sparkler app in the “Tips for Adults” section, Blast Off Into Space!

ECR@Home Activities will include making the solar system, learning about gravity, the moon's phases, and daytime and nighttime. Your child will learn the letters Q, M, B, S, O, P, U, and Y, identify and write numbers 0-10, add two sets together, blend sounds to make words, and learn about friendship. You can incorporate these activities throughout your day by observing and drawing how the moon looks each night, going on a number scavenger hunt, and writing the numbers found when doing errands or taking a walk.

Unit 10 Vocabulary

astronaut

gravity

moon

planet

reflection

shadow

space

Sun

Week 1

PK4 Unit 10 Week 1 Overview

The Night Sky

This week your child will:

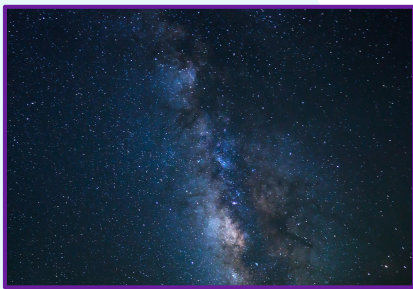
Learn about the moon's phases, craters, and day and night. They will identify and write numbers 0-10, talk about friendship, learn the letters Q and M, and blend two sounds to make a word. To extend these activities, talk about how the sky looks at different times of the day and count objects like forks as you set the table and write the number you have counted. Save your child's work, like the moon and constellations, so you can use it when playing together in Week 3.

Key Vocabulary



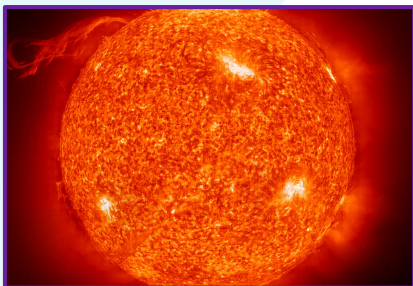
moon

a round object that orbits around a planet. Earth has one Moon which you can see shining in the sky at night



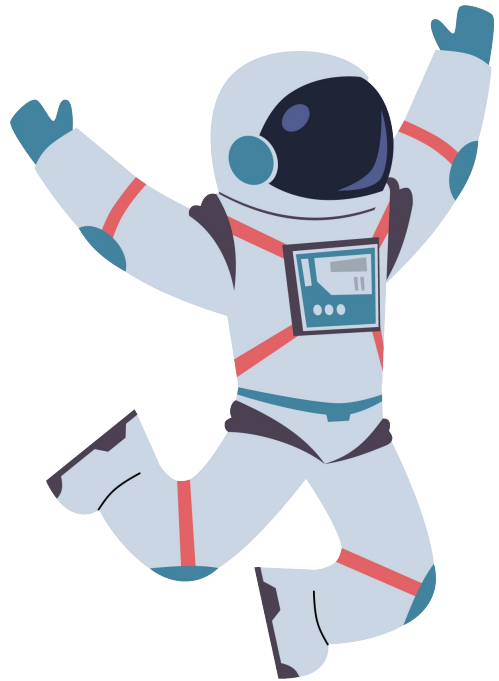
space

the area beyond the earth where the stars and planets are



Sun

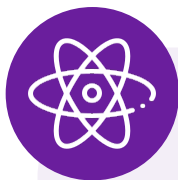
a star that we can see during the day that gives us light and heat



Create Connections

This week you will learn about daytime and nighttime. Before you begin the packet, draw a picture of what the sky looks like during your favorite time of day.

**Think
About It!**



STEM: Name a Number (0-5)

MATERIALS: help your child to write each number from 0-5 on small pieces of paper and make 2 number cards for each number

- Create two sets of number cards 0-5. Give your child one set and keep the other.
- Show a number card. Ask your child to say the number. Have them find the same number card from their set.
- Switch roles. Have your child show the card. You say the number and find it.
- If your child can identify 0-5, add higher numbers to the set.

Save the number cards for later in the unit.



Independent Learning: Painting the Night Sky

MATERIALS: watercolor palette or crayons, paper, *optional* - decorative items like glue, salt, glitter, or foil for tiny stars, cotton balls for clouds, etc.

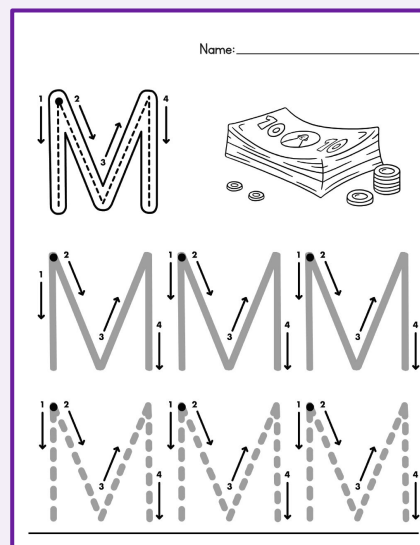
- Talk with your child about what they like to see in the sky at night. You can look at pictures on a tablet or phone.
- Allow your child to paint a picture of the night sky. They can place droplets of glue and sprinkle salt for stars or add cotton for clouds.
- After, ask, **Tell me about your night sky! What did you put in your picture?**



Literacy: Letter M

MATERIALS: [Letter M Practice 2](#)

- **Make an M by writing down, slant down, slant up, down.** Have your child say the letter M and make the letter sound.
- Your child can trace the M with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “m.” Use words like monkey, man, map, magic, etc. Switch roles so your child can suggest words.
- Go for a walk and see how many uppercase M’s you can find on signs and license plates in your neighborhood.
- *Optional - practice writing with other materials.*

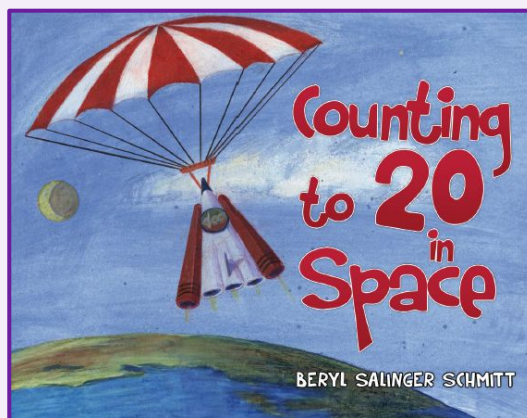


Read: *Counting to 20 in Space*

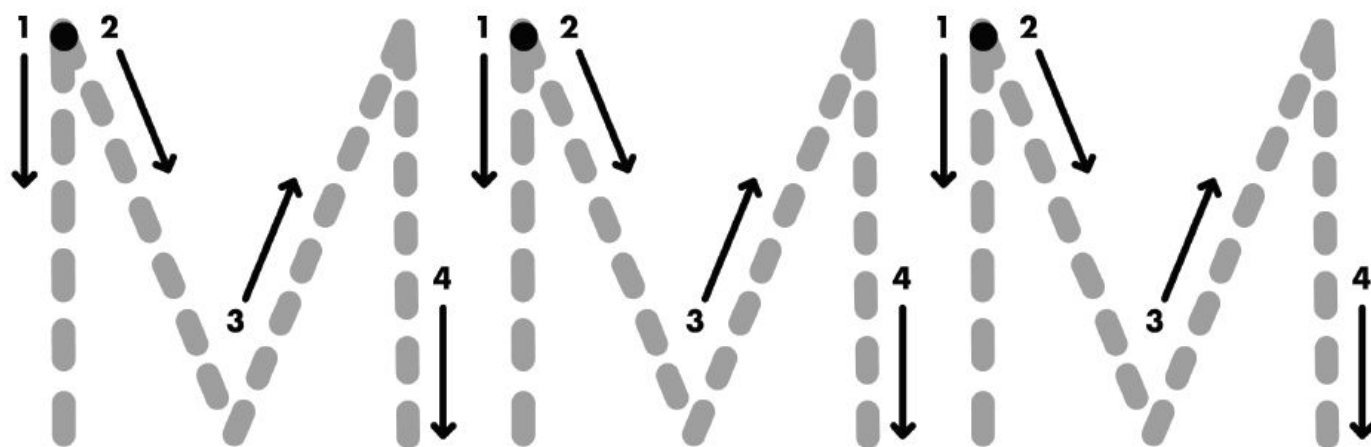
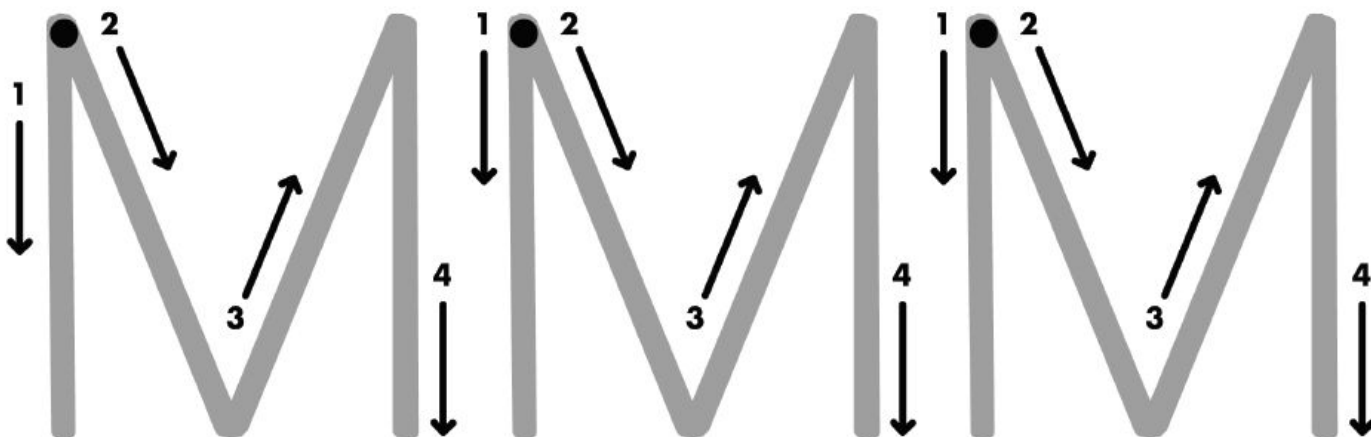
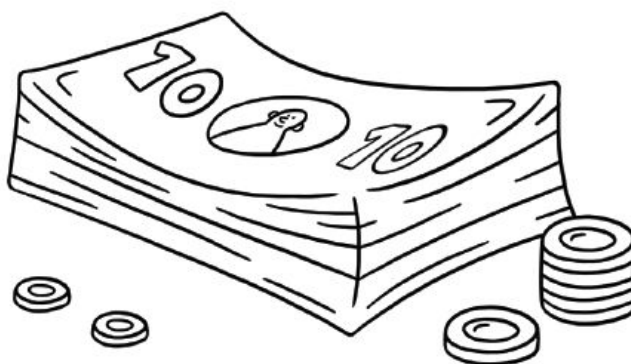
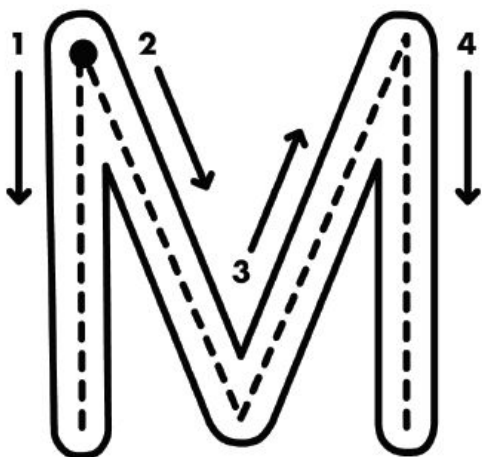
MATERIALS: [Counting to 20 in Space](#)

- Read the book with your child.
- Ask, **What would you like to see if you went to space?**

You can also access a pre-recorded reading of this book on the Spakler app in the “Tips for Adults” section, Blast Off Into Space!

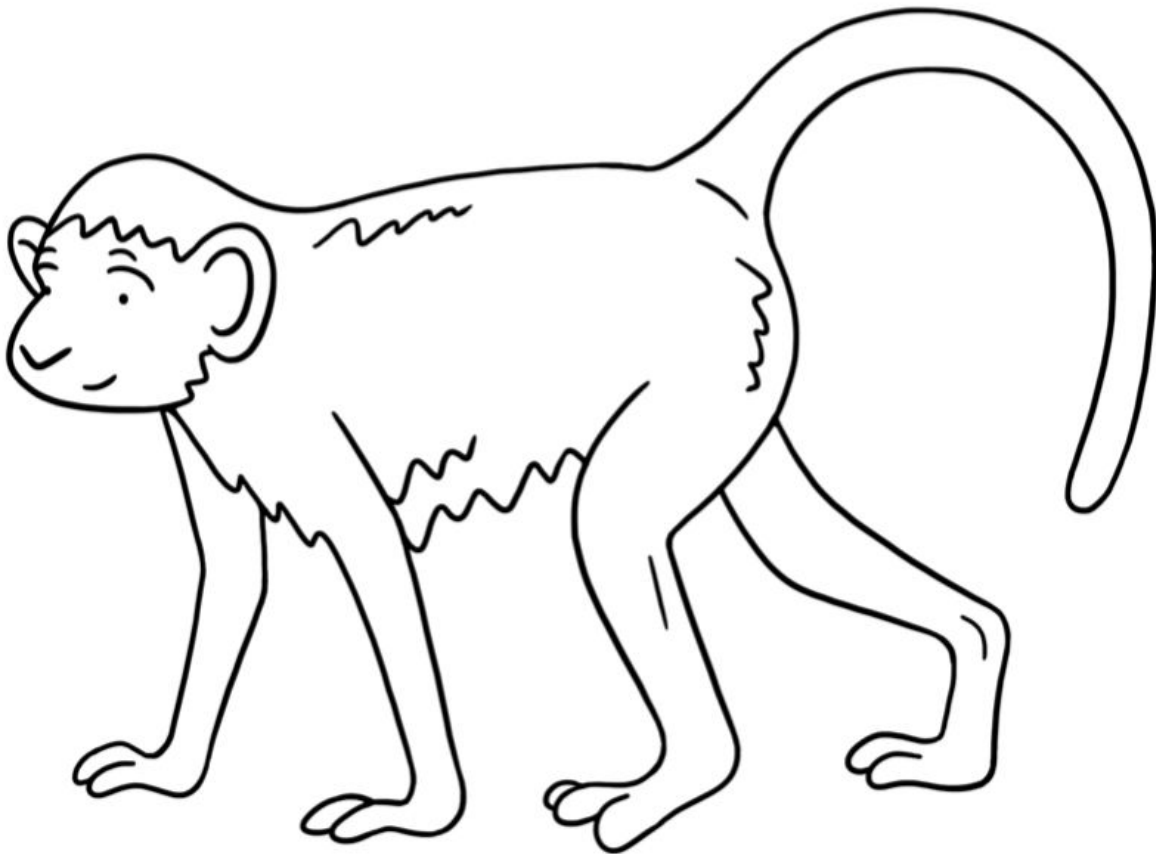


Name: _____

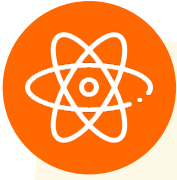




Milk



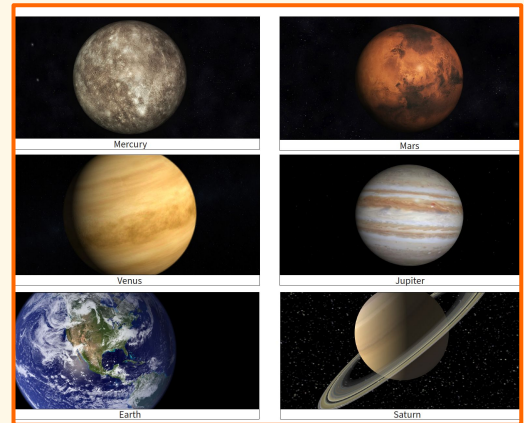
Monkey



STEM: The Moon

MATERIALS: [Solar System](#), [Moon](#), flashlight or phone app with flashlight, ball or crumpled paper in a ball shape or round fruit

- With your child, look at pictures of the moon. Describe each of the phases.
- Go into a dark room. Use a flashlight and ball to show why the moon changes size. Have your child hold the ball. Shine a flashlight on the ball and move the flashlight.
- Ask, **What do you notice?** Explain, **You can see different parts of the moon depending on where the light is shining.**

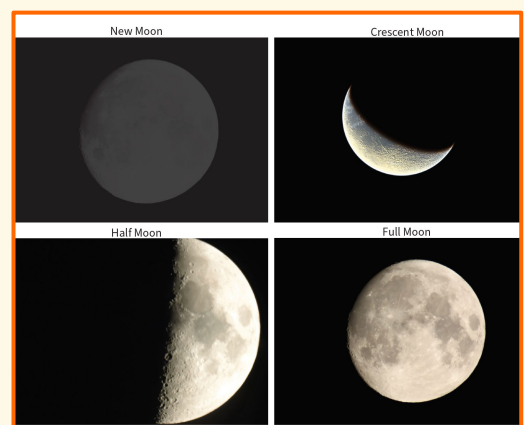


Independent Learning: Making the Moon

MATERIALS: [Moon](#), watercolor palette, foil or paper, child-safe scissors, *optional - string, a stick or hanger*

- Talk about the phases of the moon. Say, **Let's make the moon using foil (or paper). Which phase do you want to make?** Encourage your child to add craters using paint.
- Say, **Tell me about your moon. Which phase did you pick?**
- *Optional - Add stars using foil. Hang the moon and stars from a stick or hanger using string.*

Save the moon for use when you play together in the Air and Space Museum in Week 3.





Literacy: Blending 2 Sounds

MATERIALS: 2 pebbles or cotton balls, [Phoneme Box](#) cut along the horizontal line (use the part with 2 boxes today)

- **Let's blend or put sounds together to make a word!**
- **l-t**, place a pebble in each box from left to right as you say each sound. Point to each box as you blend and say it. **l-t, it!**
- Repeat for a-t (at) and o-t (ot).

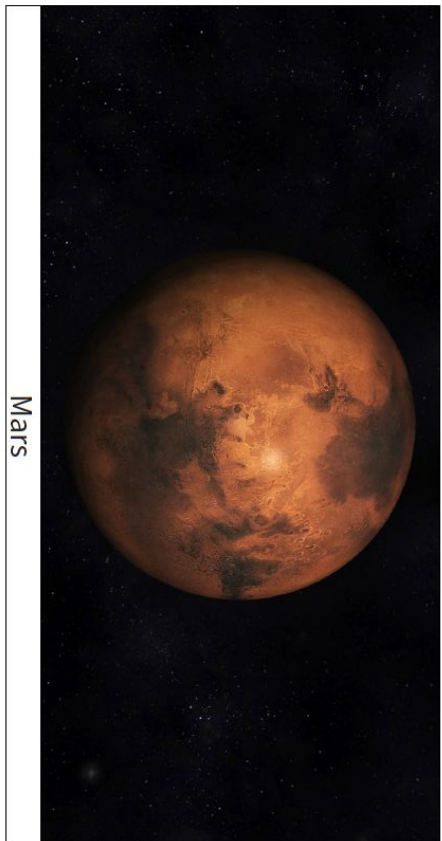
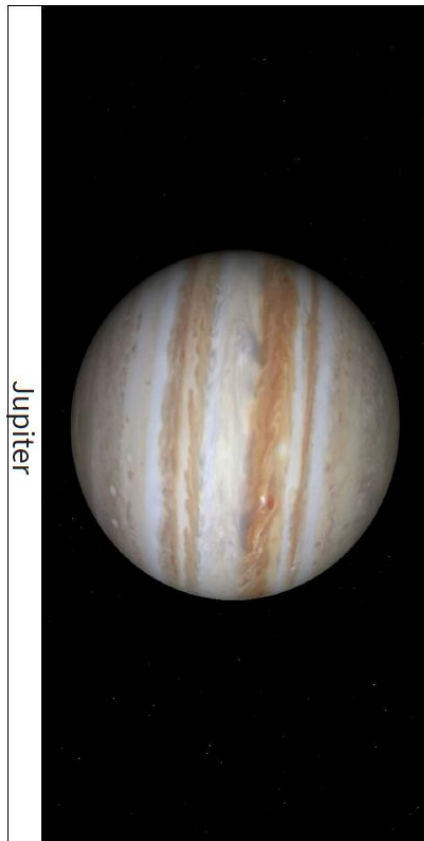
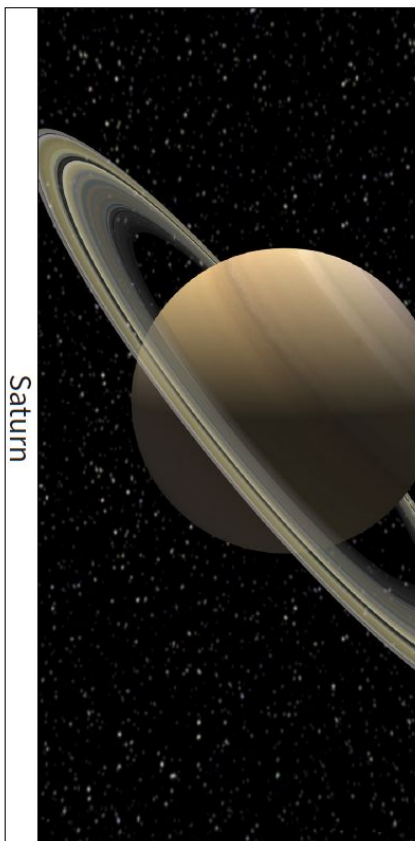
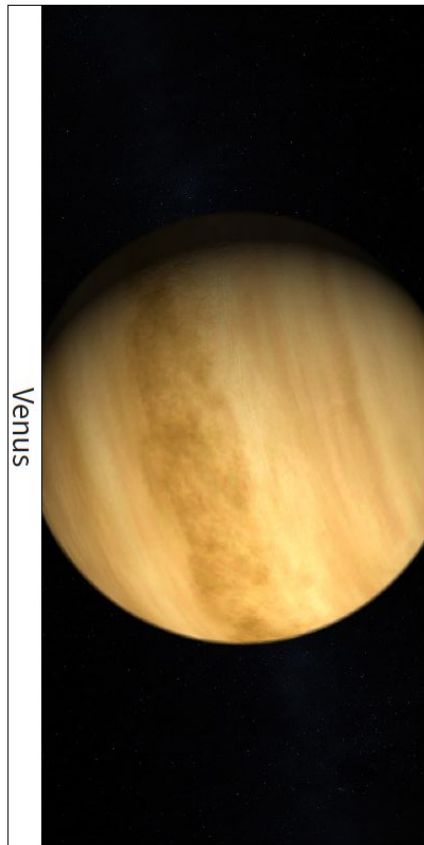
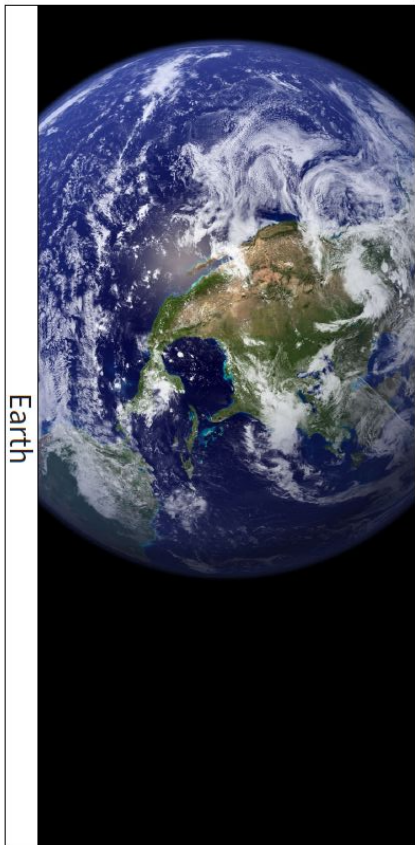
Save the objects and boxes for use throughout the unit.

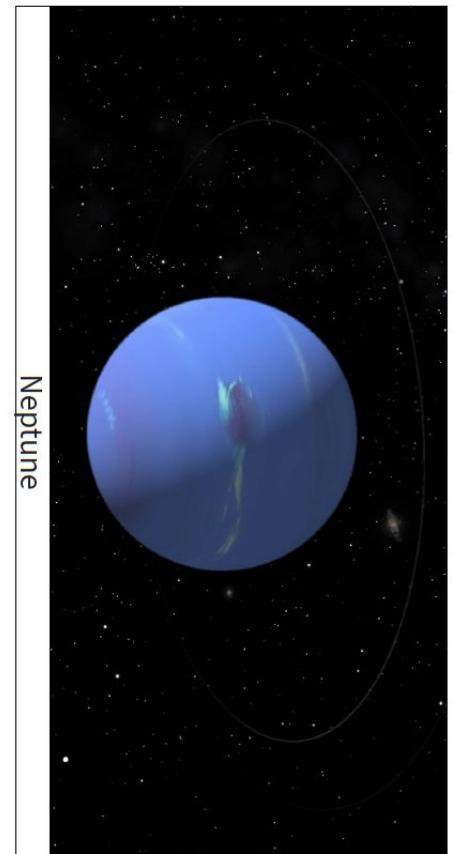
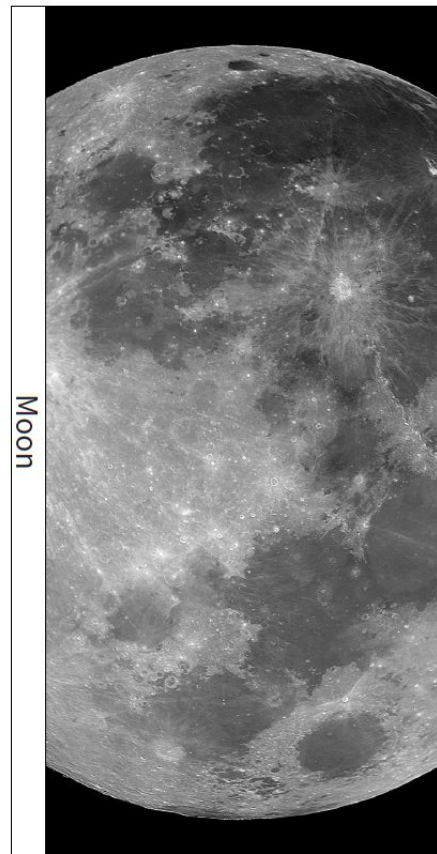
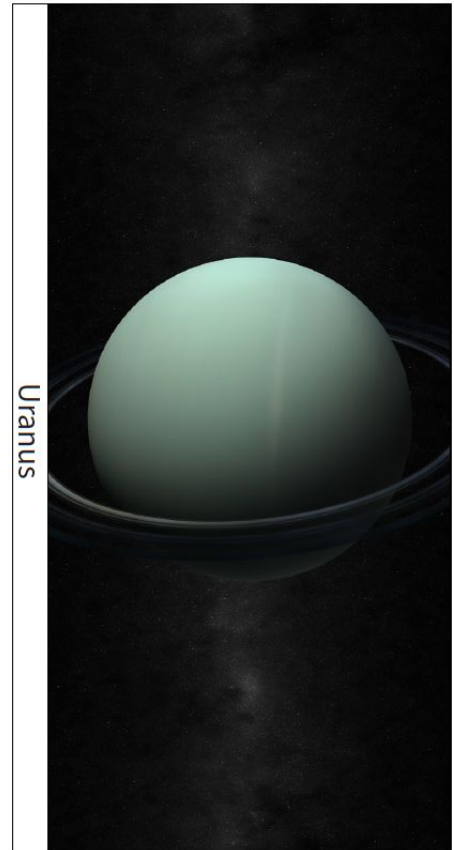
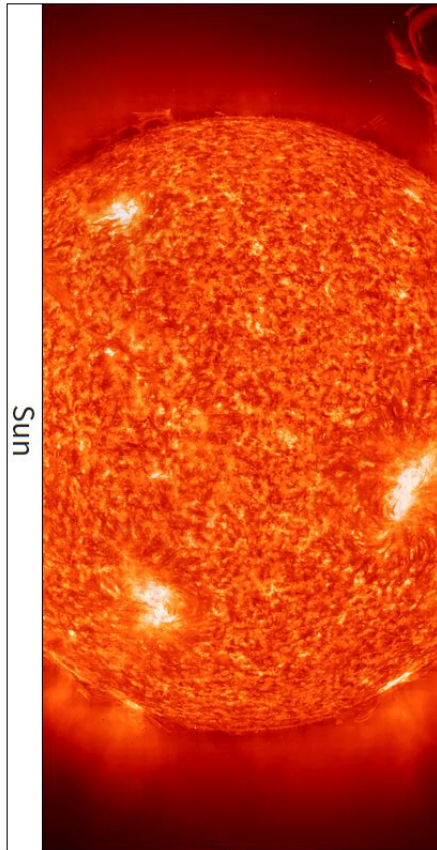
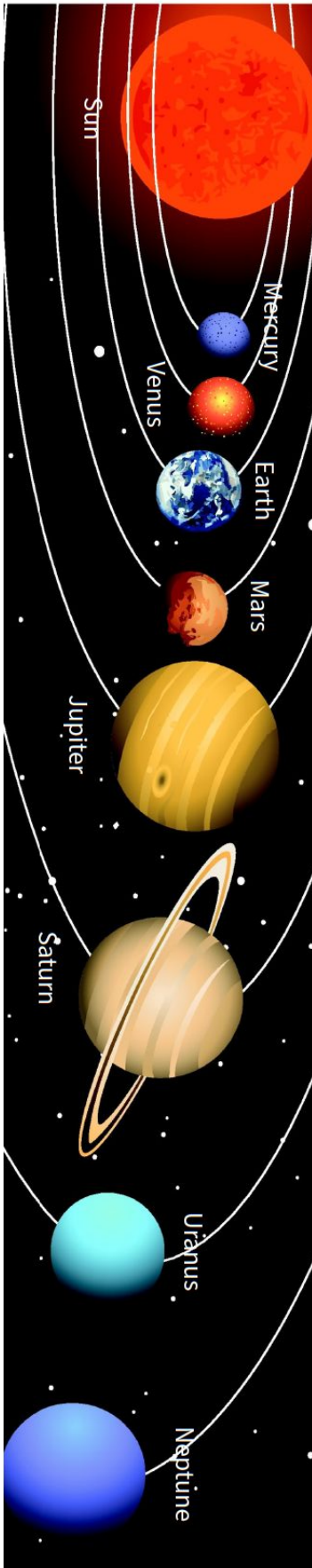


Journal Prompt: Moon and Sun

MATERIALS: crayons, pencil, Moon and Sun Journal Page

- With your child, talk about the moon and the Sun and which one they prefer or like more.
- Have your child write and draw about it.
- Ask, **Which do you prefer, the moon or the sun? Why do you prefer the ____?**







Half Moon



New Moon



Full Moon



Crescent Moon

--	--

--	--	--

Name: _____

Do you prefer the moon or the sun? Why?



