Blast Off into Summer Reading

Elementary Families,

Amherst County Public Schools is excited to offer a space-themed reading adventure packet for elementary students and families to extend learning opportunities in Summer 2022!

The best way to get kids learning is to build on their curiosity and interests. Every time you pair a book with an experience, you are giving children an opportunity to learn more about their world. Interesting experiences give kids a broader framework for new information they might encounter in books. When kids have lots of experiences to draw on, they have a better chance of making a connection with what they read!

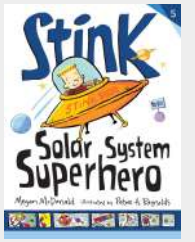
Each child PreK-5 will receive a space-themed book, as well as this **Blast Off into Summer Reading** activity packet. In this packet, you will find information to build background knowledge, hands-on activities to engage children in interesting experiences, writing opportunities, and word play activities. We've designed the packet to be user-friendly and adaptable. You can use the materials each day for five days in a row, or once a week for five weeks, or any other way you like to add fun learning experiences to your summer.

By engaging children in literacy activities over the summer, we give them opportunities to build background knowledge, deepen vocabulary, improve reading – and be ready in the fall for a successful school year. Get ready to blast off into an adventure in space!

Activities adapted from Reading Rockets Start with a Book startwithabook.org

Grades PK-1: Fly Guy Presents Space

Grades 2-3: Stink: Solar System Superhero



Grades 4-5: The Secret Explorers and the Comet Collision

Looking For More?

If you like the activities you see in this packet, visit our ACPS Parent & Family Literacy Links webpage for more book lists, parent tips, and ideas you can try at home!

SCAN ME

Activating Background Knowledge

Before diving into the activities in this packet, here are some questions you can ask your child to see what he/she knows about space. Can you think of any other questions you could ask your child?

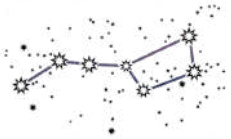
- Have you ever looked at the sky at night? What did you see?
- What is the solar system and why is the sun at the center of it?
- How big is the solar system? How big are all the planets?
- Besides planets, what other objects are in our solar system?
- What is the surface of the moon like? Where do all the craters come from?
- Have you seen the moon seem to change shape?
- What is gravity? Is there gravity in space? On the moon?
- How does a rocket get into space?
- How do scientists make sure a spacecraft can land safely on Mars or the moon?
- What's it like for astronauts to live and work in space?

Survey Says...

Complete the brief survey below let us know if you liked the activities in this packet and how we can better support you with these types of activities in the future. We look forward to your feedback!

SCAN ME

Topic 1 - Stars & Constellations



Stars are so far away from Earth that, even through large telescopes, they appear only as tiny points of bright light. Stars seem to twinkle because we see them through the layers of the atmosphere — the gasses that surround our planet. The movement of air and dust in the atmosphere bends, or refracts, a star's light in different directions. Because the light is scattered by the time it reaches our eyes on Earth, stars appear to twinkle. You might think of it as the light traveling a zig-zag path to our eyes, instead of the straight path the light would travel if Earth didn't have an atmosphere. Watch: *What Are Stars?* (SciShow Kids) https://youtu.be/ZrS3Ye8p61Y

Hands On Activity:

In this activity, we will be exploring why stars appear to twinkle. Have you ever looked at stars in the night sky? What have you observed? Have you ever looked up high in the night sky at the stars and then moved your head down closer to the horizon. Do the stars seem to change? Stars closer to the horizon will appear to twinkle more than stars higher up in the sky because there is a lot more atmosphere between you and a star near the horizon.

Supplies:

- 12-inch x 12-inch square of aluminum foil
- 2-quart clear glass bowl filled with water
- Flashlight
- Pencil (optional)
- *This activity works best in a darkened room*

Fun fact: The scientific word for this twinkling phenomenon is called *scintillation.*

How to:

1. Crumple your square of foil, then open it up, and place it on a table. Fill your clear bowl with tap water and place the bowl on top of the crumpled foil.
2. Darken the room by turning off the lights. Hold the flashlight about 12 inches above the bowl. Look at the foil through the undisturbed water. What does the reflected light look like?
3. Now using your finger or a pencil, tap the surface of the water gently. Look at the foil through the moving water. How does the reflected light look like now? What happened?