STEM: Add It Up

MATERIALS: counters in 2 different colors, e.g., 4 red paper squares and 4 blue paper squares

- **Let's add 2 sets together to see how many we have in all.**
- Place 2 red items and 3 blue items in a row, so they are easy to count as you touch each one. **1, 2, 3, 4, 5. I have 5 paper squares in all.**
- Continue making sets that total no more than 5 for your child to add (e.g., 3 red paper squares and 1 blue paper squares, 1 red square and 4 blue squares).
- Increase the number of items for a greater challenge

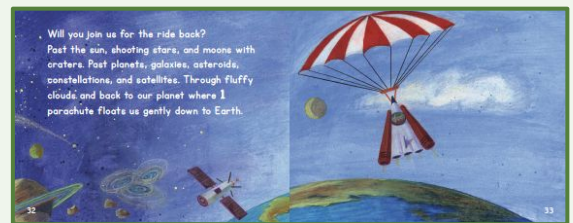
Save the items for use throughout the unit.



Independent Learning: Parachute

MATERIALS: [*Counting to 20 in Space*](#), lightweight object that will not break when dropped, like a toy or ball, paper, crayons, cloth like a bandana, scarf, lightweight towel, mask

- Show pp.32-33 and say, **A parachute helps astronauts float slowly and safely down. The air pushes the parachute up, so it falls more slowly.**
- With your child, drop a toy and observe how fast it falls.
- Have your child design and draw a parachute.
- With your child, use a cloth to make a parachute based on their design. Drop the toy again.
- Together, talk about how the toy fell with and without the parachute.

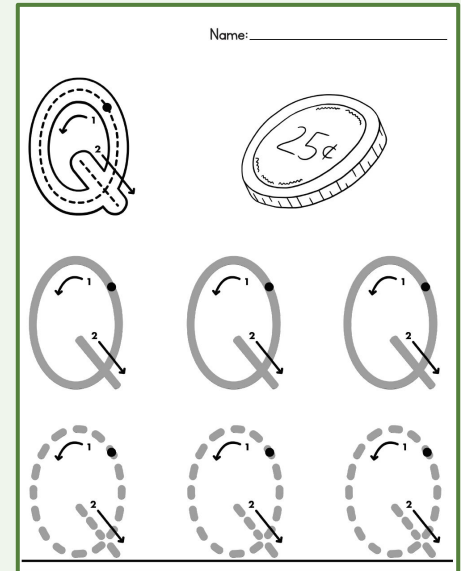




Literacy: Letter Q

MATERIALS: [Letter Q Practice](#)

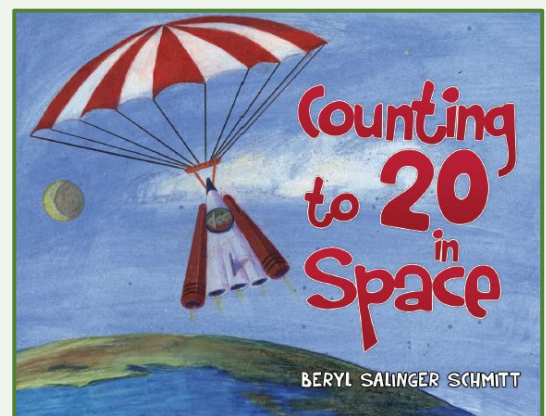
- **Make a Q by writing curve, slant down.** Have your child say the letter Q and make the letter sound.
- Your child can trace the Q with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “q.” Use words like queen, quail, quick, quarter, etc. Switch roles so your child can suggest words.
- Pick a favorite book and see how many uppercase Q’s you can find in it together.
- *Optional - practice writing with other materials.*



Read: *Counting to 20 in Space*

MATERIALS: [Counting to 20 in Space](#)

- Read with your child. Encourage them to name the numbers 1-10.
- Ask, **Tell me two things from the story. Which one happened first?**



Wednesday

PK4 Unit 10 Week 1 Day 3



Let's Move: Blast Off to the Number

MATERIALS: number cards from 0-10, *optional - music*

- Place the number cards randomly around the room.
- With your child, identify numbers 0-10. Say, **I will say a number and you will find it. Pretend to be a rocketship while you fly around the room!** Demonstrate.
- Take turns saying different numbers for you to find together.

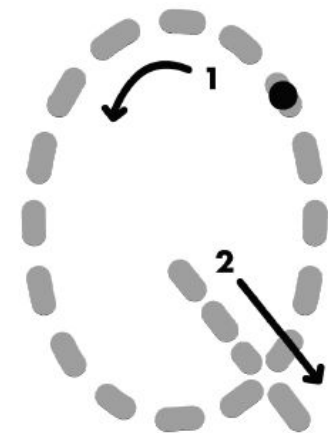
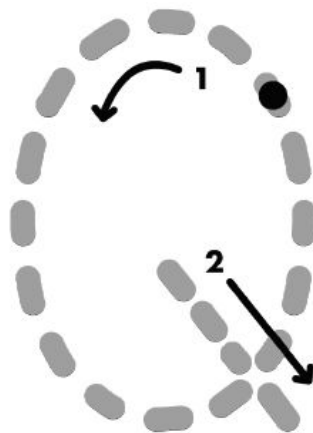
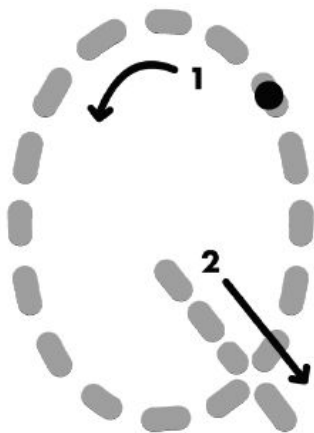
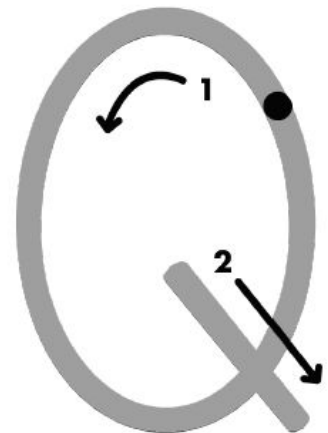
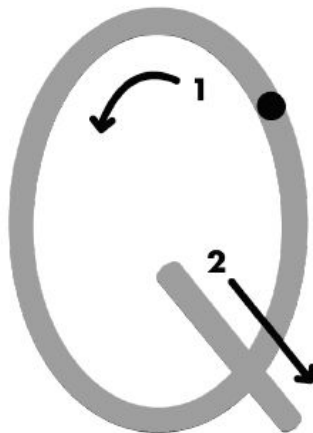
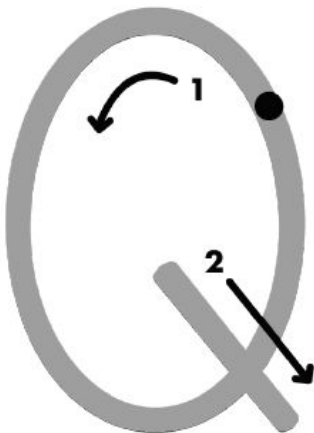
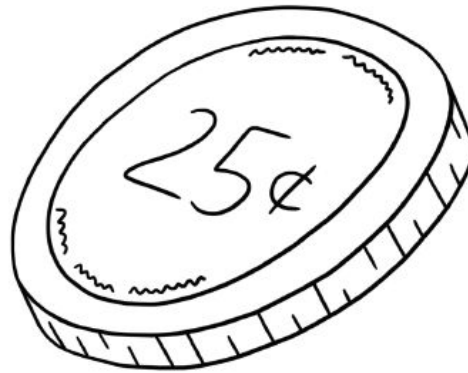
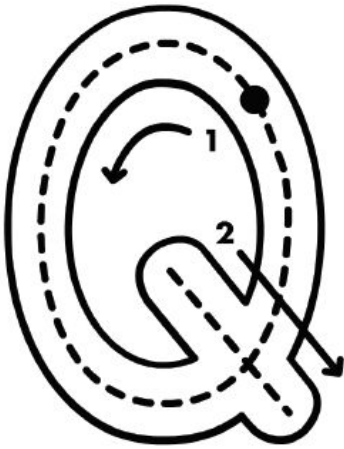


Learning Together: What is Friendship?

MATERIALS: paper, crayons or watercolor palette

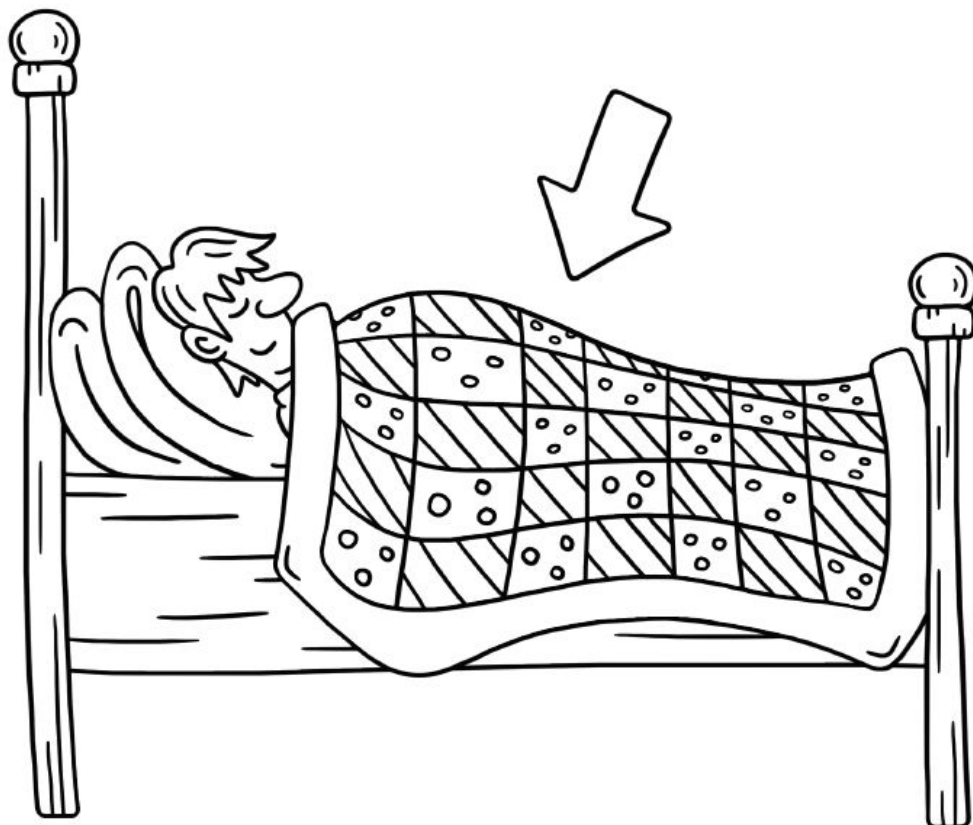
- Talk about friendship and how we can be a good friend.
- Have your child write and draw about friendship like sharing, helping, encouraging, being kind, etc.
- Display the picture and add to it as your child thinks of more examples.

Name: _____

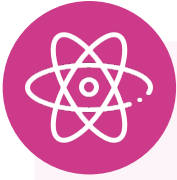




Queen



Quilt



STEM: Day and Night

MATERIALS: flashlight, ball

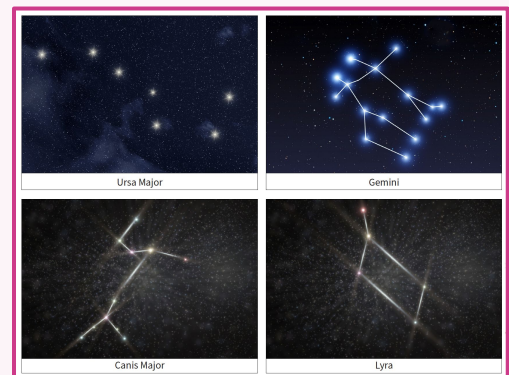
- **Pretend the ball is Earth and the light is the sun!** Have your child hold the light. **The sun shines on Earth in the day.** Talk about things you do during the day.
- Turn the ball a little. Say, **Now the light is on a different part of Earth. That's what happens at night.** Together, talk about things you do at night.



Independent Learning: Designs in the Stars

MATERIALS: [Constellations](#), paper, watercolor palette, *optional - black paper, glue, balled pieces of foil, pom-poms, or cotton balls, etc.*

- Look at the pictures of constellations with your child and talk about the patterns. **Constellations are groups of stars that make a pattern and have a name.**
- Have your child make a constellation by painting stars to make a pattern or design.
- *Optional - your child can add the foil, pom-poms or other items for stars.*



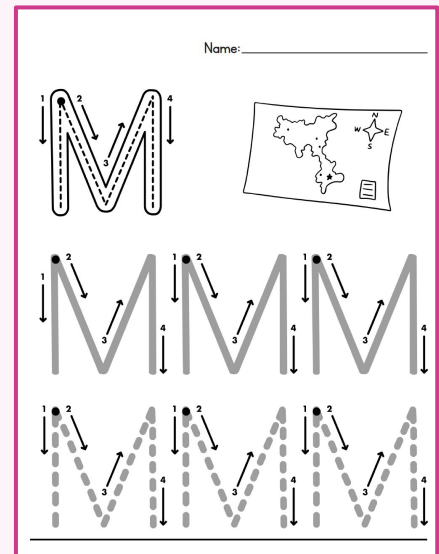
Save the picture for use when you play together in the Air and Space Museum in Week 3.



Literacy: Writing Letters M & Q

MATERIALS: M & Q, pencil, crayons

- Brainstorm words that start with the letters M and Q.
- Have your child trace the letters M and Q and color the pictures or draw and color their own.
- Ask, **What letters did you write? What words start with the same sound as map? What words start with the same sound as quarter?**



Journal Prompt: Daytime or Nighttime

MATERIALS: crayons, pencil, Daytime or Nighttime Journal Page

- With your child, talk about things you can do during the day (play, learn, eat lunch) and at night (look at the stars, read a story before bed, go to sleep).
- Have your child write and draw about it.
- Ask, **Do you like daytime or nighttime better? Why?**

Name: _____

Do you prefer daytime or nighttime? Why?

Canis Major



Ursa Major



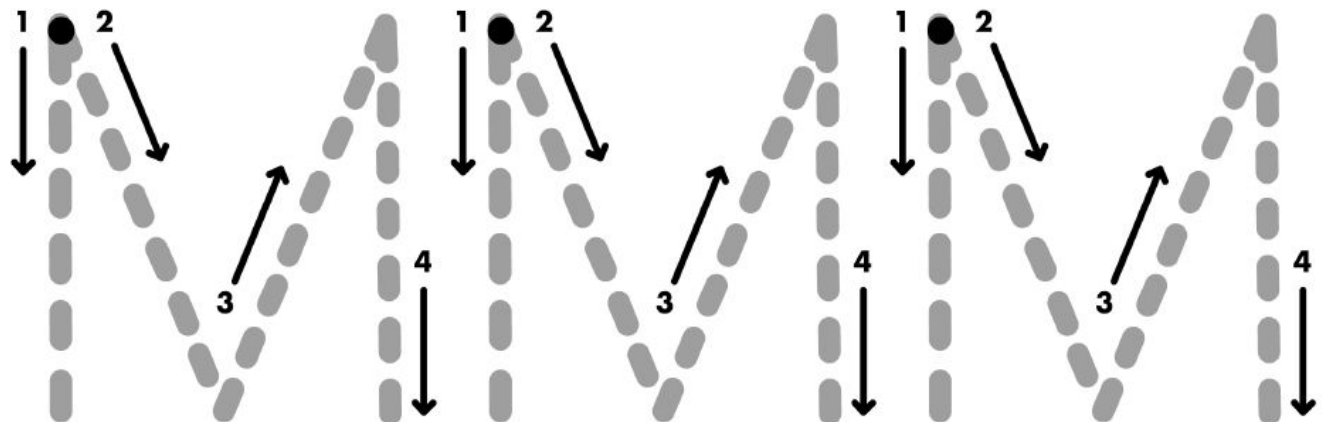
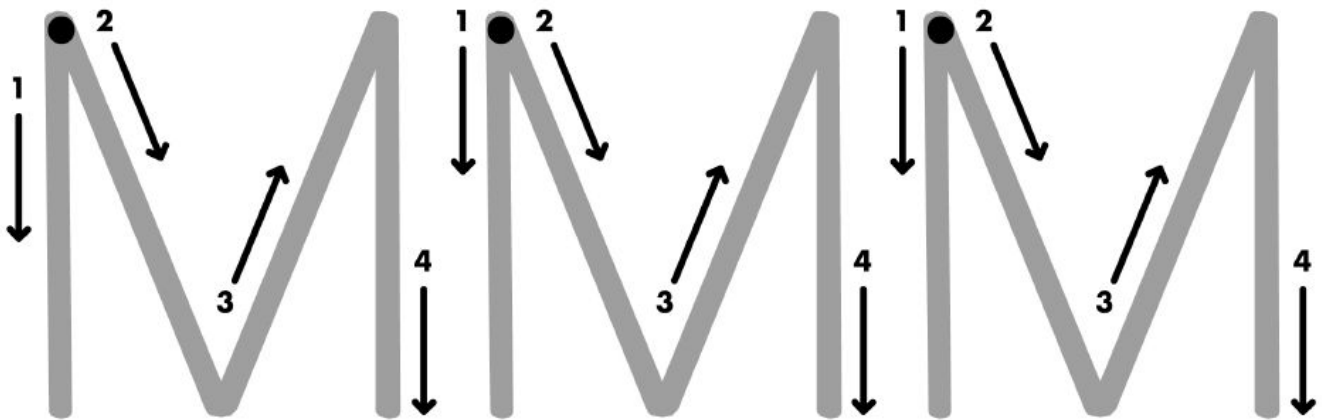
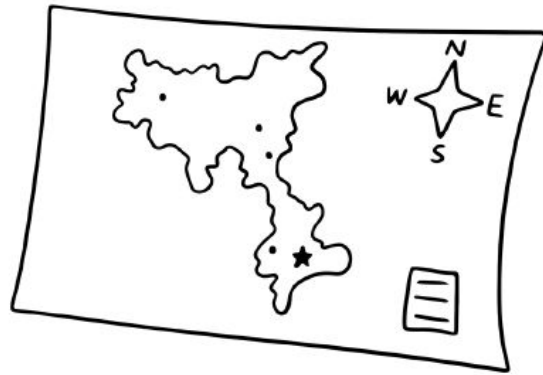
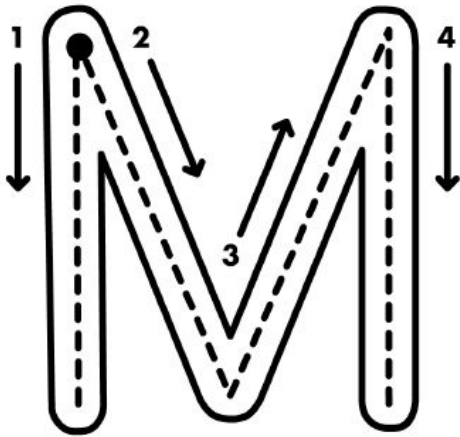
Lyra



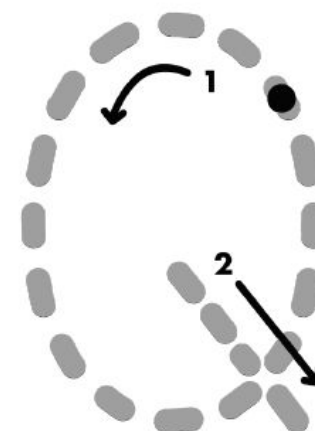
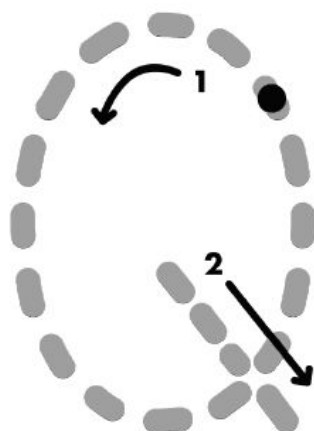
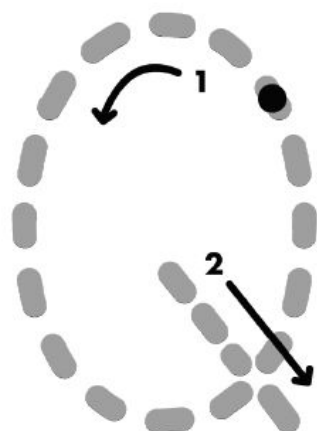
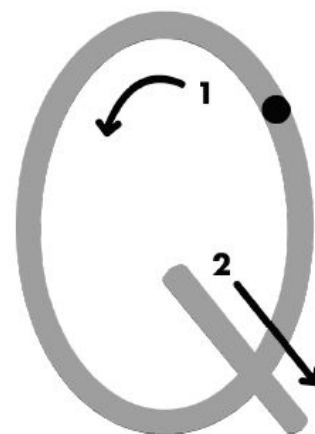
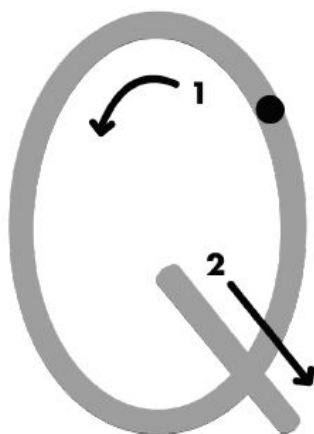
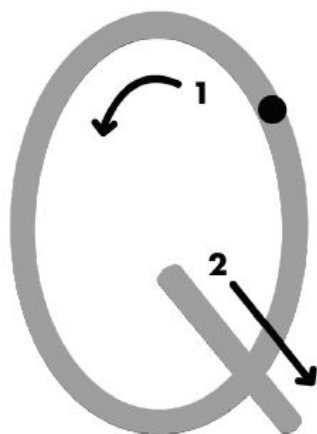
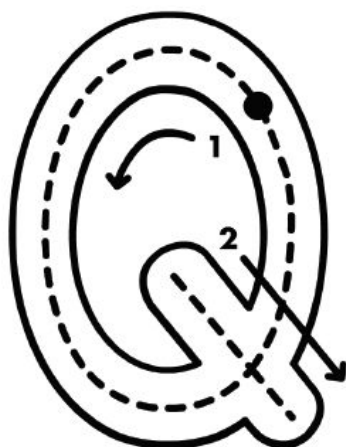
Gemini



Name: _____

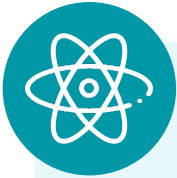


Name: _____



Name: _____

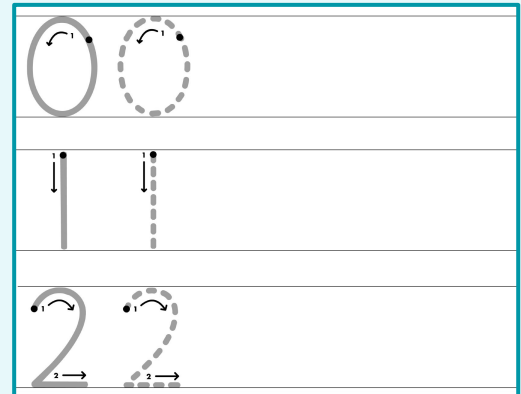
Do you prefer daytime or nighttime? Why?



STEM: Writing Numbers 0-5

MATERIALS: 0-5, crayons

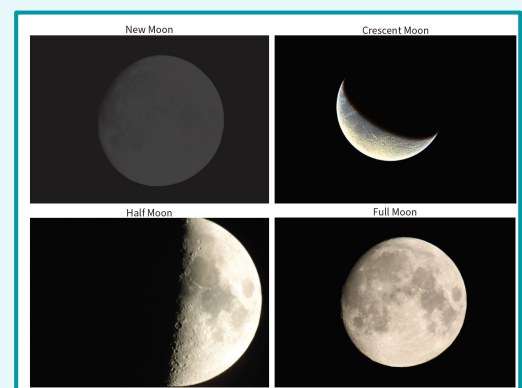
- Allow your child to trace and write the numbers. Have them say the number as they write them.



Independent Learning: Moon Craters

MATERIALS: Moon, paper, crayons, balls or balled-up socks of different sizes, a deep container, dirt or coffee grounds

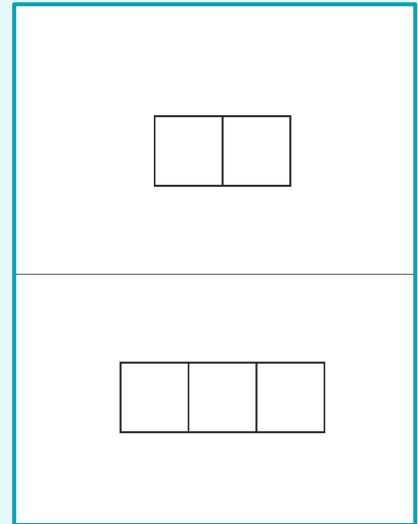
- Place dirt in a deep container.
- Together, look at pictures of craters on the moon. Say, **craters are made when large rocks, like meteors, hit the moon.**
- With your child, make craters by dropping balls in the dirt. Talk about what happens when you drop different size balls. Explore dropping them from different heights.
- Ask, **What did you notice about the craters? How did you make the largest crater?**





Literacy: Blending Two Sounds 2

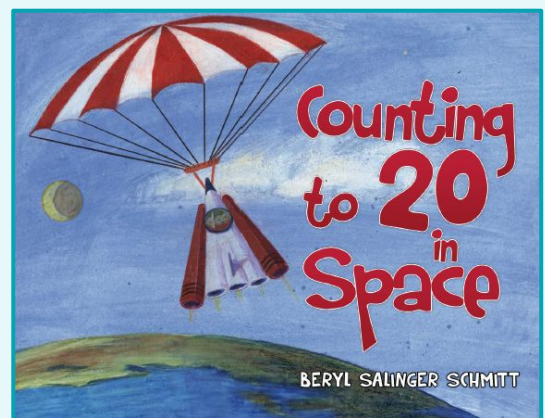
- Let's blend or put sounds together to make a word. Some words will be silly words!
- E-t. Blend the sounds together, e-t. Repeat e-t faster. Yes, e-t, et!
- Repeat for i-n (in) and i-p (ip).
- If your child needs help, use the Phoneme Box and objects from earlier in the week.

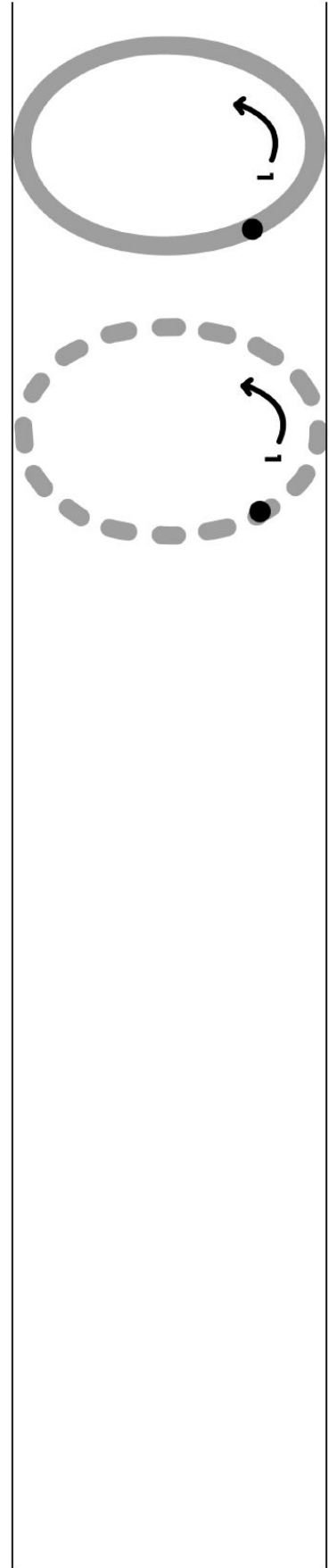
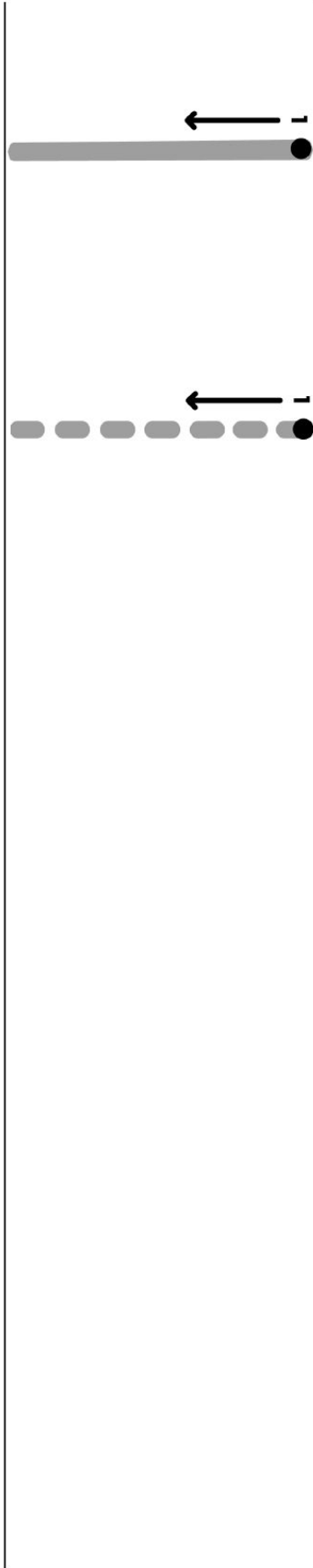
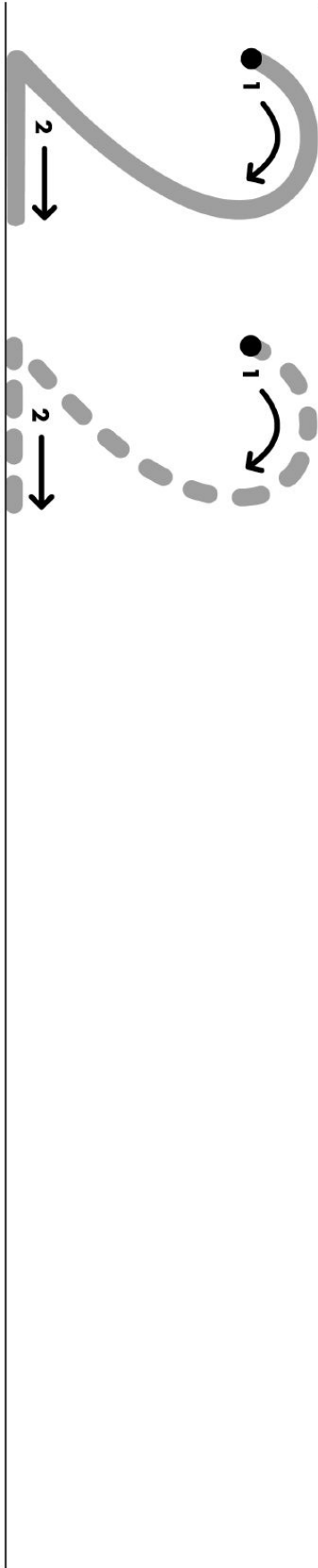


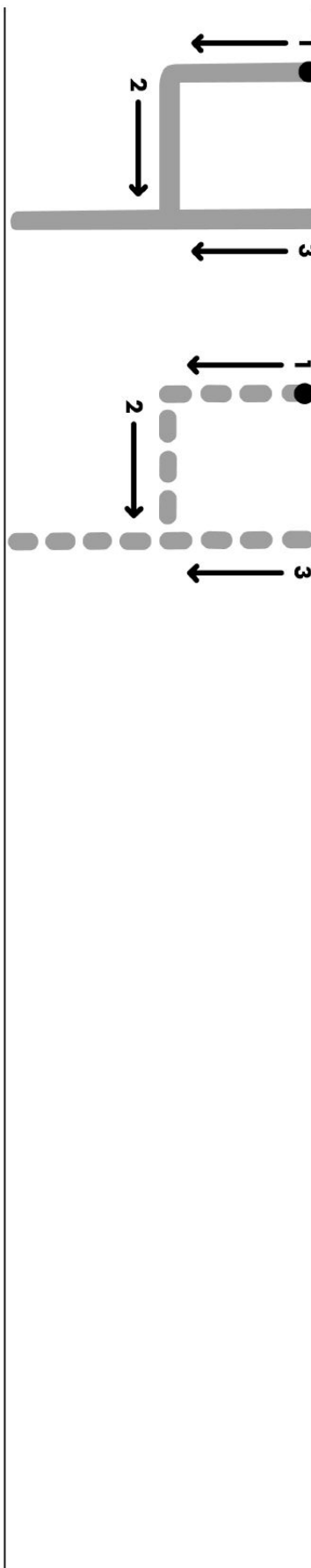
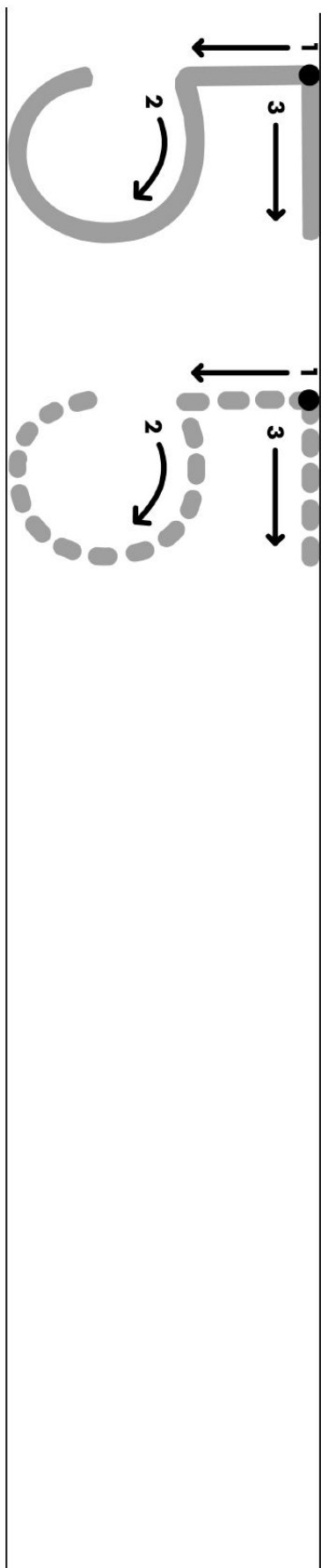
Read: *Counting to 20 in Space*

MATERIALS: [*Counting to 20 in Space*](#)

- Read the book with your child. Have them point out the numbers 1-10.
- Ask, **What do you think it would be like to travel to space?**







Week 2

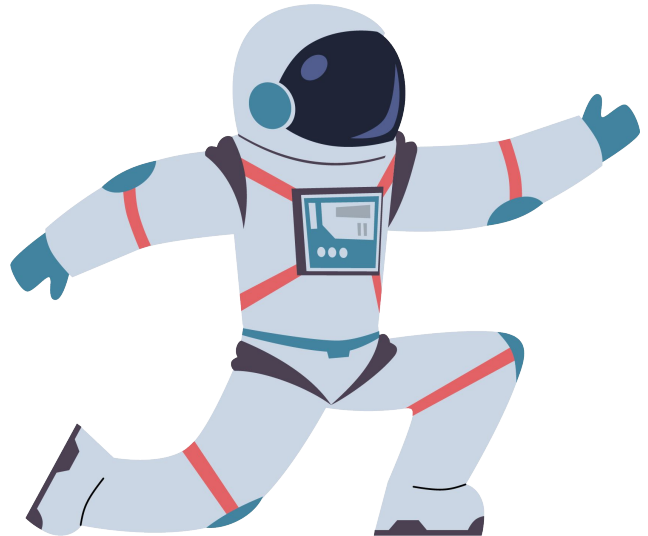
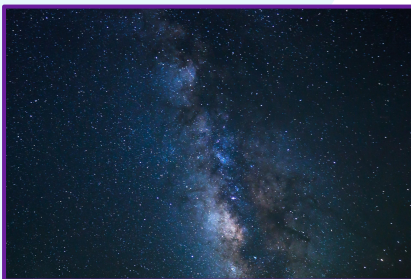
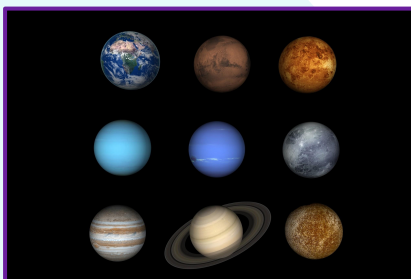
PK4 Unit 10 Week 2 Overview

Blast Off to Space

This week your child will:

Make the solar system. Your child will learn the letters B and S, talk about encouraging friends, add sets, and write numbers 6-10. Help your child learn about friendship by highlighting how they or another family member are good friends. Save your child's work, like the solar system, so that they can use it in Week 3.

Key Vocabulary



astronaut

someone who travels to and works in space

planet

a large round object in space that moves around a star, like the sun

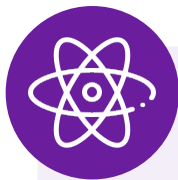
space

the area beyond the earth where the stars and planets are

Create Connections

This week, you will make the solar system with all of the planets, including planet Earth where we live. Before you begin the packet, write and draw about your favorite planet.

**Think
About It!**



STEM: Name the Number (6-10)

MATERIALS: paper, crayons

- Help your child make two sets of number cards 6-10. Give your child one set and keep the other.
- Show a number card. Ask your child to say the number and find the same number card from their set.
- Switch roles. Have your child show the card. You say the number and find it.
- If your child can identify 6-10, add a few higher numbers to the set.

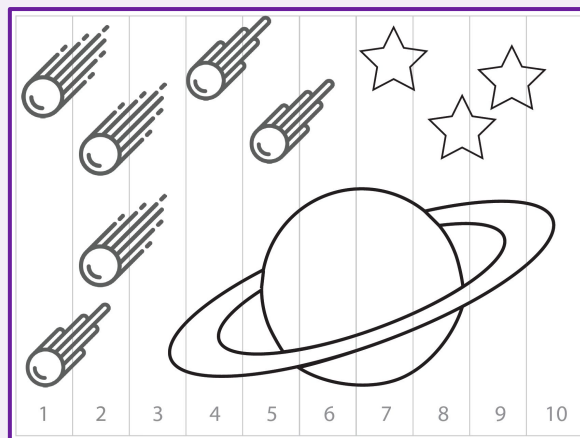
Save the number cards for later in the unit.



Independent Learning: Space Puzzle

MATERIALS: [Space Puzzle](#), crayons, child-safe scissors, *optional - glue the puzzle onto cardboard before coloring and cutting out*

- With your child, review the numbers at the bottom of the puzzle.
- Have them color the puzzle, cut it out, and then put the pieces in order from 1-10.
- Ask them to point to different numbers for practice.

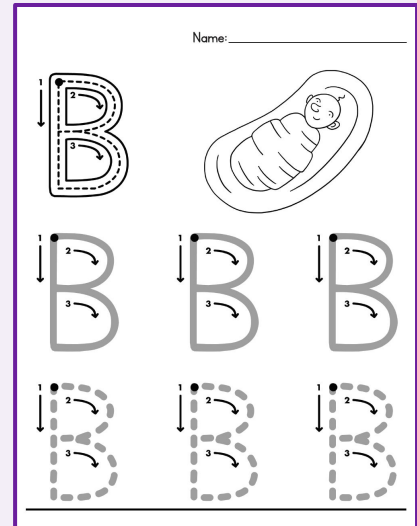




Literacy: Letter B

MATERIALS: [Letter B Practice 2](#)

- **Make a B by writing down, curve, curve.** Have your child say the letter B and make the letter sound .
- Your child can trace the B with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “b.” Use words like bee, baby, bottle, bat, etc. Switch roles so your child can suggest words.
- Together, look for B’s around your home on food labels, clothing tags, and in books.
- *Optional - practice writing with other materials.*

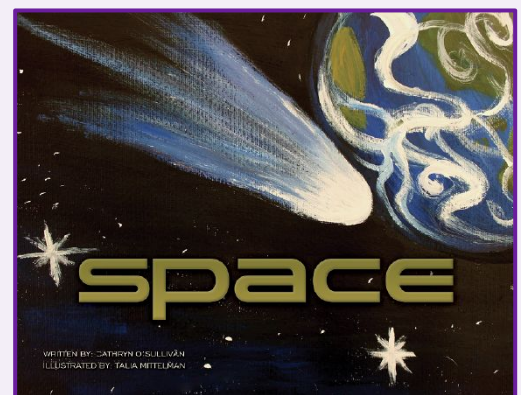


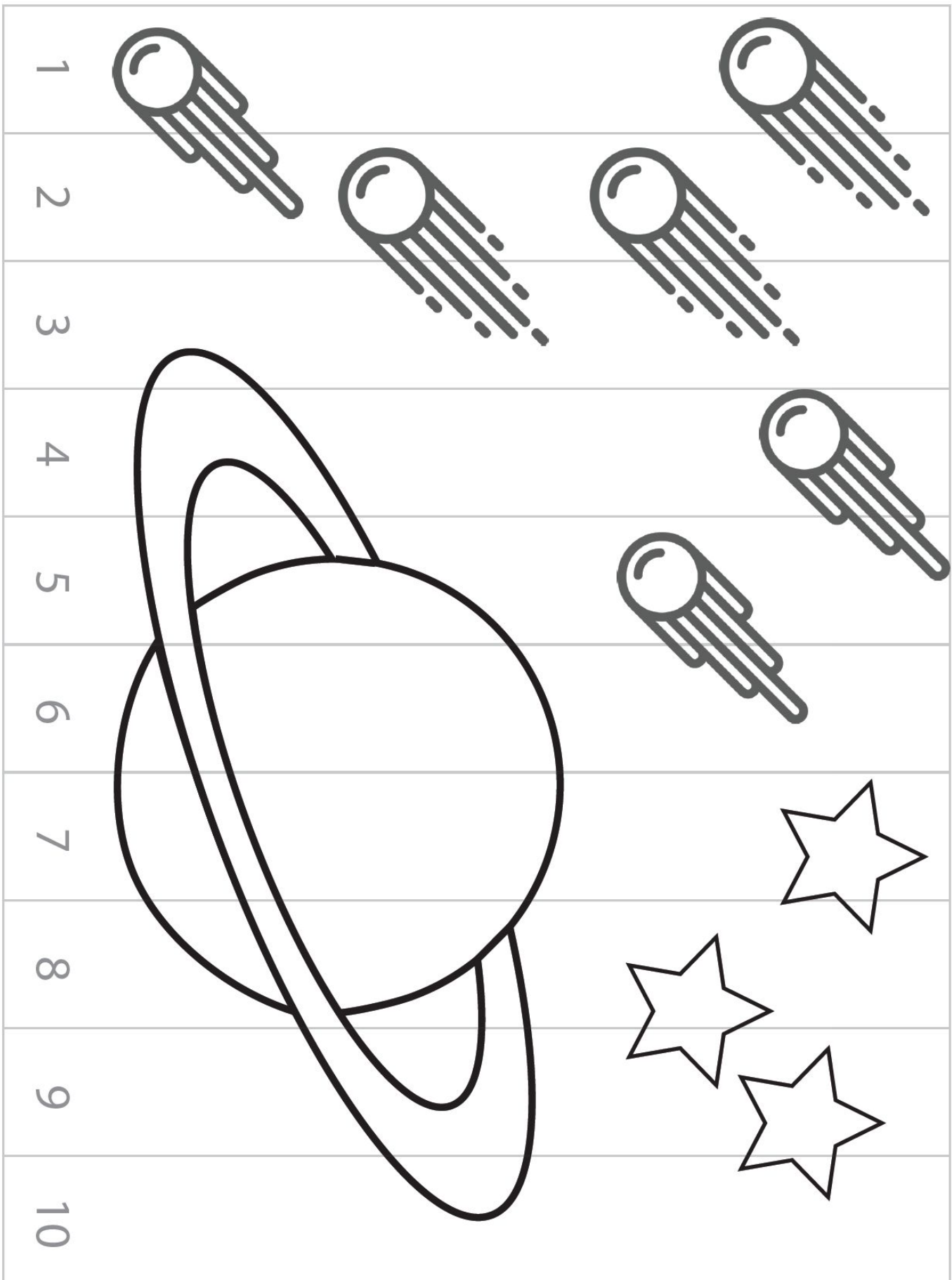
Read: Space

MATERIALS: [Space](#)

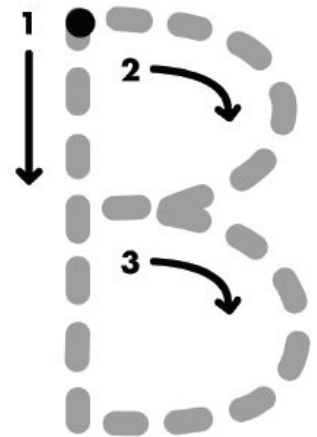
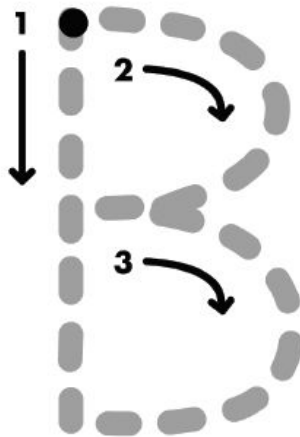
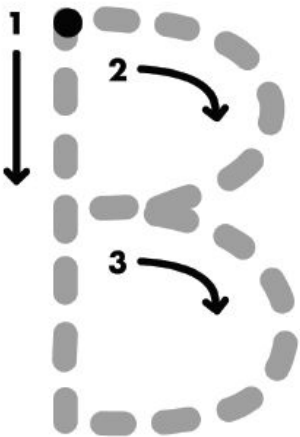
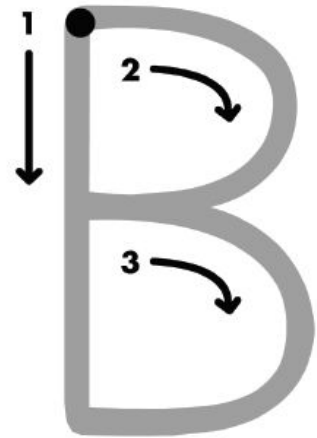
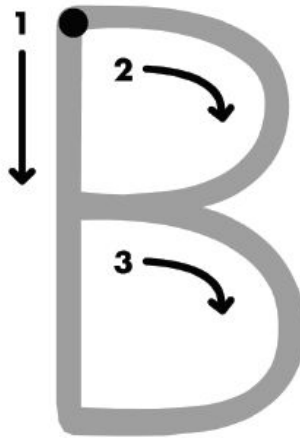
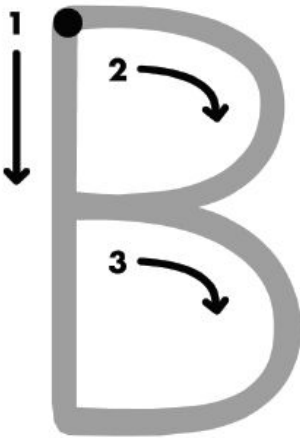
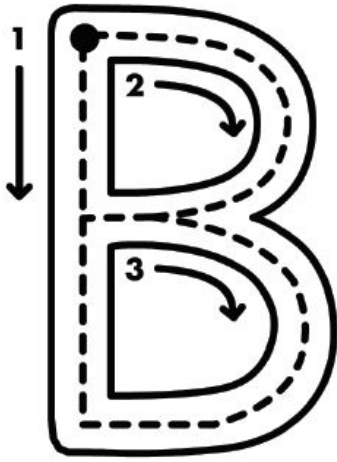
- Read the book with your child.
- Ask, **Tell me 2 things you remember in the Milky Way Galaxy.** If they need help, refer to the book.

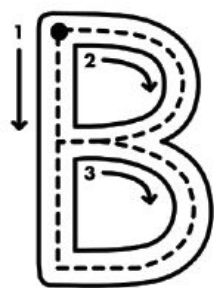
You can also access a pre-recorded reading of this book on the Spakler app in the “Tips for Adults” section, Blast Off Into Space!



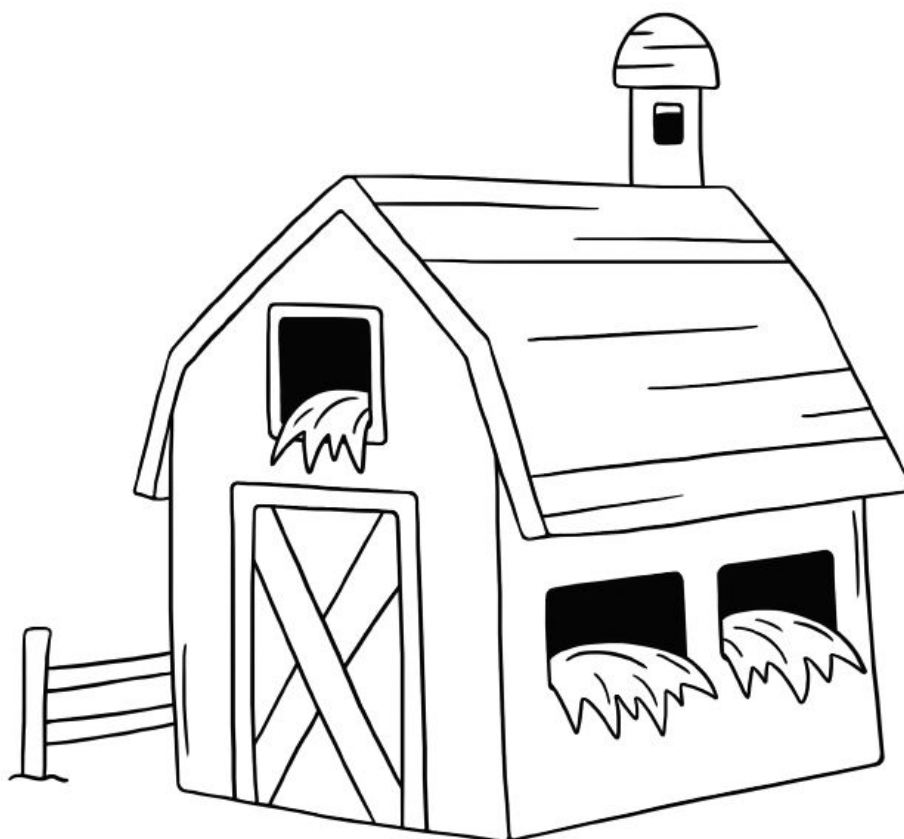


Name: _____

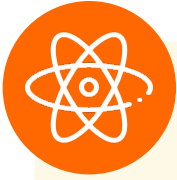




Banana



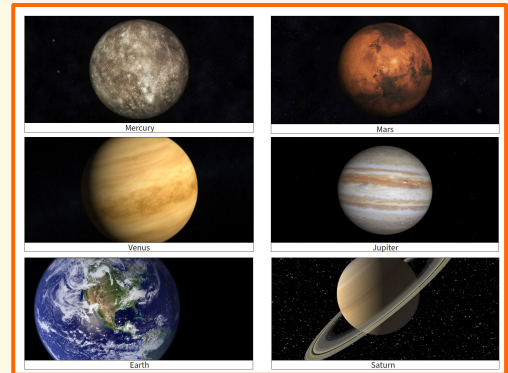
Barn



STEM: Solar System Part 1

MATERIALS: [Solar System](#), paper (can be scrap paper), watercolor palette or playdough or [Playdough Recipe](#), *optional - foil or other decorative items to make additional features like stars*

- With your child talk about the solar system and planets. Look at the pictures together.
- Together, make the Sun and planets by crumpling paper and painting each one. Or, you can use playdough!



Allow time for the solar system to dry and save for Day 9



Independent Learning: View from Space

MATERIALS: [View from Space](#), paper, watercolor palette or crayons

- Use the pictures to talk with your child about what they think it would be like to be in space and look down at Earth.
- Have your child paint a picture of what they think they would see if they were in space.
- Ask, **Tell me about your painting! What can you see from space?**



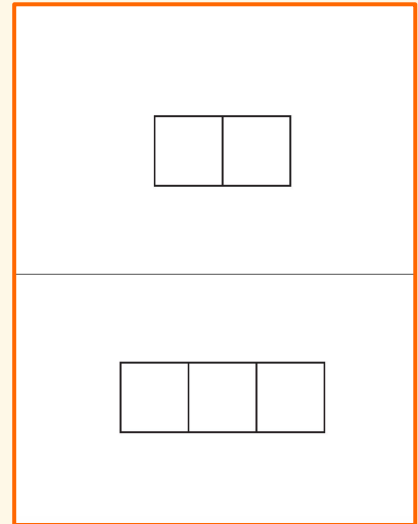


Literacy: Blending 3 Sounds

MATERIALS: 3 pebbles or cotton balls, [Phoneme Box](#)

- Cut the Phoneme Box along the horizontal line and use the part with 3 boxes.
- **Let's blend or put 3 sounds together to make a word!**
- Say, **P-i-t**. Place a pebble in each box from left to right as you say each sound. Point to each box as you blend and say pit. **P-i-t, pit!**
- Repeat for other "it" words such as hit, kit, sit.

Save the objects and boxes for use throughout the unit.



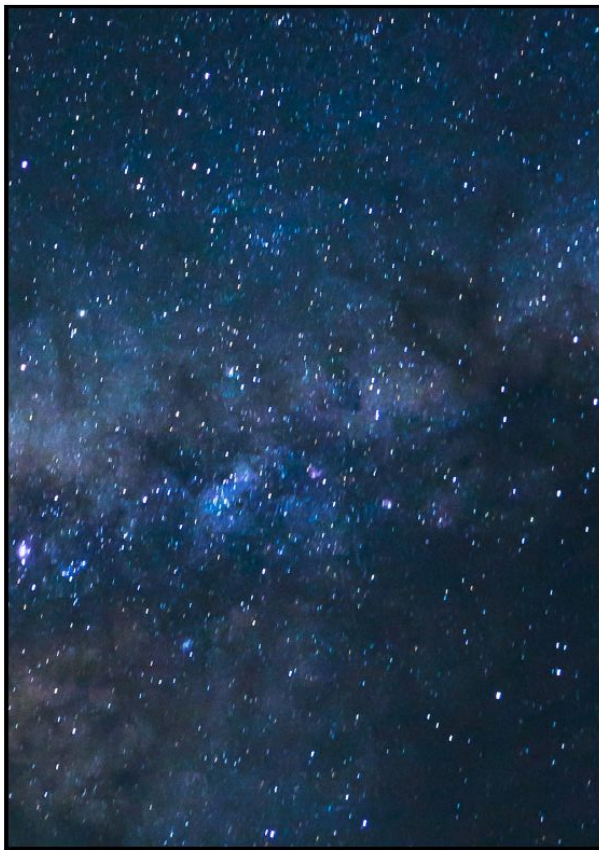
Journal Prompt: A Visit to Space

MATERIALS: crayons, pencil, A Visit to Space Journal Page

- Talk with your child about what they would like to see if they went to space.
- Have your child write and draw about it.
- Ask, **What would you like to see in space? Why?**

Name: _____

What would you like to see in space?



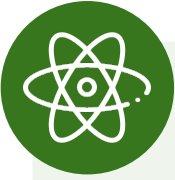
PK4 Blast Off Into Space

©2021. All Rights Reserved. AppleTree Institute. Every Child Ready.

View from Space (FE)

Name: _____

What would you like to see in space?



STEM: Add It Up 2

MATERIALS: 2 types of counters, e.g., 7 dimes and 7 pennies (or paper squares of two colors from last week)

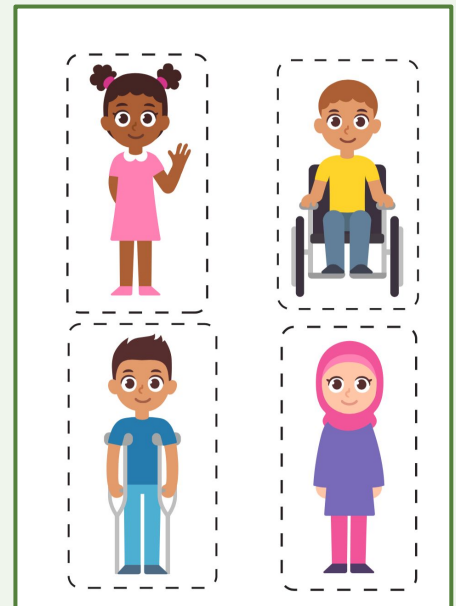
- **Let's add 2 sets together to see how many we have in all.**
- Place 5 dimes and 3 pennies in a row so they are easy to count as you touch each one. **1, 2, 3, 4, 5, 6, 7, 8. I have 8 coins in all.** Continue making sets that total no more than 8 for your child to add (e.g., 4 pennies and 1 dime, 2 pennies and 6 dimes)
- Increase the number of items for a greater challenge.



Independent Learning: Encouraging Friends

MATERIALS: [Friends Puppets](#), crayons, child-safe scissors, sticks or craft sticks or spoons with long handles, etc., tape, *optional - glue the puppets onto cardboard before cutting them out*

- **When you encourage someone you say things like, you can do it or keep trying if they are having a hard time.**
- Help your child to think of a time when they encouraged a sibling or friend.
- Allow your child to color the puppets, cut them out and tape them to a stick. Then they can act out ways to encourage friends.
- After, ask, **How did your puppets encourage each other?**



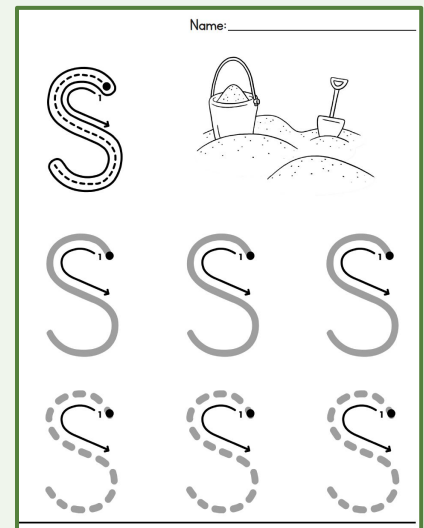
Save the puppets for use throughout the unit.



Literacy: Letter S

MATERIALS: [Letter S Practice 2](#)

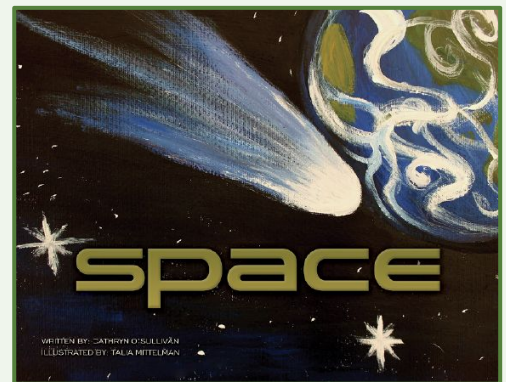
- **Make an S by writing curve back, curve forward.** Have your child say the letter S and make the letter sound.
- Your child can trace the S with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “s.” Use words like star, Sun, space, and sand. Switch roles so your child can suggest words.
- Pick a favorite book and see how many uppercase S’s you can find together.
- *Optional - practice writing with other materials.*



Read: *Space*

MATERIALS: [Space](#)

- With your child, read *Space*.
- Ask, **What else do you think the museum might have?**
- Look up more information about air and space museums and planetariums in a book or on a phone or tablet.





Let's Move: Count and Toss

MATERIALS: number cards 0-10, 10 balls (balled up paper or socks), container

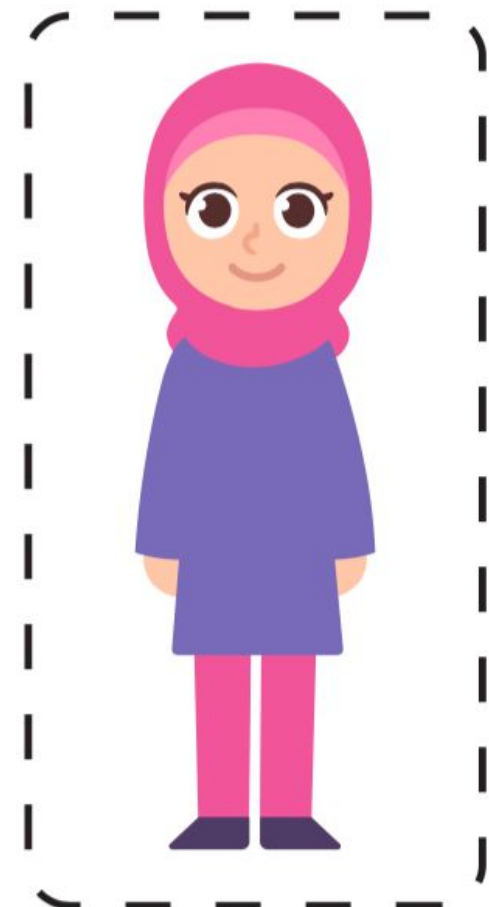
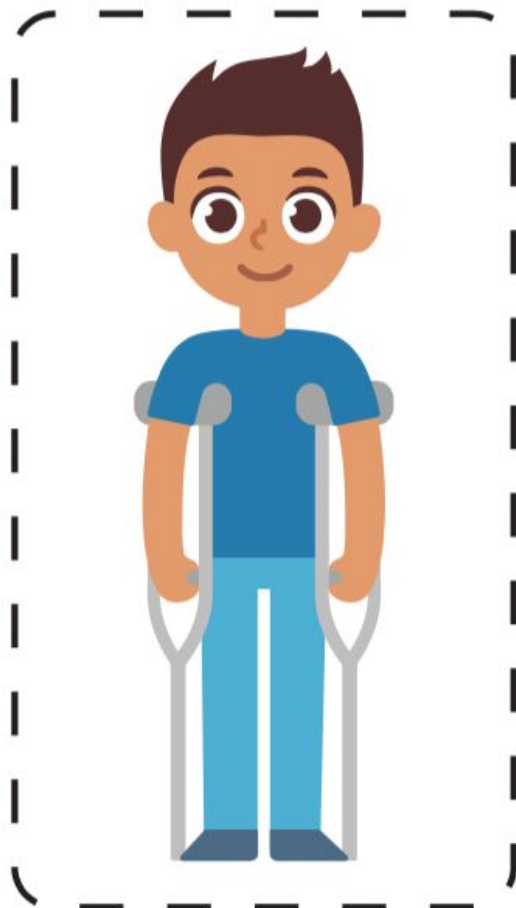
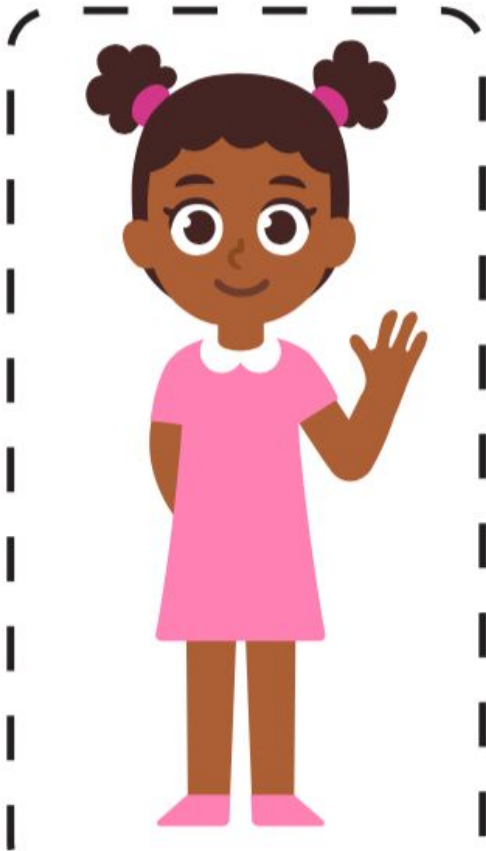
- Have your child pick a number card and say the number. Have them toss that many balls into the container.
- Repeat several times, taking turns.
- *Optional - pick a number card and throw a ball back and forth for that number of times while counting.*



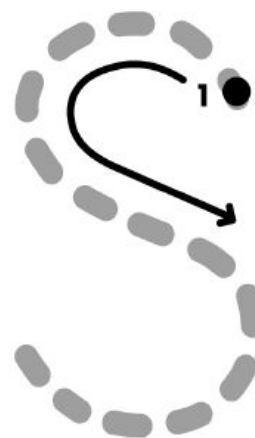
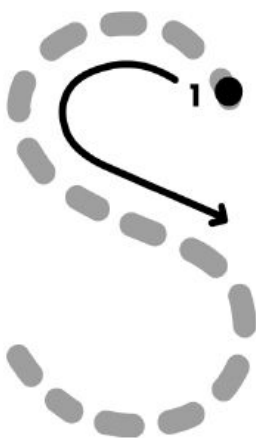
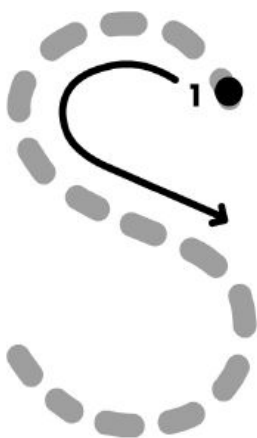
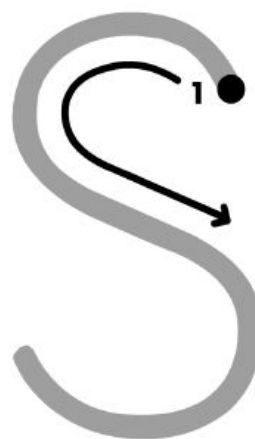
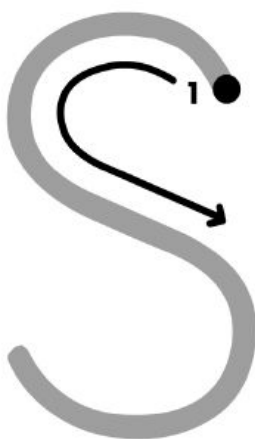
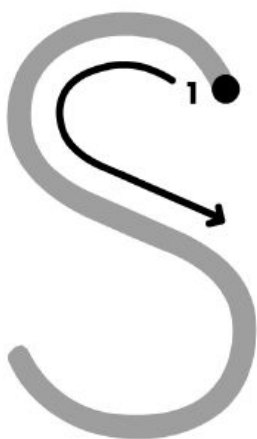
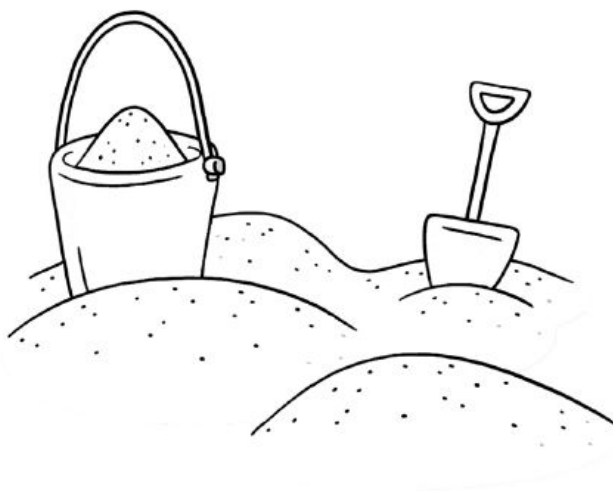
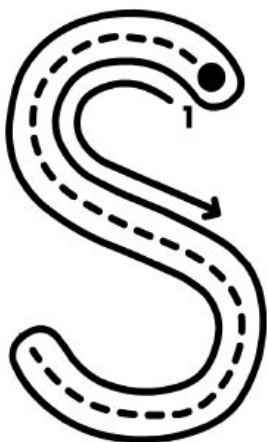
Learning Together: Space Camp

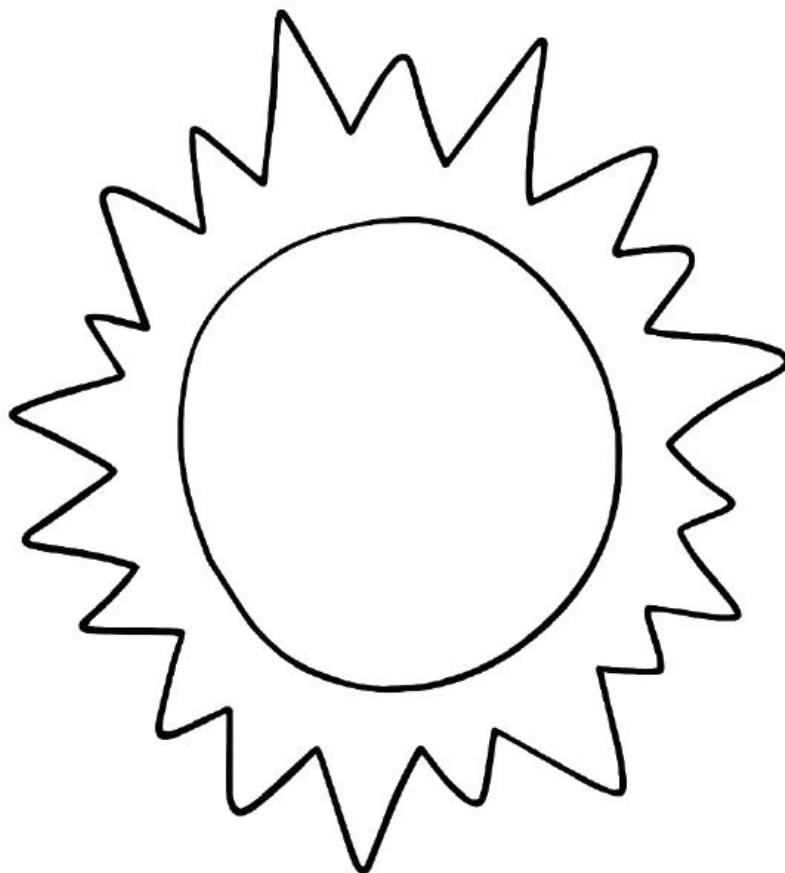
MATERIALS: items for a pretend camp, e.g., sheets or towels to make a tent, astronaut clothing, paper towel rolls to make telescopes, snacks

- **Let's pretend that we have just landed on a new planet and we have to set up a camp. What should we use to build our tent?**
- Make believe together! Have fun building a tent, exploring a new planet, and making a space meal together.

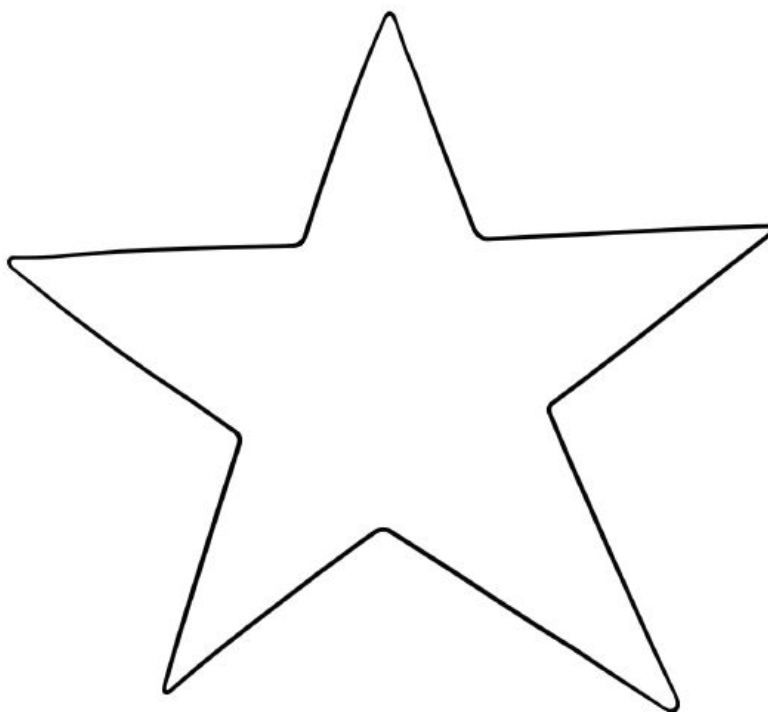


Name: _____

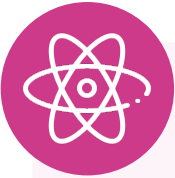




Sun



Star



STEM: Solar System Part 2

MATERIALS: [Solar System](#), planets and sun made on Day 7, cardboard or hanger, string, tape

- Talk with your child about the planets they made and how they can put them together.
- Help your child tie a string around each planet and attach the string to the cardboard or hanger. Then hang the solar system up to enjoy!

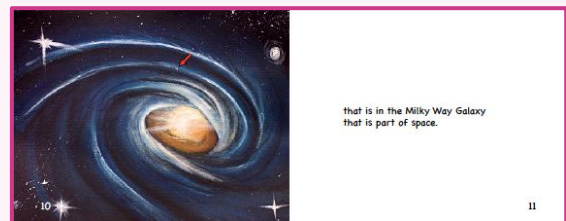
Save the solar system for when you play together in the Air and Space Museum in Week 3.



Independent Learning: Tiny Stars Painting

MATERIALS: paper, watercolor palette, [Space](#), tray or newspaper for the paper

- With your child, look at p. 10 of *Space*. Talk with your child about the illustration and how the tiny white dots are stars in space.
- Allow your child to make a space painting by painting dark colors first then adding tiny white stars. Model how to use the paintbrush to make tiny white dots.

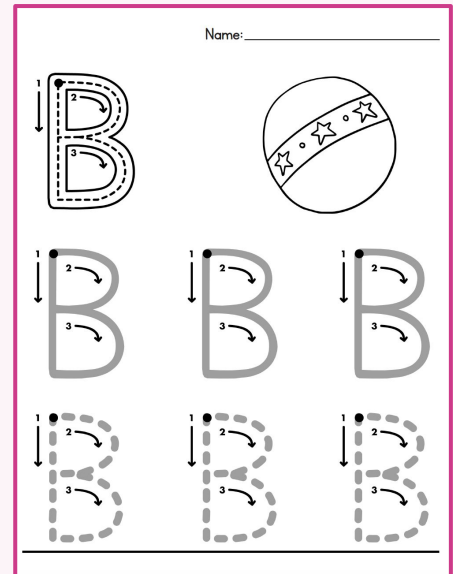




Literacy: Writing Letters B & S

MATERIALS: B & S, pencil, crayons

- Brainstorm words that start with the letters B and S.
- Have your child trace the letters B and S and color the pictures. They can also draw and color more of their own.
- Ask, **What letters did you write? What words start with the same sound as ball? What words start with the same sound as seahorse?**



Journal Prompt: Astronomer

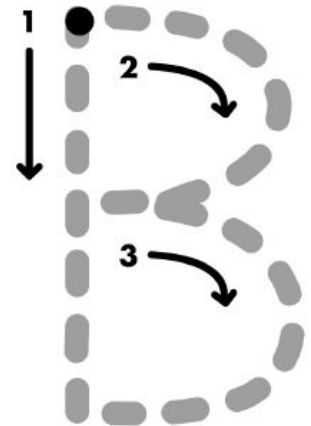
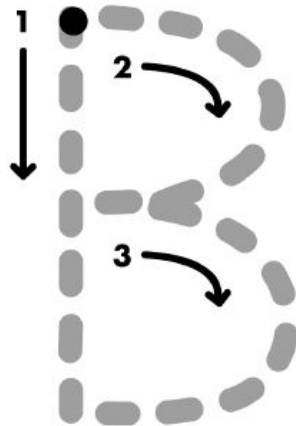
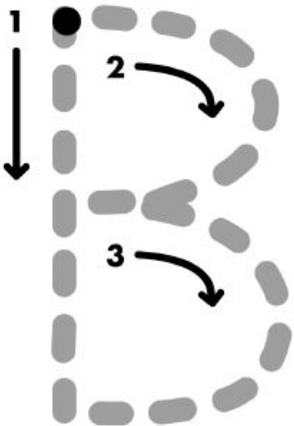
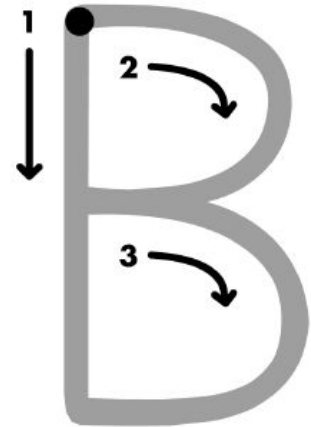
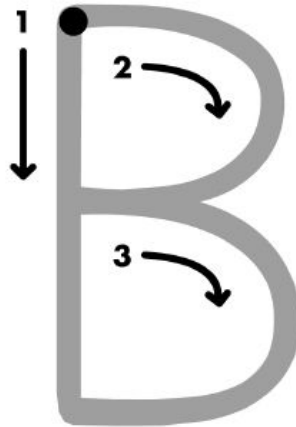
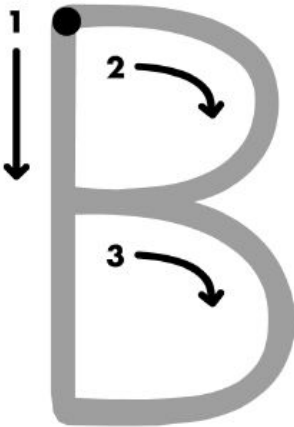
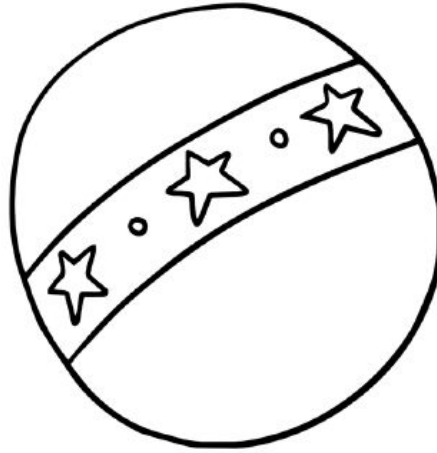
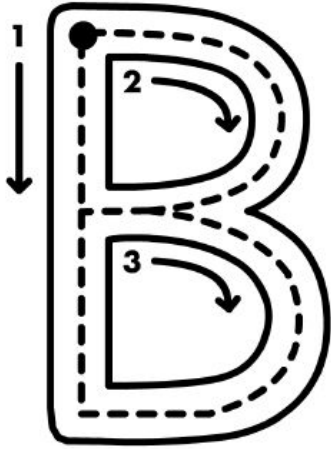
MATERIALS: crayons, pencil, Astronomer Journal Page

- Talk with your child about astronomers and their jobs. **Astronomers are scientists who study things in space, like stars and planets.**
- Have your child write and draw about whether or not they would like to be an astronomer.

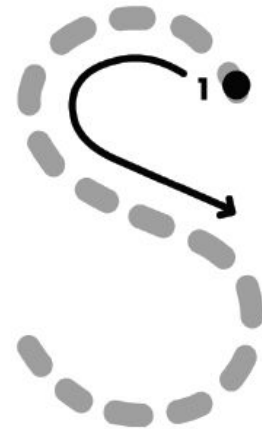
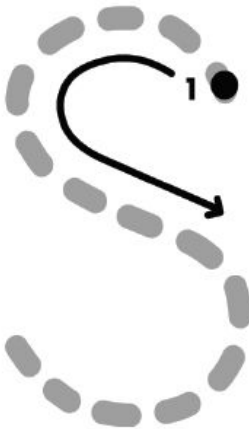
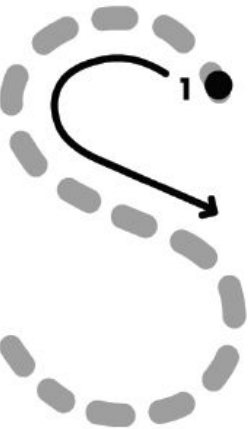
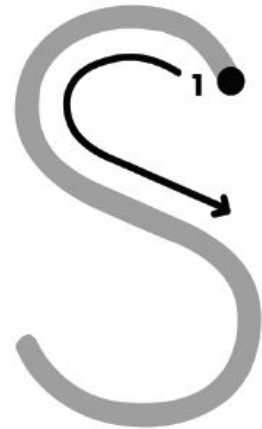
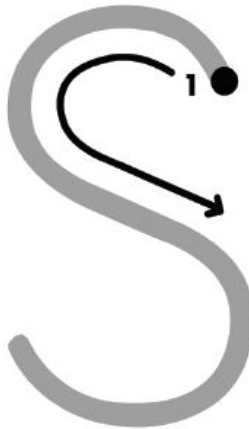
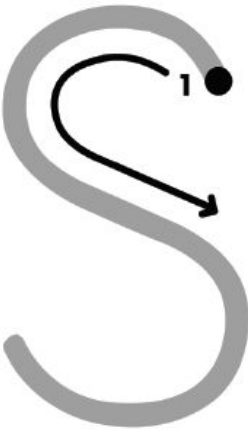
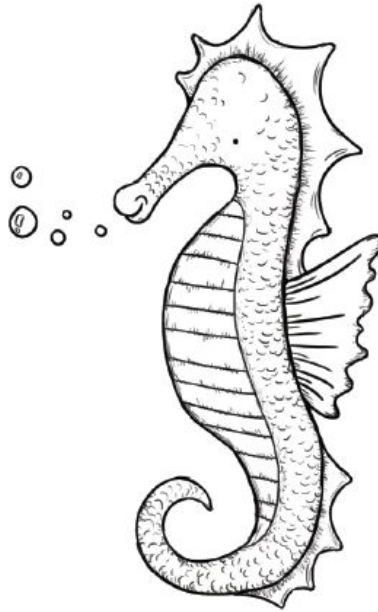
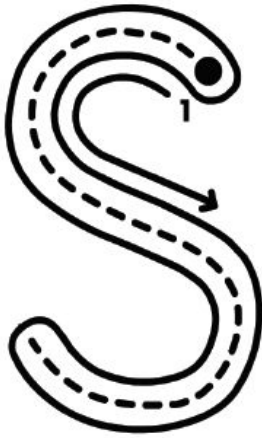
Name: _____

Would you like to be an astronomer? Why or why not?

Name: _____

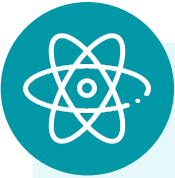


Name: _____



Name: _____

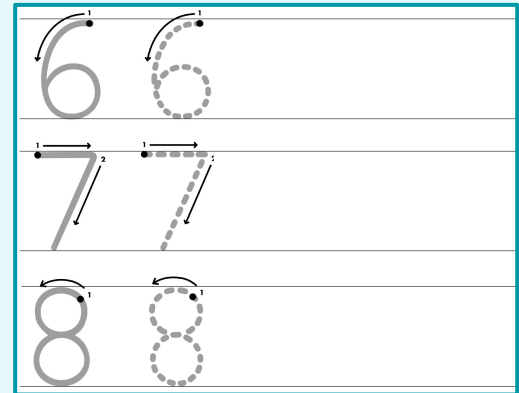
Would you like to be an astronomer? Why or why not?



STEM: Writing Numbers 6-10

MATERIALS: [6 - 10](#), crayons

- Allow your child to trace and write the numbers. Have them say the number as they write them.



Independent Learning: My Planet

MATERIALS: [Solar System](#), paper, watercolor palette or crayons, playdough or [Playdough Recipe](#)

- Talk with your child about planet features. Saturn has rings of ice and rock. Jupiter has many moons. **What is special about our planet Earth (it has plants and animals, water we can drink, air for us to breathe).**
- Allow your child to make a planet out of playdough and paint it.
- Ask, **Tell me about your planet! What special things does it have? Is there anything living on your planet?**

PLAYDOUGH RECIPE

1 cup of flour
2 teaspoons cream of tartar
1/3 cup of salt
1 cup of water
1 tablespoon of vegetable oil
food coloring of your choice

- Place flour, cream of tartar, and salt in a saucepan.
- Add water and vegetable oil to the saucepan. Over medium/low heat, stir the mixture.
- Before the mixture starts getting thick, add the food coloring.
- Keep stirring and scraping the mixture from the bottom of the saucepan.
- Allow the dough to cool before play. Store in an airtight container.



Playdough Recipe (FE)

©2021 AppleTree Institute. All Rights Reserved.



Literacy: Letters Review

MATERIALS: make 2 letter cards each for the letters M, Q, B, and S

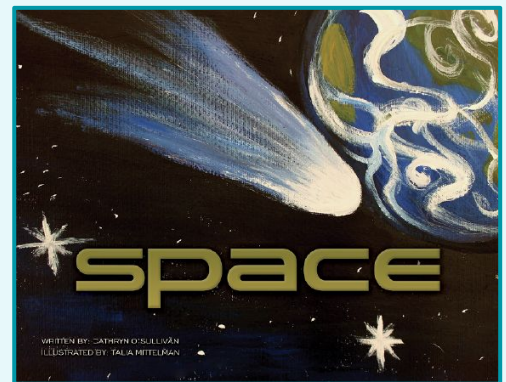
- Your child can help you make the letter cards.
- Give one set of cards to your child and keep one set.
- Show your child a letter and ask for the letter name and letter sound. Have your child show their matching card.
- Switch roles so that your child can show you a card.
- For more practice, you can say a letter and have your child find something in your home that starts with that letter sound.

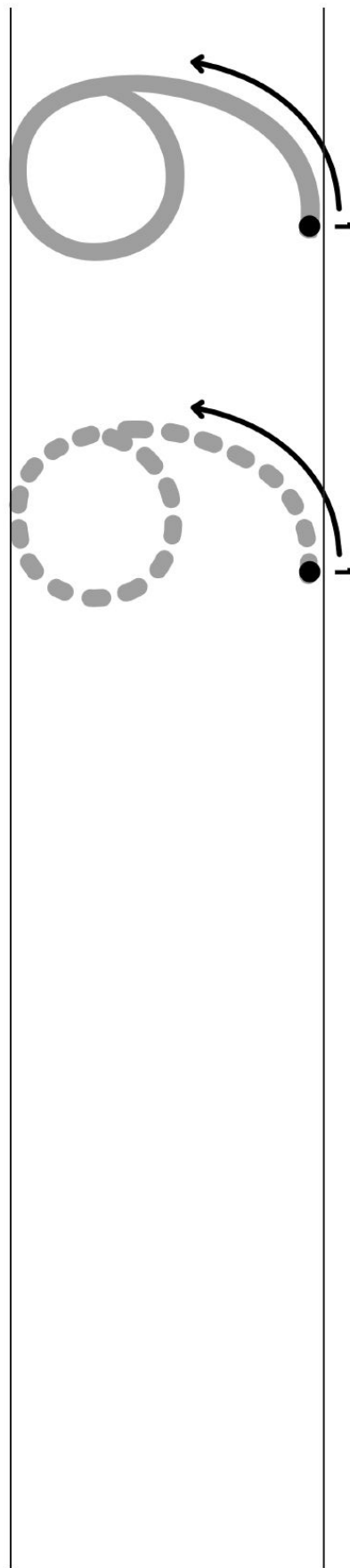
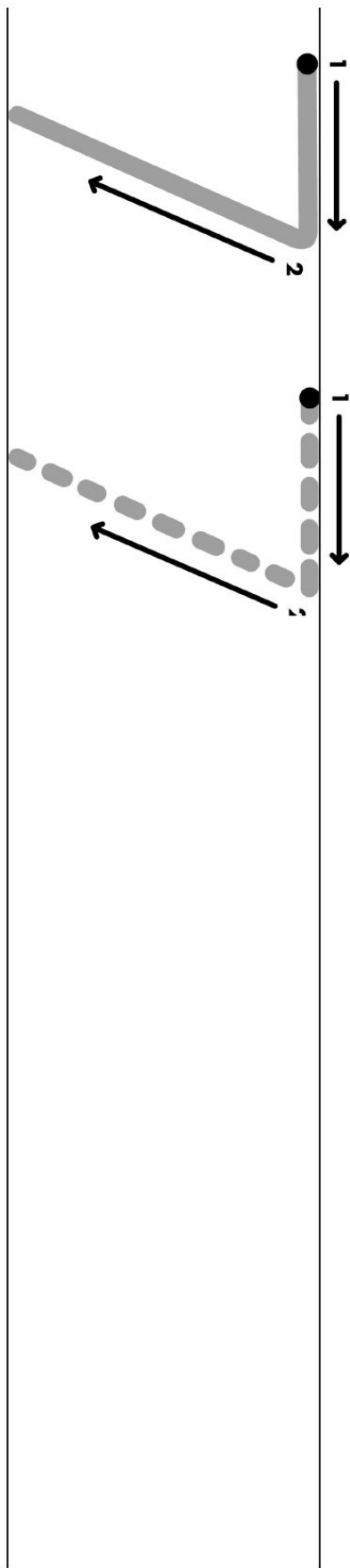
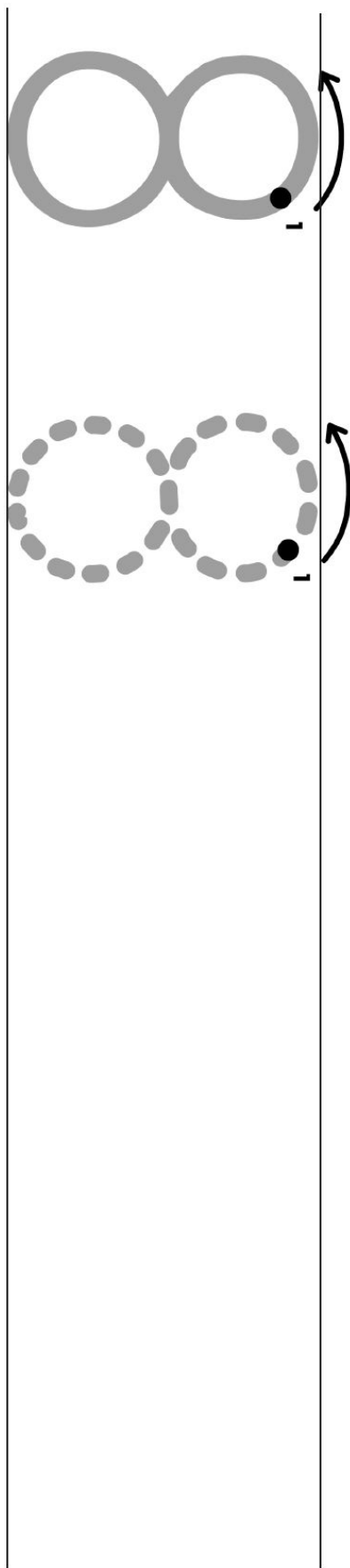


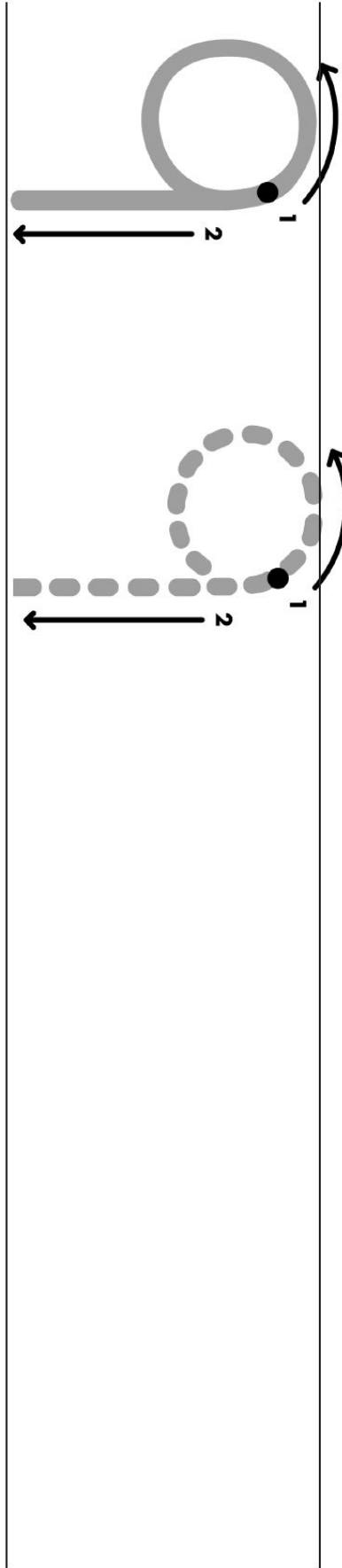
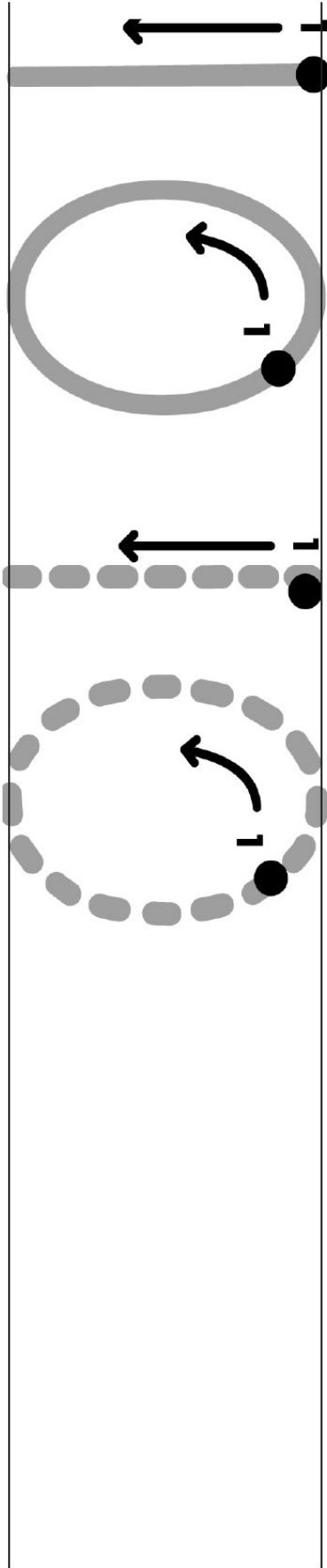
Read: *Space*

MATERIALS: [*Space*](#)

- With your child, read *Space*.
- Ask, **What would you like to see if you looked through a telescope?**







PLAYDOUGH RECIPE

1 cup of flour
2 teaspoons cream of tartar
1/3 cup of salt
1 cup of water
1 tablespoon of vegetable oil
food coloring of your choice

1. Place flour, cream of tartar, and salt in a saucepan.
2. Add water and vegetable oil to the saucepan. Over medium/low heat, stir the mixture.
3. Before the mixture starts getting thick, add the food coloring.
4. Keep stirring and scraping the mixture from the bottom of the saucepan.
5. Allow the dough to cool before play. Store in an airtight container.



Week 3

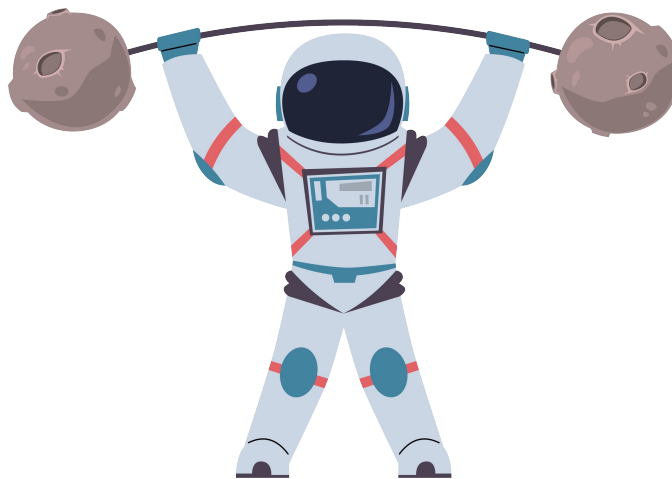
PK4 Unit 10 Week 3 Overview

All About Astronauts

This week your child will:

Build the International Space Station and explore gravity. They will add, search for numbers, learn the letters P and O, learn about being an astronaut, and design a space suit. Help your child understand that people wear special clothes to do their jobs by pointing out workers' uniforms.

Key Vocabulary



astronaut

someone who travels to and works in space

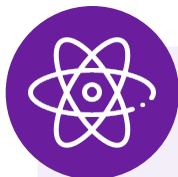
gravity

the force that causes something to fall to the ground or to be attracted to another planet

Create Connections

This week, you will learn about astronauts who travel to space. Before you begin the packet, write and draw about where you would like to travel.

**Think
About It!**



STEM: Find the Number Cards

MATERIALS: number cards 0-10, scrap paper or newspaper, container, *optional - tongs, a clothespin, or a large spoon*

- **Let's look for numbers!** Have your child tear paper into small pieces and place them in the container. Hide the number cards in the container, naming them as they go in.
- Allow your child to use the tongs, a clothespin, or spoon to find the number cards, naming them as they find them.
- *Optional - your child can write the numbers as they find them or you can include number cards for 11-15 for a challenge.*



Independent Learning: Painting Myself in Space

MATERIALS: watercolor palette or crayons, paper

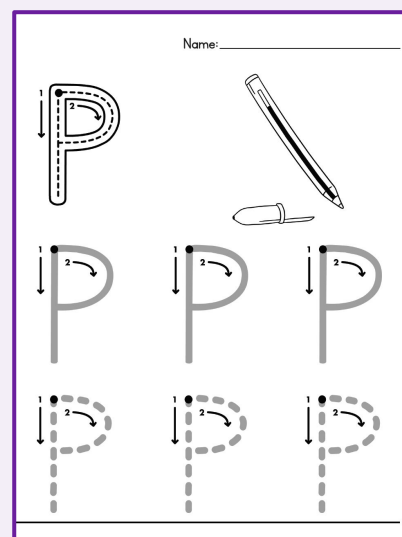
- Talk with your child about what they would do if they went to space.
- Have your child paint a picture of themselves in space.
- Ask, **Tell me about your painting! What are you doing in space?**



Literacy: Letter P

MATERIALS: [Letter P Practice 3](#)

- **Make a P by writing down, curve around.** Have your child say the letter P and make the letter sound.
- Your child can trace the P with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “p.” Use words like planet, pet, pan, etc. Switch roles so your child can suggest words.
- Go for a walk and see how many uppercase P’s you can find on store and street signs and license plates .
- *Optional - practice writing with other materials.*



Read: *Sam the Astronaut*

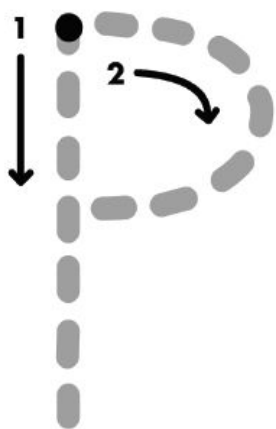
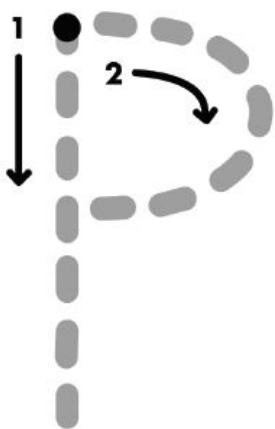
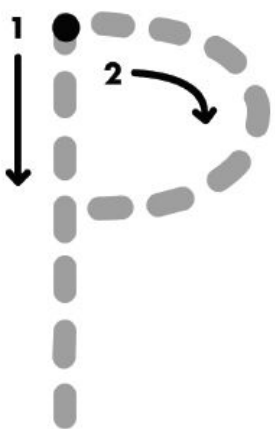
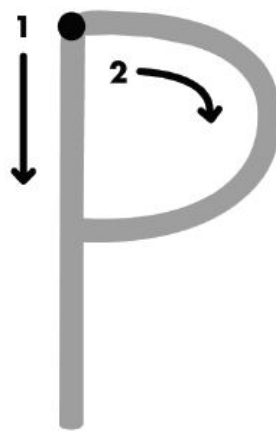
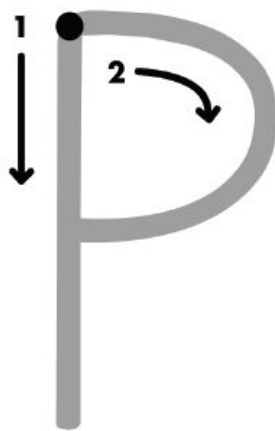
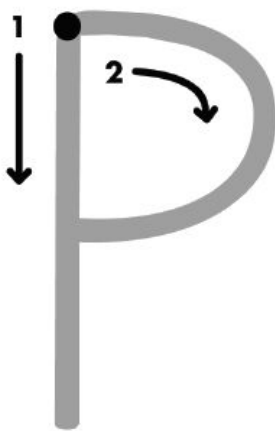
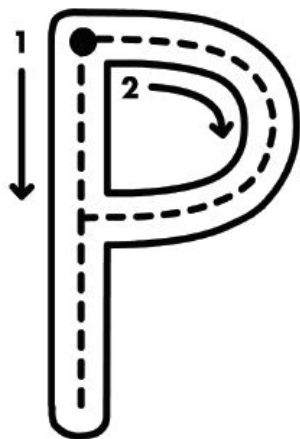
MATERIALS: [Sam the Astronaut](#)

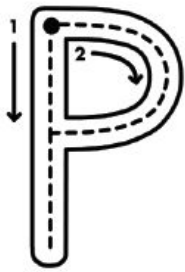
- Read the book with your child.
- **Training to be an astronaut seems like hard work! What do you think it would be like to train to be an astronaut?** You can also ask, **What was the most surprising thing about astronaut training?**

You can also access a pre-recorded reading of this book on the Spakler app in the “Tips for Adults” section, Blast Off Into Space!

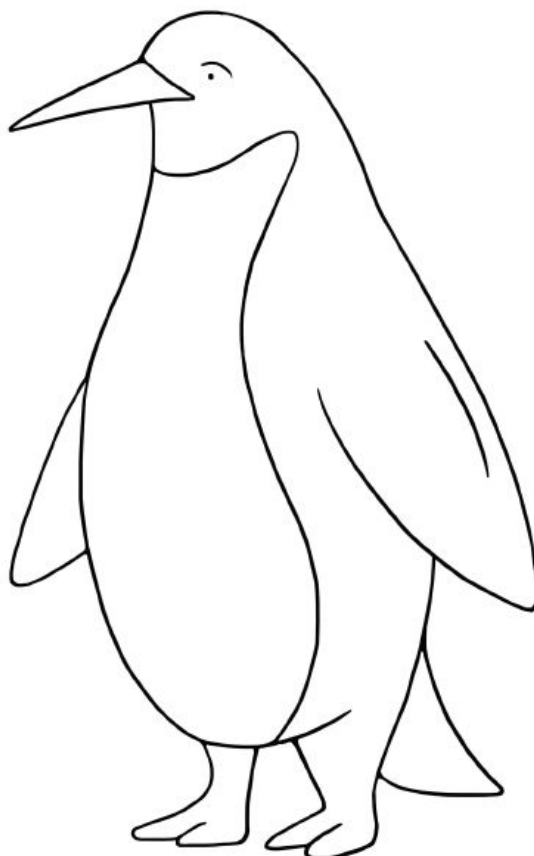


Name: _____

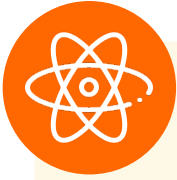




Pie



Penguin



STEM: Building the International Space Station

MATERIALS: [International Space Station](#), paper, crayons, recyclable items like paper towel rolls, small containers, or playdough or [Playdough Recipe](#)

- Talk with your child about the International Space Station and a satellite.
- **The International Space Station is where astronauts live in space. Satellites send signals to Earth so we can do things like watch TV and use the internet.**
- Together, draw a design for a satellite and build it with the materials.

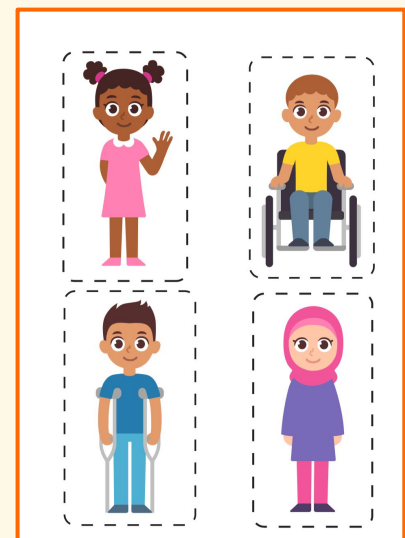


Independent Learning: Helping Others

MATERIALS: [Friends Puppets](#) made on day 8

- Talk with your child about ways to help a friend calm down when they are upset or angry. Help them to take deep breaths, tell them something kind, dance and laugh together, help them think of a solution, or get a grown-up to help.
- Allow your child to act out helping others using the puppets.
- Ask, **How did the puppets ask for help? How did the others help that puppet?**

You can review calm down strategies with your child on the Spakler app in the “Calm Down” pod in the Play section.





Literacy: Blending 3 Sounds

MATERIALS: *optional - 3 pebbles or cotton balls, Phoneme Box*

- Cut the Phoneme Box along the horizontal line and use the part with 3 boxes today.
- **Let's blend or put 3 sounds together to make a word!**
- Say, **P-e-t**. Place a pebble in each box from left to right as you say each sound. Point to each box as you blend and say pet. **P-e-t, pet!**
- Repeat for other "et" words: n-e-t (net), g-e-t (get) s-e-t (set).



Journal Prompt: Astronaut

MATERIALS: *crayons, pencil, Astronaut Journal Page*

- Talk with your child about the work astronauts do. They travel to space to learn about things in space like planets and stars. They live at the space station to observe different things in space. They go on spacewalks.
- Have your child write and draw about being an astronaut.
- Ask, **Would you like to be an astronaut? Why or why not?**

Name: _____

Would you like to be an astronaut? Why or why not?



PK4 Blast Off Into Space

©2021. All Rights Reserved. AppleTree Institute. Every Child Ready.

International Space Station (FE)

Name: _____

Would you like to be an astronaut? Why or why not?



STEM: Shake It Up Addition

MATERIALS: bag, counters in 2 different colors, e.g., 7 yellow counting bears and 7 red counting bears (or use pennies and dimes)

- Drop 2 yellow and 5 red bears into the bag. Have your child shake the bag, pour the bears out, and count how many are all together.
- Repeat for different amounts totaling no more than 8.
- Increase or decrease the number of items as needed.

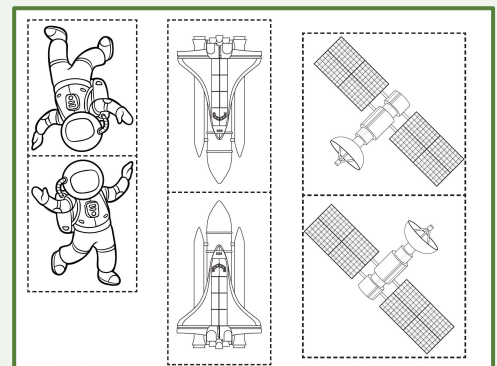
Save the items for use throughout the unit.



Independent Learning: Space Walk

MATERIALS: [Space Walk](#), crayons, child-safe scissors, [Sam the Astronaut](#)

- Talk with your child about space walks. Say, **Sometimes astronauts leave their shuttle to fix something like a satellite, or they do an experiment.** Refer to the space walk on pp. 20-21 of *Counting to 20 in Space*.
- Allow your child to color the pictures and cut them out. Fold them over so they can stand on their own. Your child can play and act out different scenes.
- After, ask, **What did you do on your space walk?**

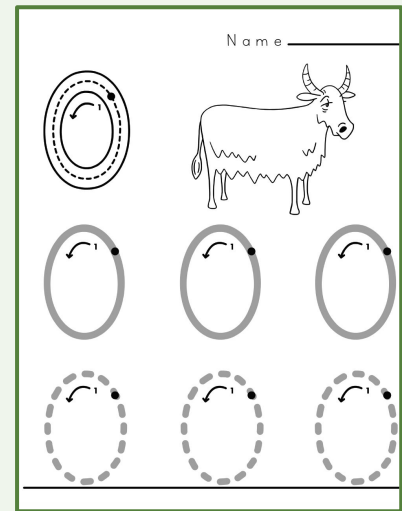




Literacy: Letter O

MATERIALS: [Letter O Practice 2](#)

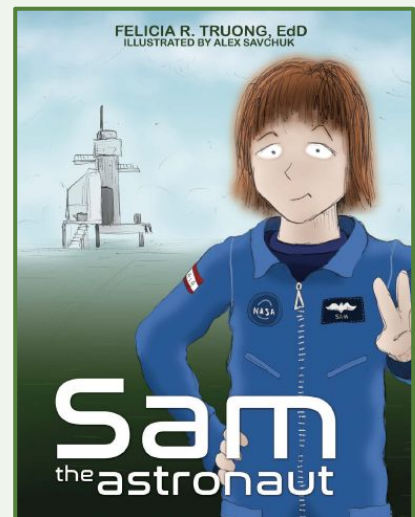
- **Make an O by writing curve around.** Have your child say the letter O and make the letter sound for O (like octopus, not like over).
- Your child can trace the O with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “o.” Use words like octagon, ostrich, octopus, and otter. Switch roles so your child can suggest words.
- Look for uppercase O’s around your house (on food labels, clothing tags, books, ect.).
- *Optional - practice writing with other materials.*



Read: *Sam the Astronaut*

MATERIALS: [Sam the Astronaut](#)

- Read the book with your child.
- Ask, **What are two things that Sam did when she was learning to be an astronaut?**





Let's Move: Astronaut Training

MATERIALS: *optional - music, number cards from 0-10*

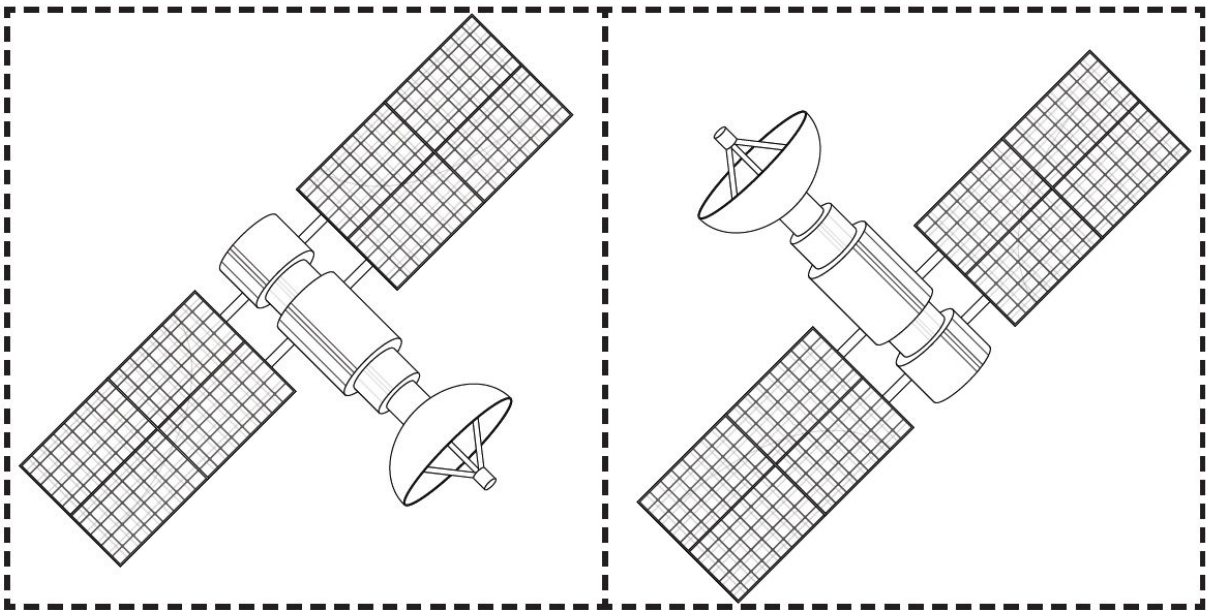
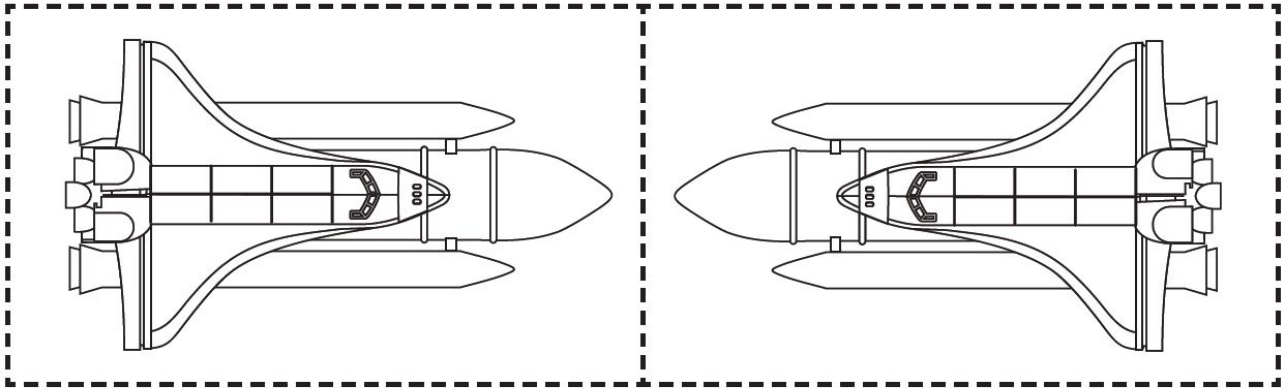
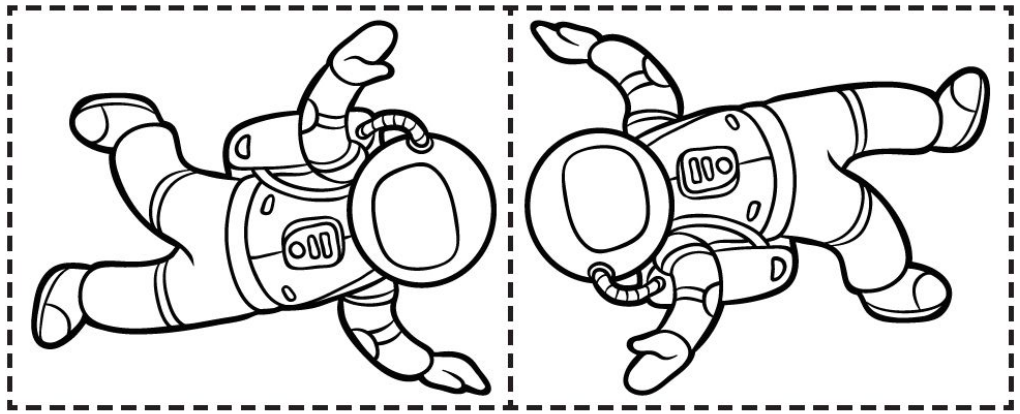
- Astronauts have to do a lot of exercise and go through a lot of training before they go into space. Sam even had to exercise when she came back to keep her muscles strong! Let's do some exercises like the astronauts.
- Take turns suggesting different exercises you can do, like do 5 jumping jacks, 3 squats, 10 twists, pretend we're scuba diving, etc.
- *Optional - randomly pick number cards to decide how many of each exercise you should do.*



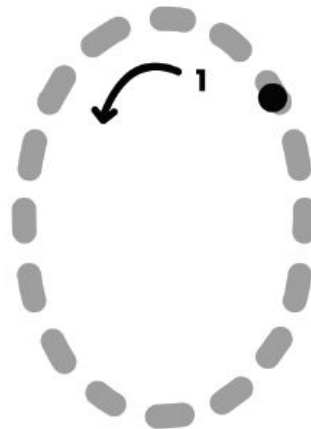
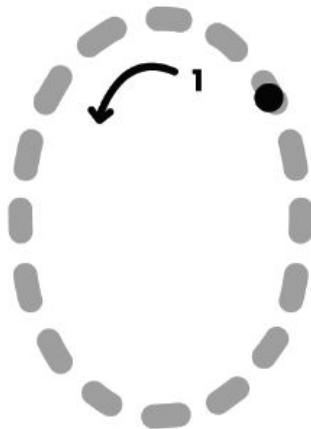
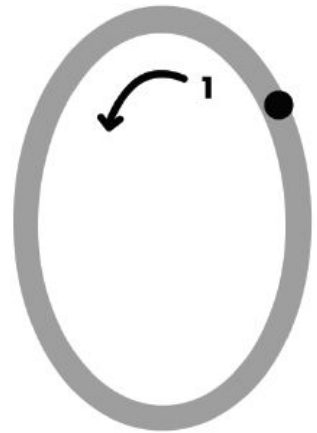
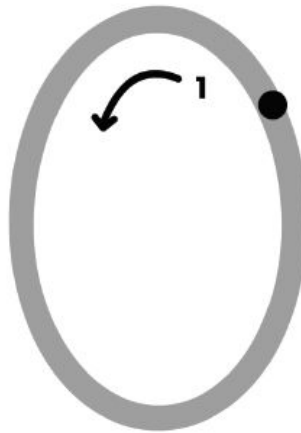
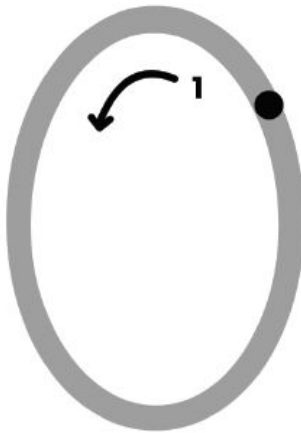
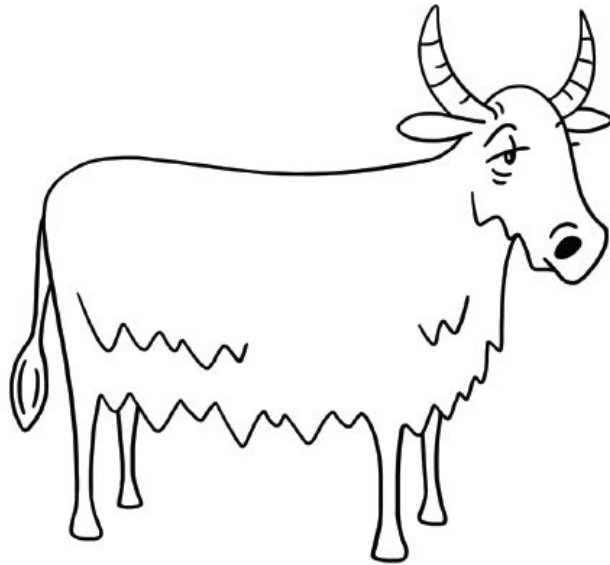
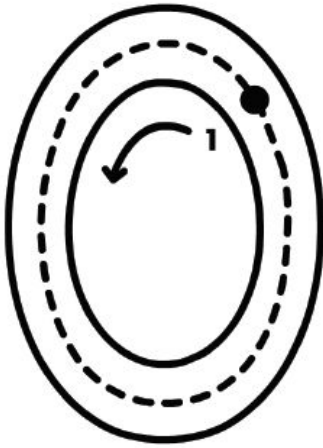
Learning Together: At the Air and Space Museum

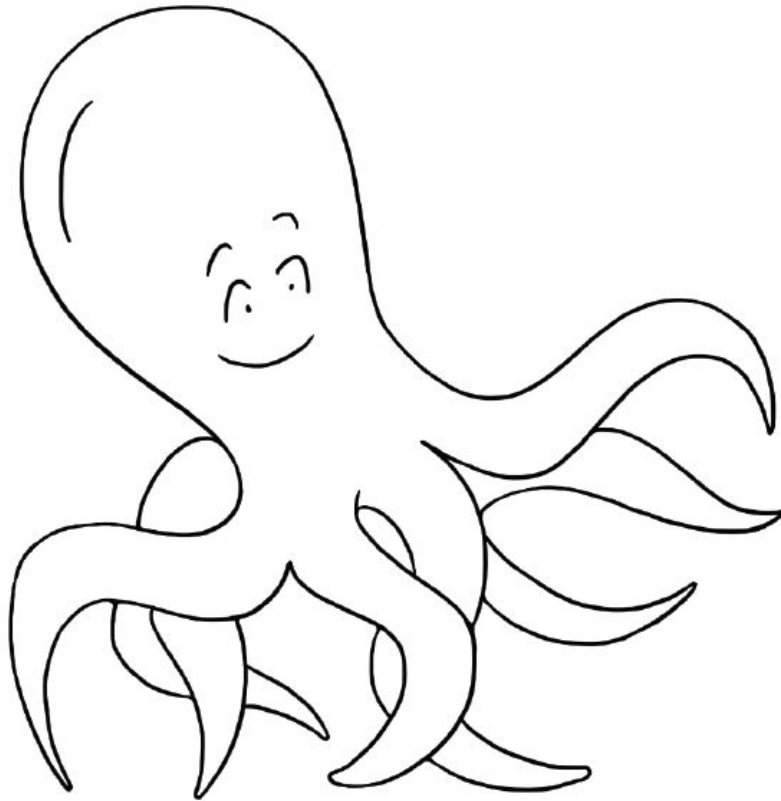
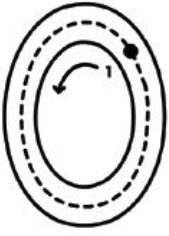
MATERIALS: display child's work from weeks 1 and 2 like the constellations, moon, and [Solar System](#), *optional - make additional items like a telescope from a paper towel roll*

- An Air and Space Museum has information and pictures about space. Sometimes they have telescopes to see the stars. They are like giant magnifying glasses that make the stars look bigger!
- Play make believe together! Pretend to be at the Air and Space Museum. You can pretend to be visitors at the museum or even astronomers studying space.

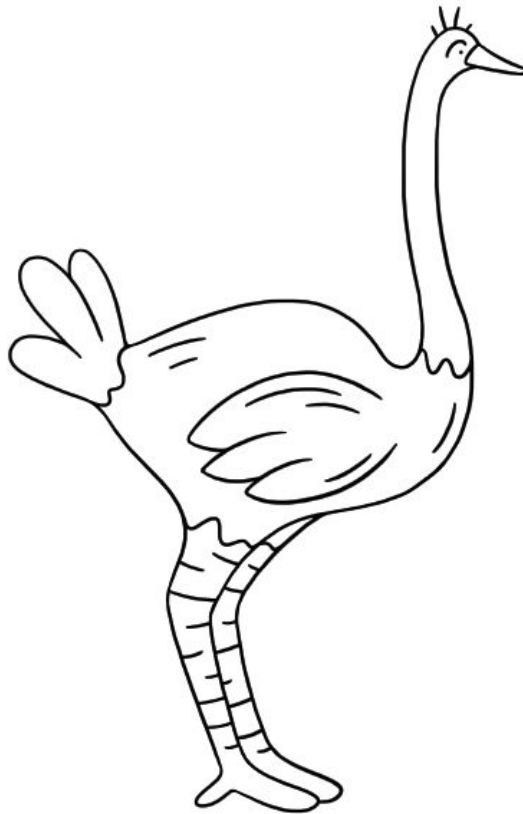


Name _____

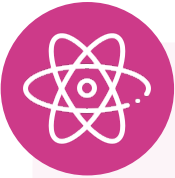




Octopus



Ostrich



STEM: Gravity

MATERIALS: different objects to drop, e.g., ball, cup, lightweight cloth or scarf, feather, cotton ball, etc.

- Drop 2 objects at the same time. Ask, **What happened?**
- **They both fell because gravity pulled them to the ground. Gravity is the force that pulls things to the ground.**
- Together, explore gravity. Have your child drop 2 objects. Observe and talk about which hit the ground first or if they hit at the same time. Repeat the exploration using different objects and varying heights.

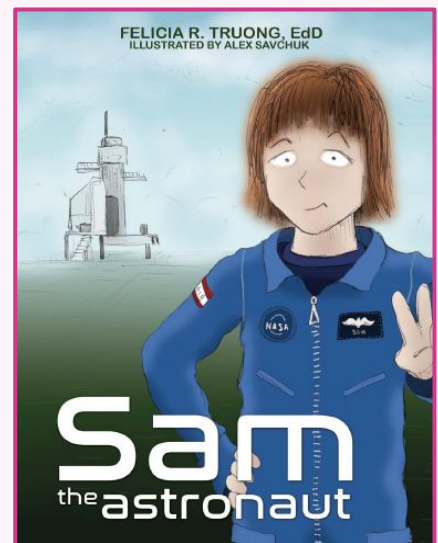
Tip: When two objects do not fall at the same rate it is because of the way the air affects their movements. On the moon with almost no gravity they would fall at the same time!



Independent Learning: If I Were an Astronaut

MATERIALS: paper, crayons, [*Sam the Astronaut*](#)

- Talk with your child about what they would do if they were an astronaut.
- Allow your child to write and draw about it.
- After, ask, **Tell me about your drawing!**

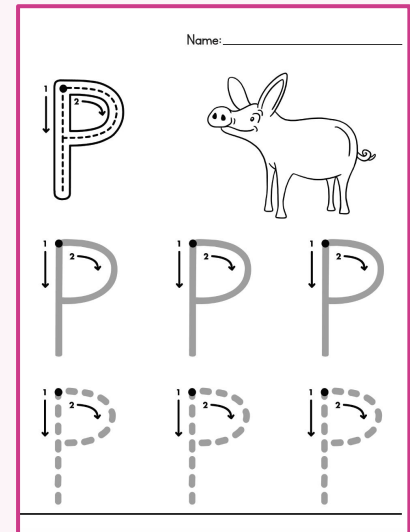




Literacy: Writing Letters P & O

MATERIALS: [P & O](#), pencil, crayons

- Brainstorm words that start with the letters P and O (focus on the o sound like octagon, not over).
- Have your child trace the letters P and O and color the pictures. They can also draw and color their own P and O pictures.
- After, ask, **What letters did you write? What words start with the same sound as pig? What words start with the same sound as olive?**



Journal Prompt: Gravity

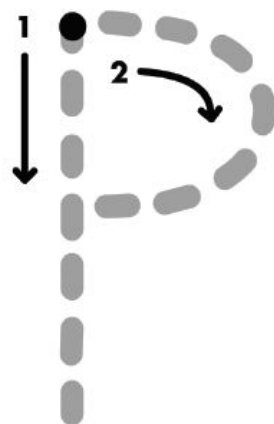
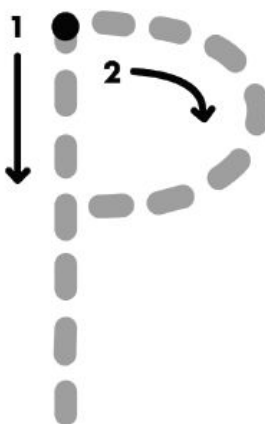
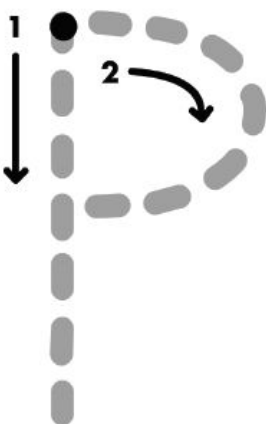
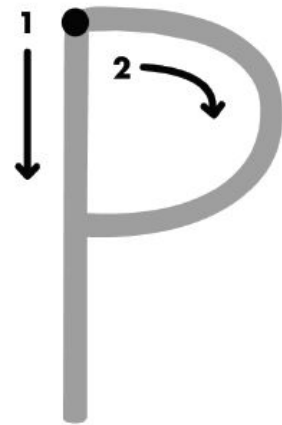
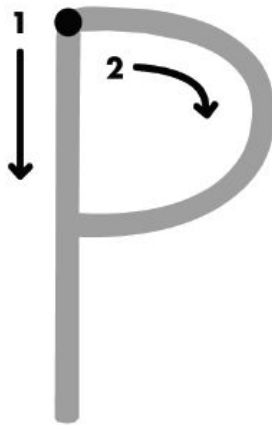
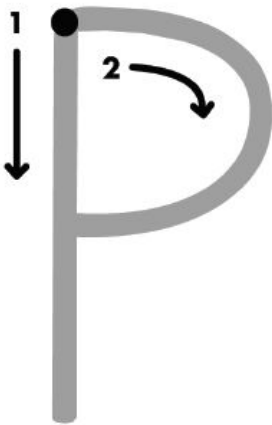
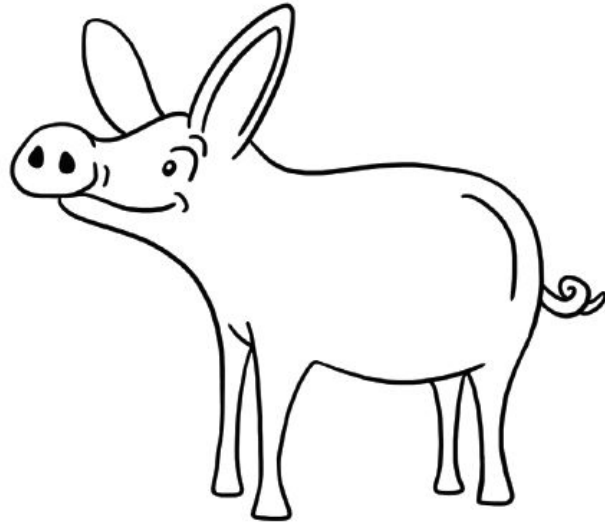
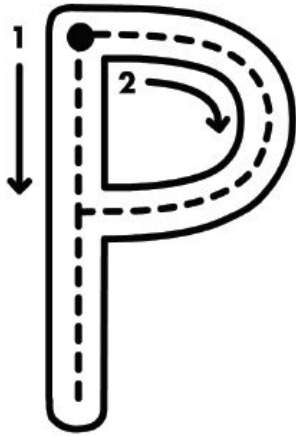
MATERIALS: crayons, pencil, Gravity Journal Page, [Sam the Astronaut](#)

- **Gravity helps us to stay on Earth and not float around.** Show pp.16-19 of *Sam the Astronaut* to show what it looks like when we have little gravity.
- Have your child write and draw about what it would be like to live with no gravity.
- After, ask, **What do you think it would be like to live in a place with no gravity? What would you do if there were no gravity?**

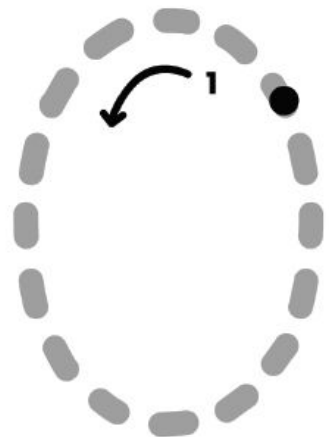
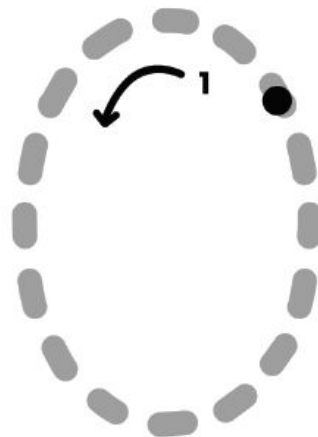
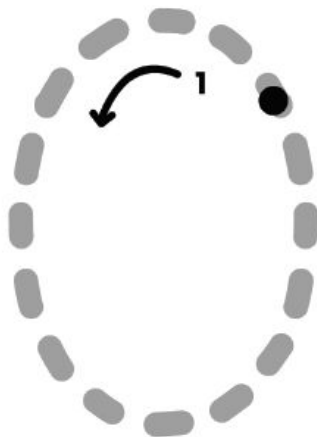
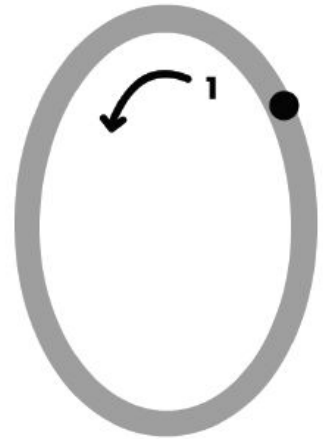
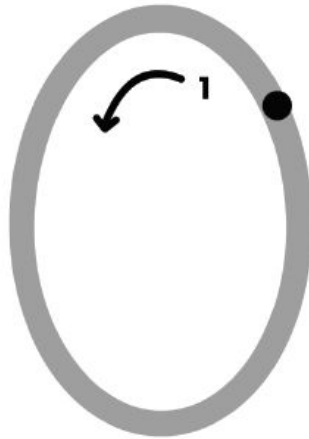
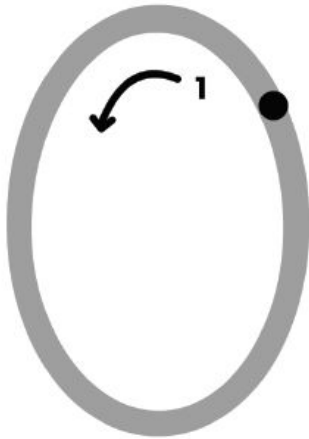
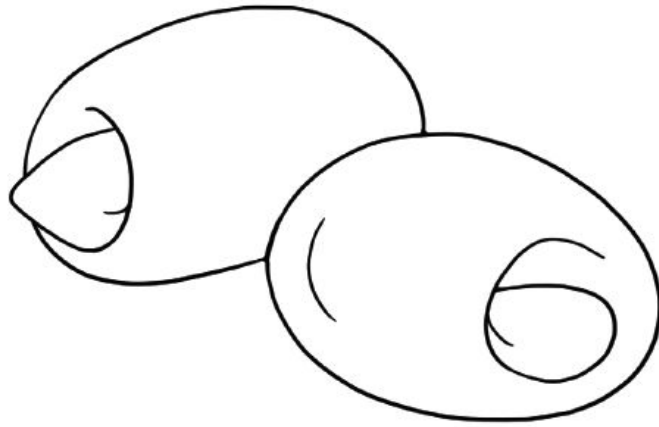
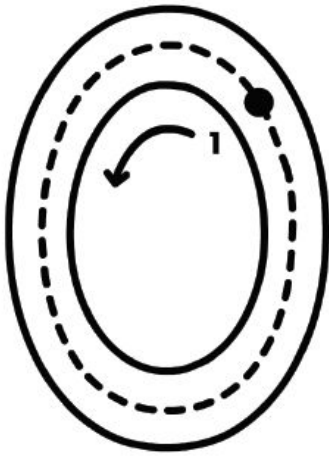
Name: _____

What would it be like to live in a place with no gravity?

Name: _____

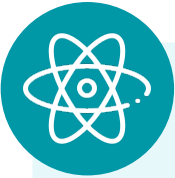


Name _____



Name: _____

What would it be like to live in a place with no gravity?



STEM: Adding Fingers Up to 8

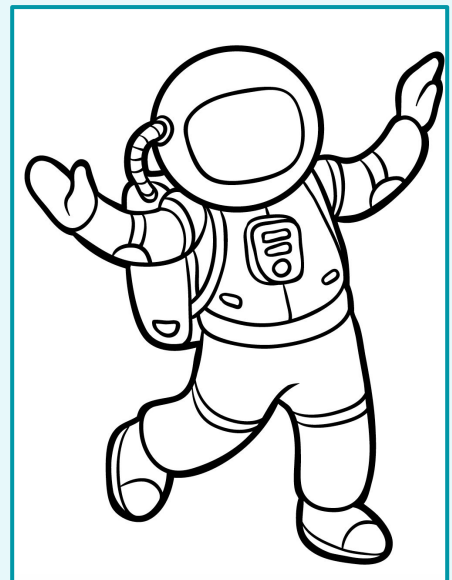
- Hold up 3 fingers on one hand and 5 fingers on the other.
- Have your child add all your fingers together. Ask, **How many are there in all? Yes! There are 8 fingers in all.**
- Repeat for other sets of fingers, totaling no more than 8.



Independent Learning: My Space Suit

MATERIALS: [Space Suit](#), [Sam the Astronaut](#), crayons or watercolor palette, child-safe scissors, glue, pieces of cloth, *optional - decorative items like buttons, crumpled paper, etc.*

- Talk with your child about space suits and why they are important for astronauts. You can refer to *Sam the Astronaut*.
- Have your child design a space suit on paper or decorate the drawing by painting it and adding materials.
- After, ask, **What is special about your space suit?**





Literacy: Let's Talk About Astronauts

- What do you think it would be like to be an astronaut and travel to space?
- Ask your child 2-3 follow-up questions. **Would you like to be an astronaut? Why or why not?** Or, **If you were an astronaut what would you like to do? What planets would you visit?** Practice having a back and forth conversation.



Read: *Sam the Astronaut*

MATERIALS: [*Sam the Astronaut*](#)

- Read the book with your child.
- Show pp. 16-19. Ask, **What do you think it would be like to have your food strapped down? To sleep strapped down? Would you like to try it?**

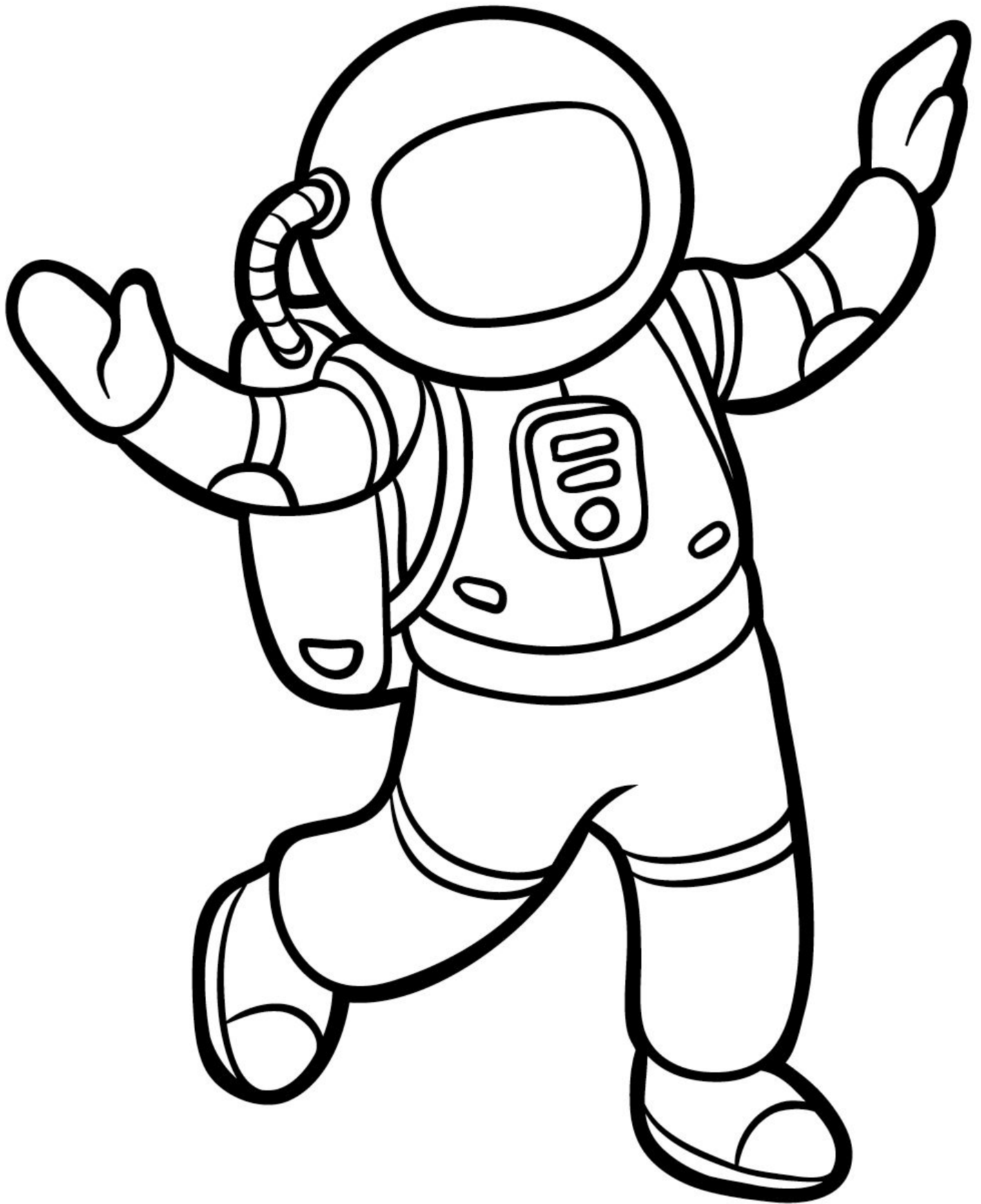
Space Food

After two long years, Sam finally got to go into space with Dominic and Alvin. While she was in space, she ate regular food! But, her food came on special trays with Velcro straps that attached the tray to a wall or other surface so her food would not float away!

Astronaut Jobs

Each astronaut has a job such as commander, payload specialist, or mission specialist.





Week 4

PK4 Unit 10 Week 4 Overview

Light and Shadows

This week your child will:

Learn about light and things related to light, like shadows and reflections. They will make art with shadows and reflections, learn the letters U and Y, identify numbers, and add sets. You can do simple experiments at home by shining a flashlight through a colander in a dark room to make it look like stars. Or, put transparent colored paper over a flashlight to mimic the northern lights.



Key Vocabulary



reflection

an image that you can see in a mirror, glass, or water



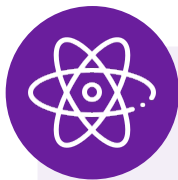
shadow

the dark shape made when someone or something stands between a surface and the light

Create Connections

This is the last week of our unit on space. Before you begin the packet, write and draw about something exciting that you have learned so far.

**Think
About It!**



STEM: Adding Fingers Up to 10

- Hold up 4 fingers on one hand and 3 fingers on the other.
- Have your child add all your fingers together. Ask, **How many are there in all? Yes! There are 7 fingers in all.**
- Repeat for other sets of fingers, totaling no more than 10.



Independent Learning: Light Puzzle

MATERIALS: [Light Puzzle](#), crayons, child-safe scissors, *optional - glue the puzzle onto cardboard before coloring and cutting out*

- Talk about the different sources of light in the puzzle. Say, **There are two types of light - light that is from nature and light that people make.** Talk about the natural sources of light like the fire, moon, and stars, and the man-made sources like the streetlight and house light.
- Have your child color and cut out the puzzle. Then they can put the pieces in order from 1 to 10.

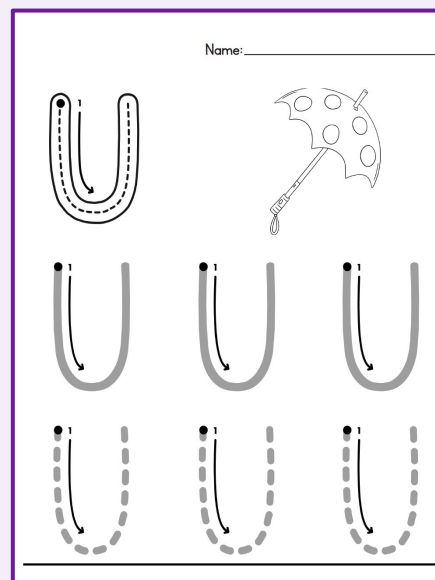




Literacy: Letter U

MATERIALS: [Letter U Practice 2](#)

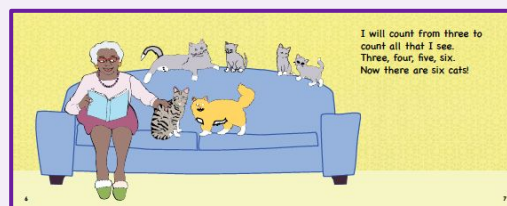
- **Make a U by writing down, curve up.** Have your child say the letter U and make the letter sound for U, like up, not like unicorn.
- Your child can trace the U with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “u.” Use words like under, unzip, umbrella, and up. Switch roles so your child can suggest words.
- Look through a book or magazine together and see how many uppercase U’s you can find.
- *Optional - practice writing with other materials.*



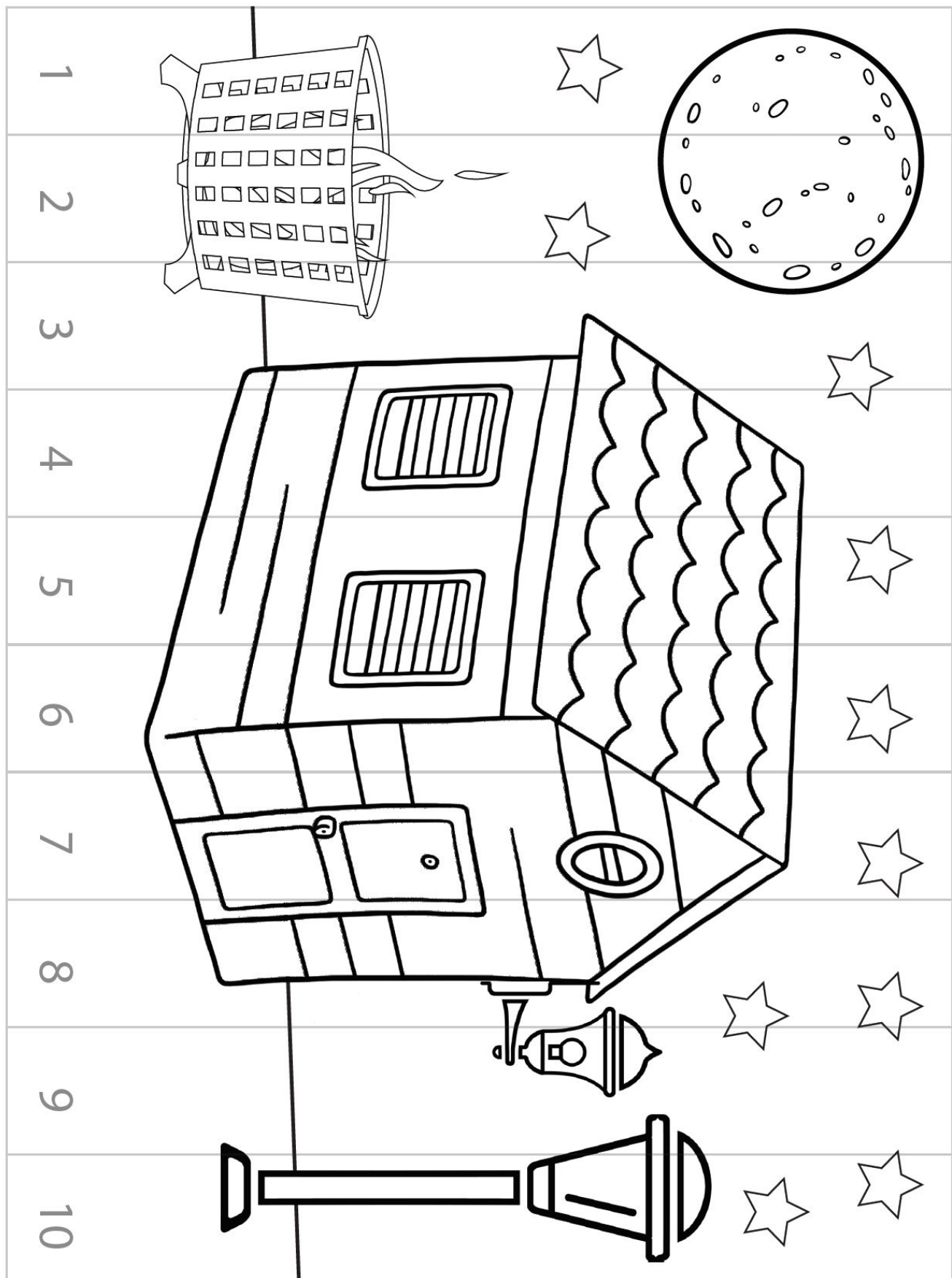
Read: *My Grandma's Cats*

MATERIALS: [My Grandma's Cats](#)

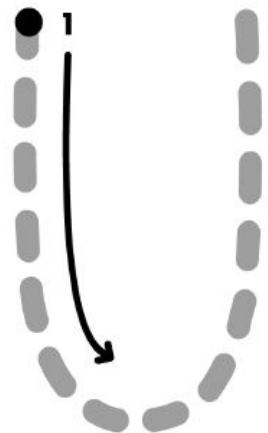
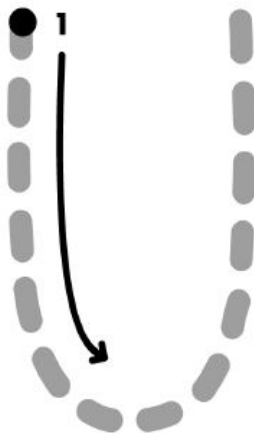
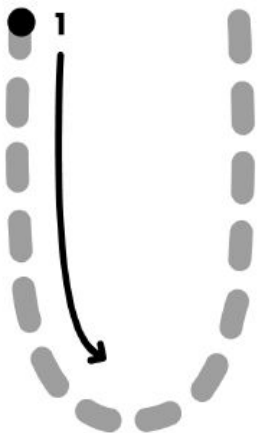
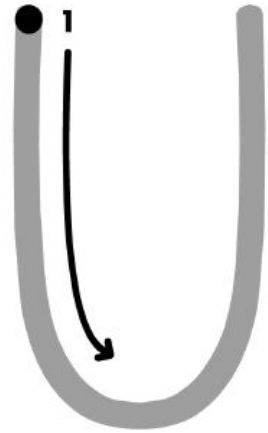
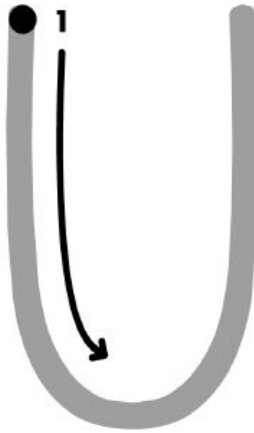
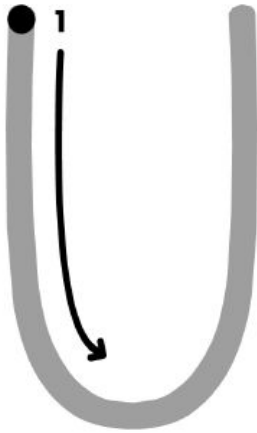
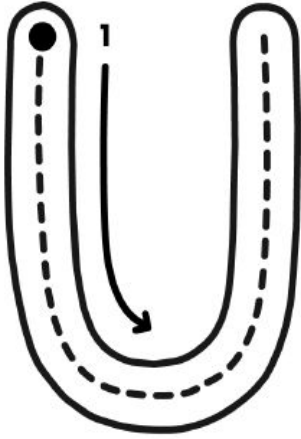
- Read the book with your child.
- Show pp.4-5 and ask, **How many cats are there in all? Yes, 6. There are 6 in all.**
- This book introduces counting on from a number. You can hold up 3 fingers and say, **There were 3 cats and then 3 kittens came. Let's count from 3 to see how many there are in all - 3, 4, 5, 6. 6!**

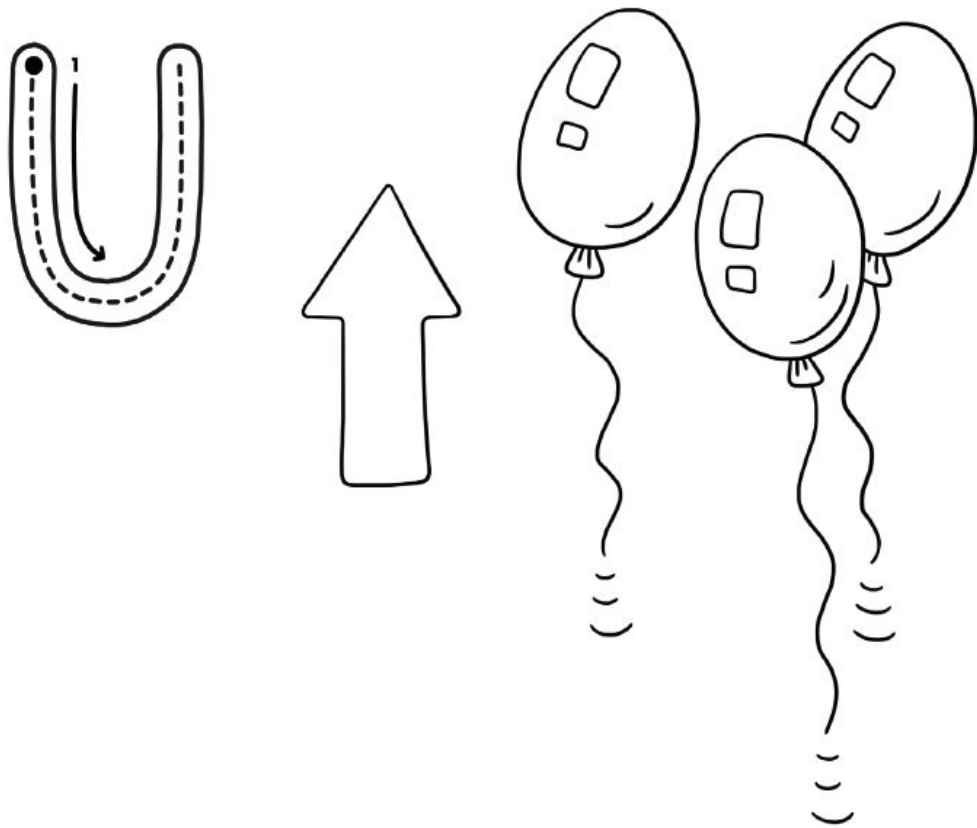


You can also access a pre-recorded reading of this book on the Spakler app in the “Tips for Adults” section, Blast Off Into Space!



Name: _____

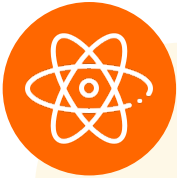




Up



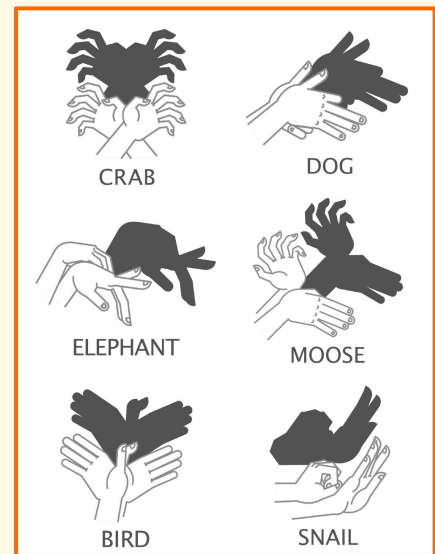
Under



STEM: Shadows

MATERIALS: [Hand Shadows](#), lamp or flashlight

- Go in a dark room if using a flashlight or lamp. Or go outside and use sunlight to make shadows.
- **A shadow is something that appears when something blocks the light.** Demonstrate how to make a shadow. Encourage your child to make a shadow with their hands and describe what they notice. The shadow does what their hand does.
- Allow them to explore shadows by seeing if they can make them larger or smaller depending on how close or far away they are from the light.
- They can make the hand shadows in the pictures or make up shapes of their own.



Independent Learning: Shadow Tracing

MATERIALS: paper, crayons, objects such as a plastic bottle, toy, cereal box, etc.

- Place the objects at the edge of a paper so their shadow falls on the paper to trace. If necessary, use a lamp or flashlight.
- Ask, **What do you notice on the paper? Yes, the shadows!**
- Have your child trace the shadows and decorate the paper.
- After, ask, **How did you decorate the shadows?**





Literacy: Blending 3 Sounds Review

MATERIALS: *optional - 3 pebbles or cotton balls, Phoneme Box*

- **Let's blend or put 3 sounds together to make a word!**
- Say, **h-i-p**. Blend the sounds together. What word do you hear?
H-i-p, hip!
- Repeat for other "ip" words: s-i-p (sip), d-i-p (dip), t-i-p (tip).
- If your child needs help, use the Phoneme Box (the part with 3 boxes) and objects (also used on Day 12).

A horizontal line is drawn across the page. Above the line, in the center, is a square box containing the number 2. Below the line, in the center, is a square box containing the number 3.



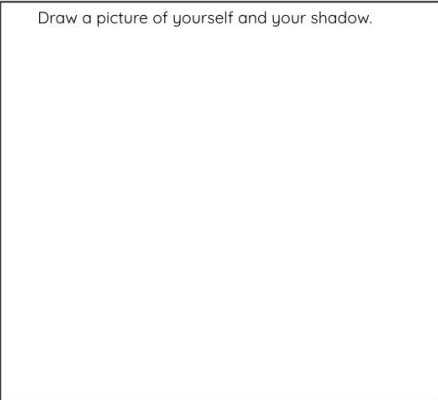
Journal Prompt: My Shadow

MATERIALS: crayons, pencil, My Shadow Journal Page

- With your child, talk about shadows. Point out the shadows of objects around the room.
- Have your child draw a picture of themselves and their shadow.
- After, ask, **What are you doing in your drawing? Where is your shadow? Is your shadow doing what you're doing?**

Name: _____

Draw a picture of yourself and your shadow.

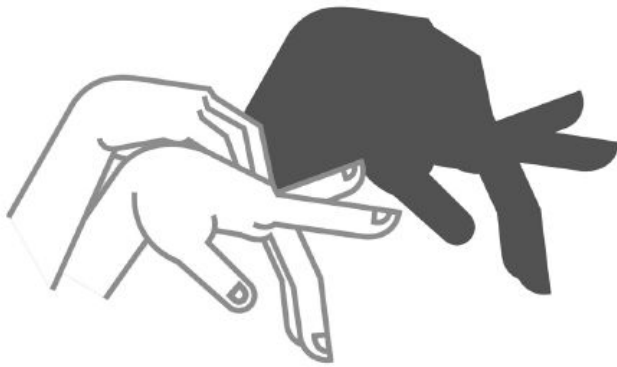




CRAB



DOG



ELEPHANT



MOOSE



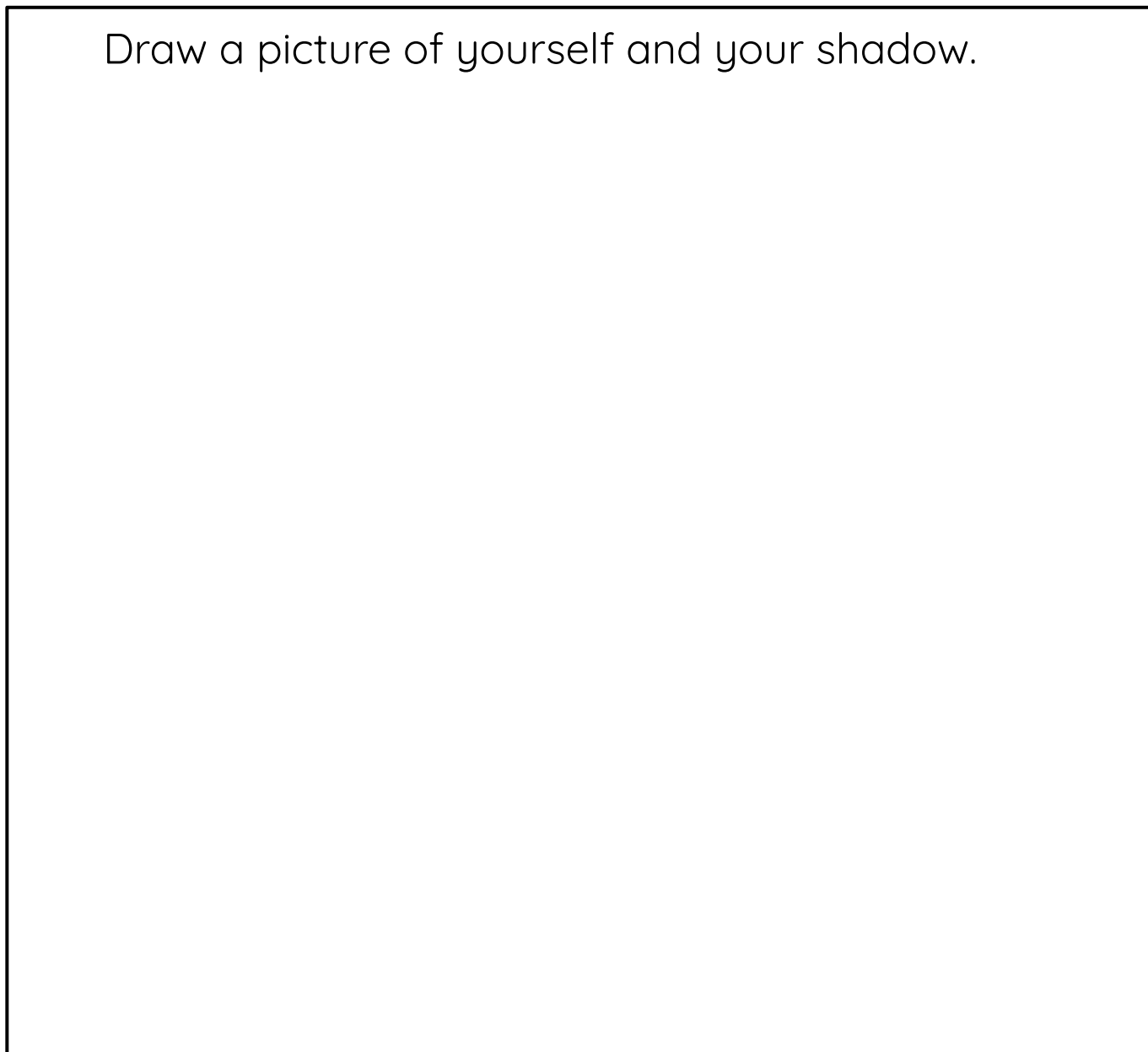
BIRD

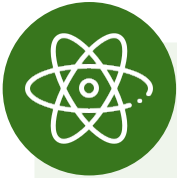


SNAIL

Name: _____

Draw a picture of yourself and your shadow.





STEM: Shake It Up Addition 2

MATERIALS: bag, counters in 2 different colors, e.g., 9 yellow counting bears and 9 red counting bears (or use paper squares of two colors or pennies and dimes)

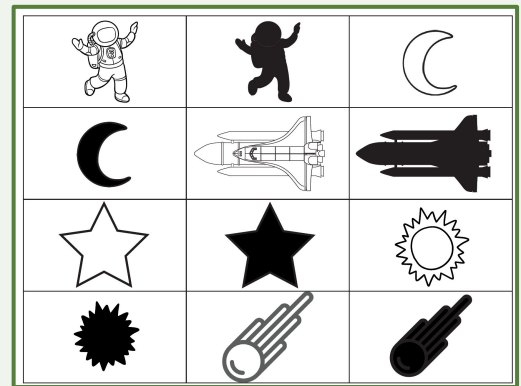
- Drop 8 yellow and 1 red bear into the bag. Have your child shake the bag, pour the bears out. Count how many there are all together.
- Repeat for different amounts totaling no more than 10.
- Increase or decrease the number of items as appropriate for your child.



Independent Learning: Shadow Matching

MATERIALS: [Shadow Matching](#), crayons, child-safe scissors

- Show your child the cards and help them to find the shadow for each picture.
- Allow your child to color the pictures and then cut them out.
- Have your child find the matches. Place 3-4 pairs of cards face down. Flip over two cards. If the pictures match, they can take the cards out of the playing area. If the cards don't match, flip them face down again.

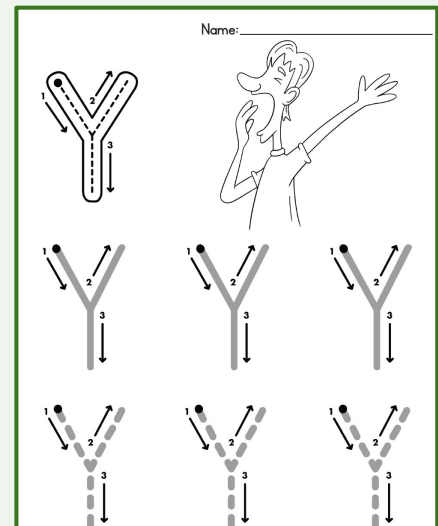




Literacy: Letter Y

MATERIALS: [Letter Y Practice 3](#)

- **Make a Y by writing slant down and up, line down.**
Have your child say the letter Y and make the letter sound for Y, like yellow.
- Your child can trace the Y with their finger, then a crayon, and then color the pictures.
- Have your child put their thumb up if you say a word that starts with “y.” Use words like yellow, yawn, yes, and yo-yo. Switch roles so your child can suggest words.
- Pick a favorite book and see how many uppercase Y’s you can find together.
- *Optional - practice writing with other materials.*



Read: *My Grandma's Cats*

MATERIALS: [My Grandma's Cats](#)

- Read the book with your child.
- Show pp.8-9 and ask, **How many cats are there in all? Yes, 10.**
- This book introduces counting on from a number. You can hold up 6 fingers and say, **There were 6 cats and 4 kittens came. Let's count from 6 to see how many there are in all - 6, 7, 8, 9, 10. 10!**





Let's Move: Shadow Movements

MATERIALS: *optional - music*

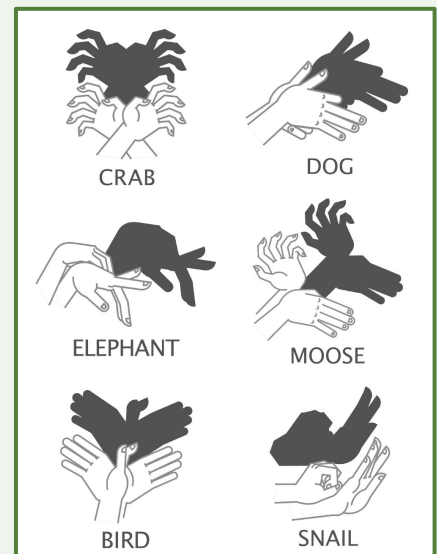
- **Let's pretend to be each other's shadow.** Have one person dance or move around. The other person is the shadow and copies the movements.
- Take turns being the leader and the shadow.

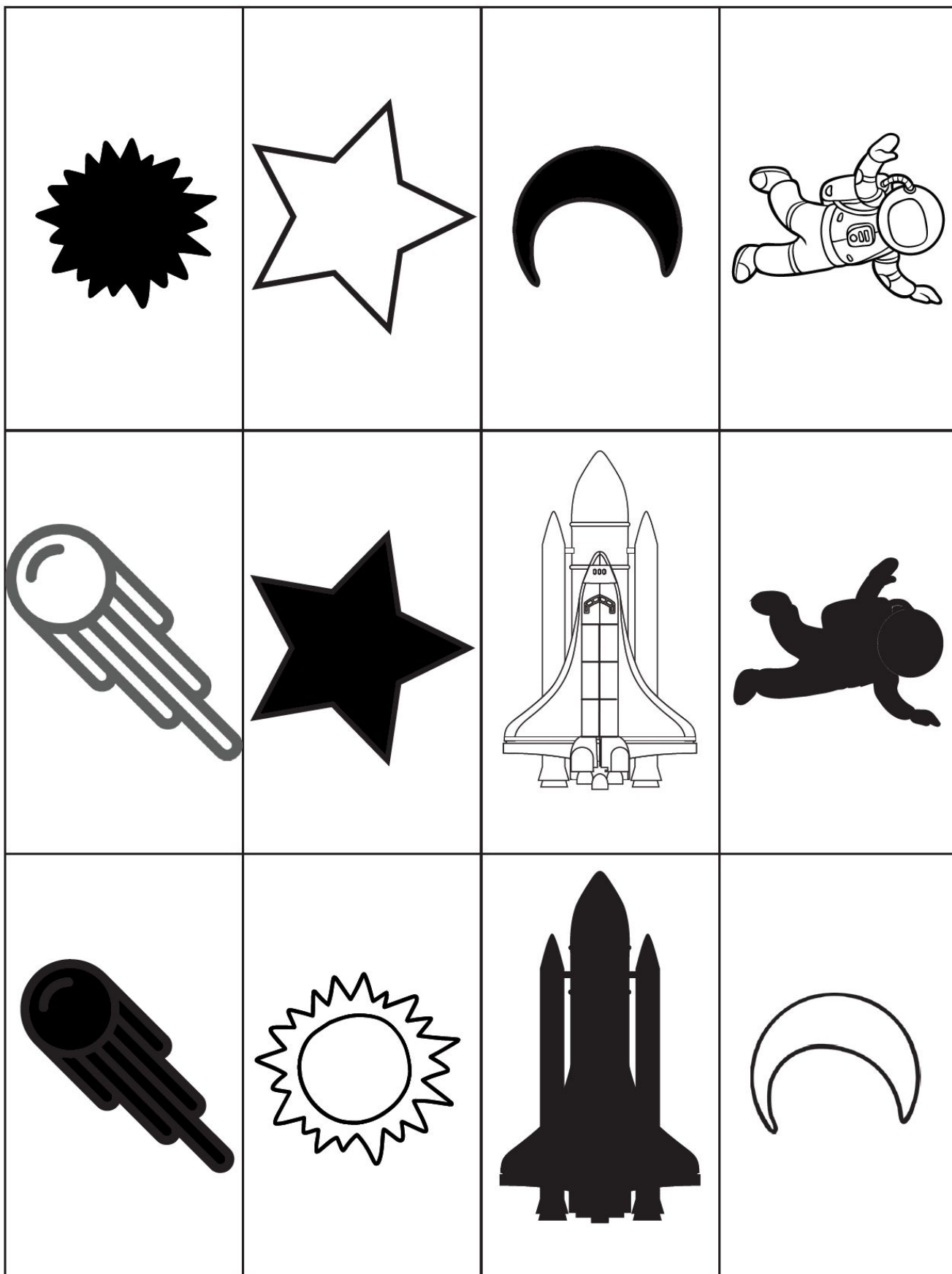


Learning Together: Shadow Theater

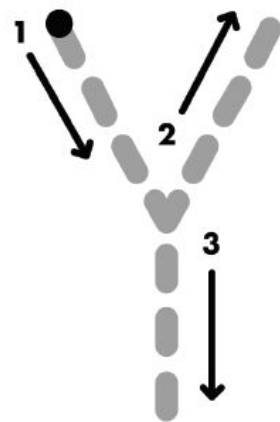
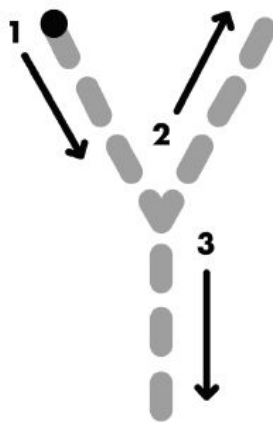
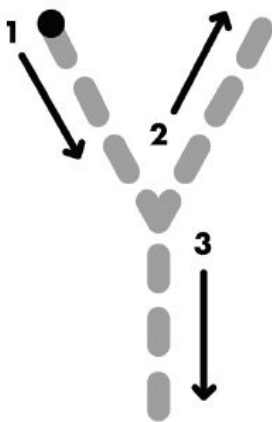
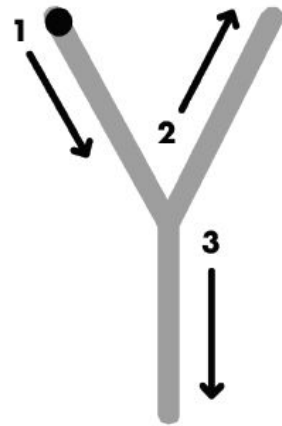
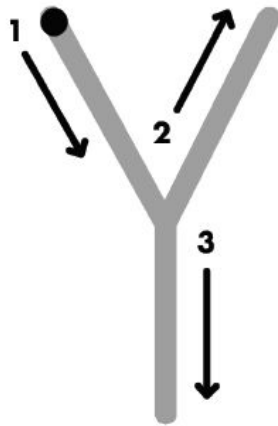
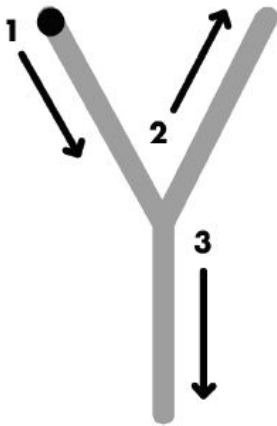
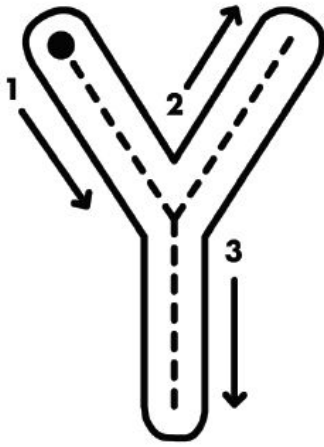
MATERIALS: [Hand Shadows](#), lamp or flashlight, a room with wall space, *optional - toys or props with interesting shapes*

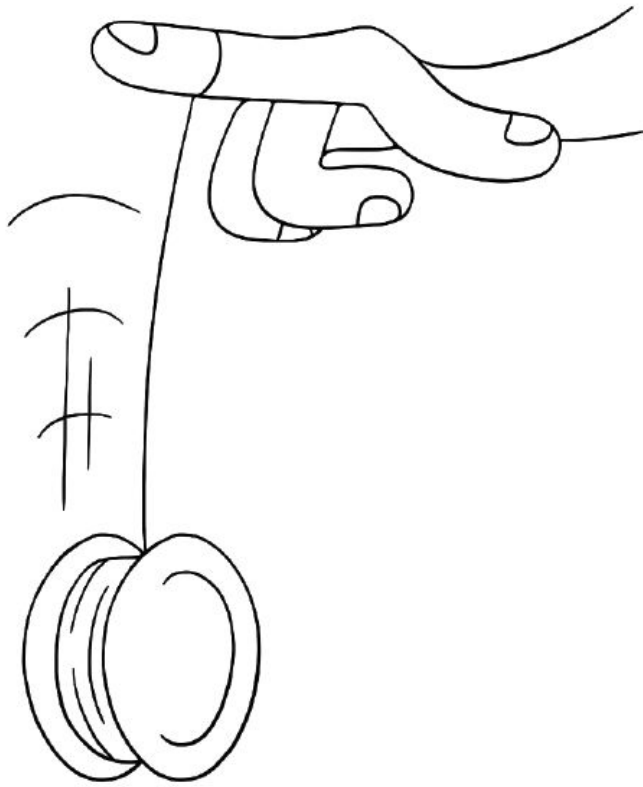
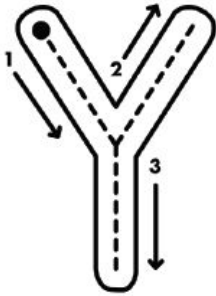
- If using a lamp or flashlight, go into a dark room. Or go outside and use sunlight to make shadows.
- **Let's make a shadow theater! Let's use our hands to make different animals.** Use the pictures to show your child how to create shadows.
- Have fun making different characters and acting out a scene together!



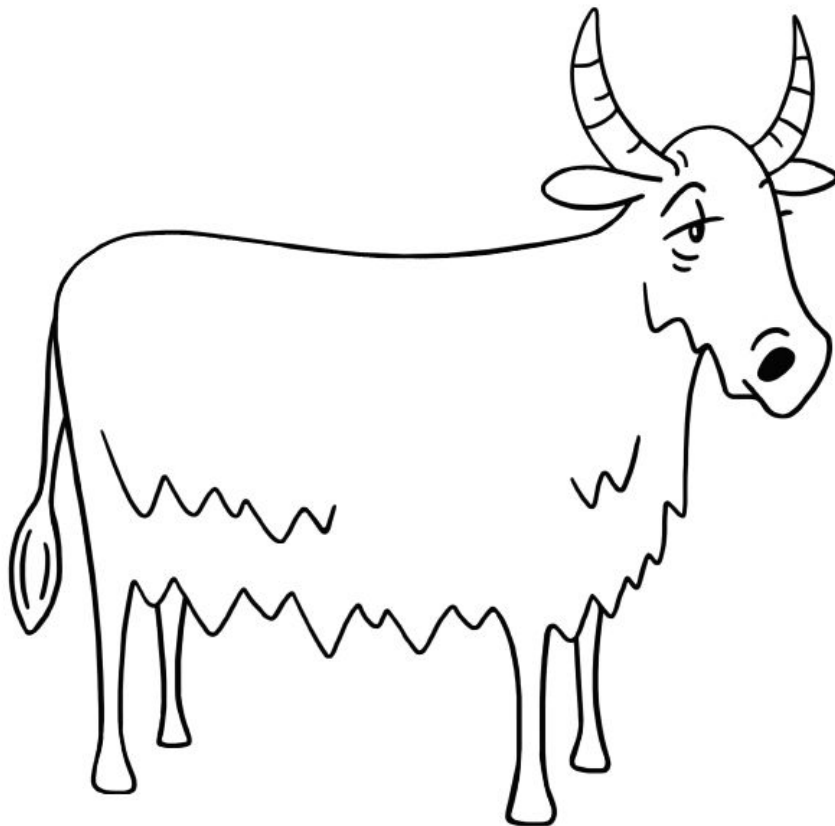


Name: _____

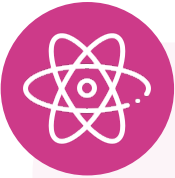




Yo-Yo



Yak



STEM: Reflections

MATERIALS: 1-2 mirrors, or selfie mode of phone, *optional - shiny metal objects like spoons, or glass objects like drinking glasses (supervise carefully), windows, water, etc.*

- **A reflection happens when light bounces off something shiny, like a mirror, glass, or water.** Look at the mirror and describe what you notice.
- Encourage your child to explore the mirrors. Experiment with having two mirrors face each other to get an endless number of images. Try to find reflections in the water, the mirror, a window, or shiny spoons.



Independent Learning: Reflection Portrait

MATERIALS: mirror or phone turned to selfie mode, paper, crayons or watercolor palette

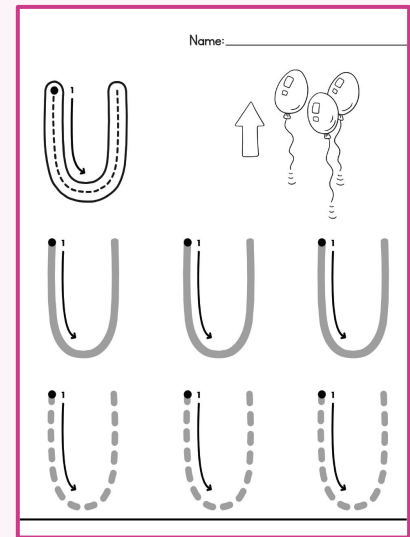
- Have your child look at their reflection and draw their picture by looking at their reflection.
- After, ask, **What was it like to draw yourself by looking at your reflection? Was it hard?**



Literacy: Writing Letters U & Y

MATERIALS: [U & Y Practice 2](#), pencil, crayons

- Brainstorm words that start with the letters Y and U (focus on the U sound like up, not like universe).
- Have your child trace the letters Y and U and color the pictures. They can also draw and color their own pictures.
- After, ask, **What letters did you write? What words start with the same sound as up? What words start with the same sound as yawn?**



Journal Prompt: Cats

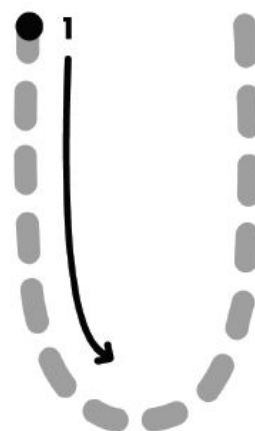
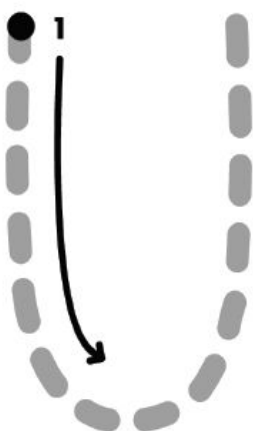
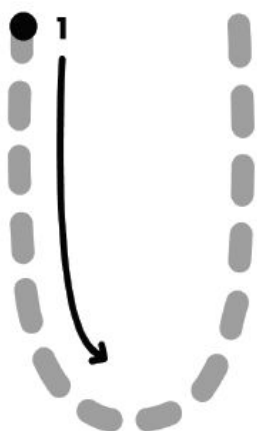
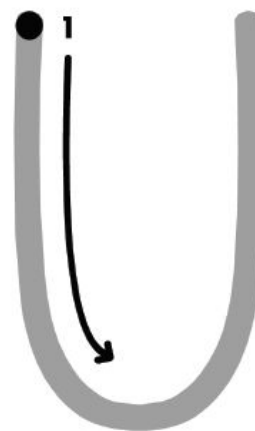
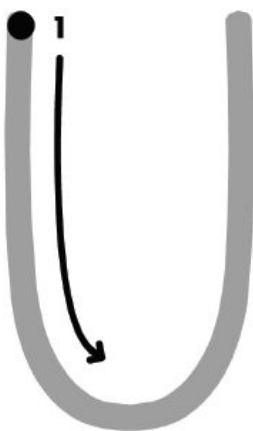
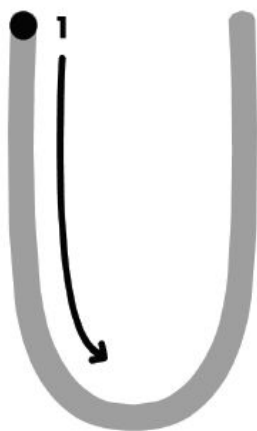
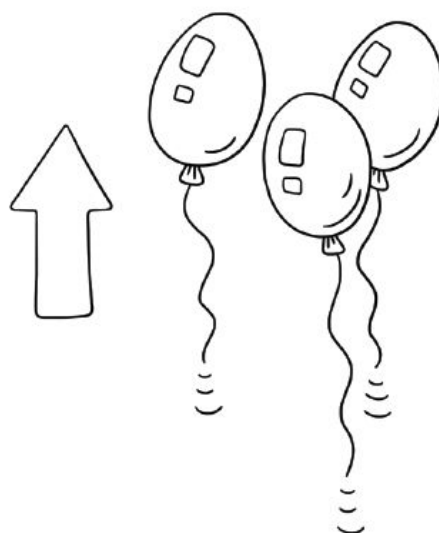
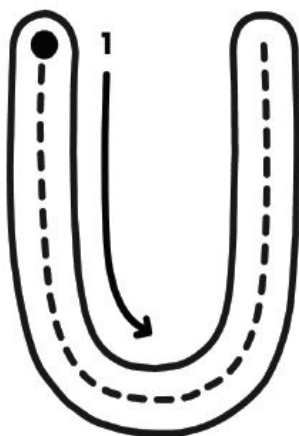
MATERIALS: crayons, pencil, Cats Journal Page, [My Grandma's Cats](#)

- Talk with your child about all the cats grandma had in the story and how they think grandma takes care of 15 cats.
- Have your child write and draw about what they would do if they had so many cats.
- After, talk about their drawing together.

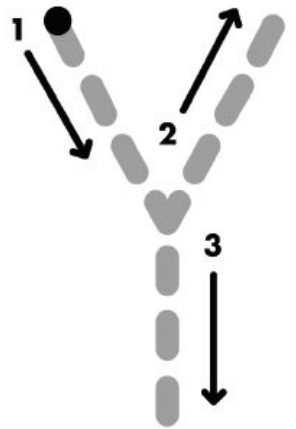
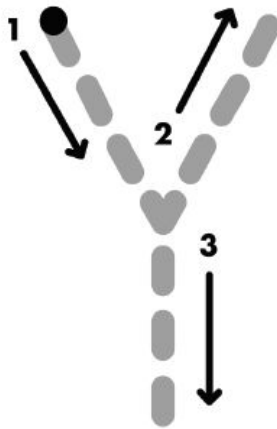
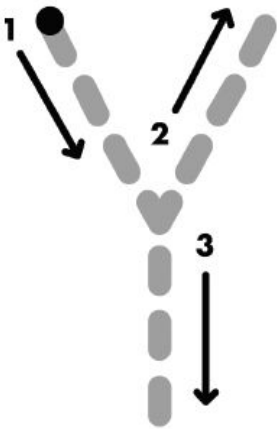
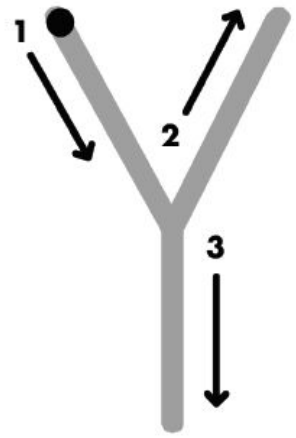
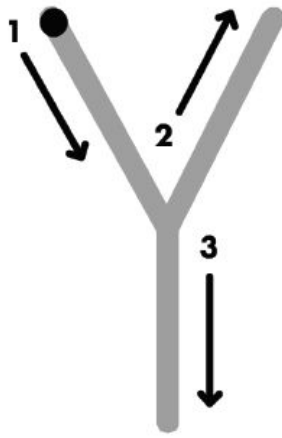
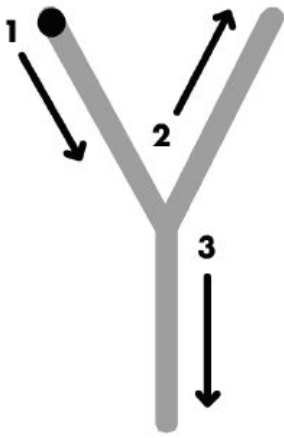
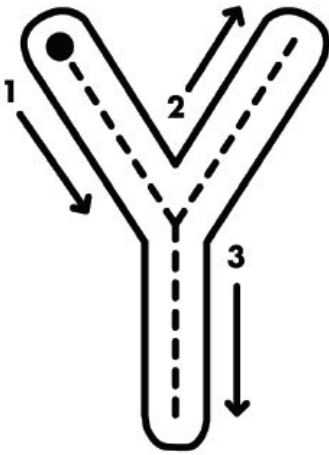
Name: _____

Write and draw about what you would do if you had as many cats as grandma does.

Name: _____

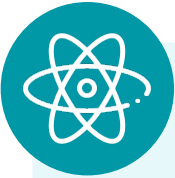


Name: _____



Name: _____

Write and draw about what you would do if you had as many cats as grandma does.



STEM: Comet Freeze Dance

MATERIALS: paper, pencil, music, 0-10 number cards

- Place the number cards in different places on the floor. Name the numbers on the floor together.
- **When the music is playing you can dance. Pretend to be a comet flying around in space. When the music stops, I will say a number. Fly like a comet to the number on the floor and freeze by it.**
- Play a few rounds. Then allow your child to lead and say a number for you to find.
- You can also pretend to be astronauts walking in zero gravity or planets orbiting around the sun.



Independent Learning: Say Goodbye to “Blast Off Into Space”

MATERIALS: paper, crayons

- Talk with your child about their favorite part of learning about space, astronomers, and astronauts. It could be an activity or a book.
- Have them draw and write about it.
- After, ask, **What did you write about? Why was that your favorite?**



Literacy: Letters Review 2

MATERIALS: make 2 letter cards each for the letters O, P, U, and Y

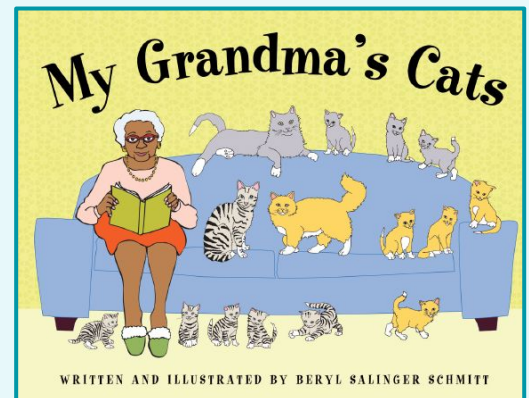
- Make the letter cards with your child to practice letter writing.
- Give one set of cards to your child and keep one set.
- Show your child a letter and ask for the letter name and letter sound. Have your child show their matching card.
- Switch roles so that your child can show you a card.
- You can also say a letter and have your child find something in your home that starts with that letter sound.



Read: *My Grandma's Cats*

MATERIALS: [*My Grandma's Cats*](#)

- Read the book with your child.
- Hold up 2 fingers and say, **I have 2 cats and then I got 3 kittens** (hold up 3 fingers). **How many do I have in all?** Allow your child to count your fingers and tell you. **Yes, 5!**



Welcome to Unit 10, Blast Off Into Space! In this unit your child will learn about the moon, things found in space, astronauts, gravity, shadows, and reflections.