The light rays reflecting from the foil when there was a movement in water appears to blur or twinkle. Why? The movement of the water causes the depth of the water to vary. The light rays twinkle because they bend or refract in different directions when they pass through the different depths of water. This is similar to the light rays from the stars. They appear to be twinkling when you are observing from Earth because they refract differently as the light rays move through the different thickness of air in the atmosphere.

Writing:

Blackout poetry is like a treasure hunt since you find hidden meanings and secret messages in unlikely places. It also creates a beautiful "night sky" — with words as the twinkling stars of your poem.

Supplies:

- Old newspapers or magazines
- Thin and thick black markers

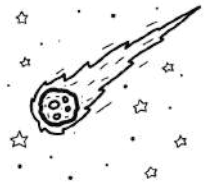
How to:

1. Select a newspaper or magazine page and look at all of the words on the page. Think about how you might use these words to create a poem.
2. With a thin black marker draw a box around the words that you want in your poem.
3. Color in (black out) the rest of the words on the page with the thick black marker, leaving just the words you selected.
4. Read your poem to family and friends! Tag Amherst County Public Schools on social media and us #ACPStitle1 to show us your poem.

Word Play:

- Brainstorm other words that rhyme with star. (car, far, jar)
- A constellation is a group of stars that form a pattern. How many syllables are in the word constellation? (4) How many other words can you think of that have four syllables? (astronomy, calculator)
- Star has three phonemes or sounds. What other words have three phonemes? (fish, like, tub)
- Star begins with the st- blend. What other words begin with st- blends? (stop, staple)
- Star has an r-controlled vowel sound /ar/. What other words contain the /ar/ sound? (bark, market)
- How many words can you think of that begin the word star? (starship, startle, starch)
- Two root words have the meaning of star: stell- and astr-. What words can you think of that share these same roots? (stellar, astronomy)

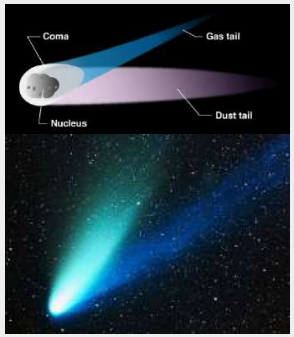
Topic 2 - The Solar System



Comets are large balls of ice, frozen gas, and dust, sort of like outer space snowballs! They travel in long, elliptical orbits around the Sun – it can take hundreds of years to complete one orbit. When a comet gets close to the Sun, the ice turns to gas and together with the dust it streams out to create two long tails. If the comet passes close to Earth, we can see the tails as bright streaks in the night sky. Comet dust tails can be 6 million miles long and can sometimes stretch almost 100 million miles! Watch: *Comets and Asteroids* (SciShow Kids): https://youtu.be/02wrLS-ue1Q

Hands On Activity:

In this challenge, we will make a simple model of a comet and then observe what happens when our comet gets close to the Sun. Comets have four parts: (1) the solid nucleus made of rock, dust, gas, and ice; (2) the coma, a fuzzy cover of ice and dust; (3) a gas tail; and (4) a dust tail. Have you ever seen a comet in the night sky? What did it look like?



The solar wind is a stream of electrically charged particles that are constantly shooting out of the Sun. Astronauts and spaceships need to steer clear! The solar wind causes the coma to flow back behind the nucleus, forming the two tails of the comet. Because it is blown by the solar wind, the comet's tail always points directly away from the Sun.

Supplies:

- 1 chopstick, popsicle stick, or even a stick from your yard
- Aluminum foil (12-inch wide)
- 3-6 ft of ribbon
- Ruler
- Scissors
- Hairdryer (optional)

Fun Fact:
Comet is derived from a Greek word *komotes* which literally means "long-haired star."

How to:

1. To create one model, cut five pieces of ribbon: two long pieces, two medium pieces, and one short piece.
2. Cut three pieces of aluminum foil so they're roughly 6" x 6".
3. Tie the ribbons around the end of the stick. The ribbons are your comet tails.
4. Hold the ribbon pieces off to one side and wrap each piece of tin foil around the end of the stick with the knot of ribbons to form a ball. The aluminum foil creates the nucleus and coma. If you want a bigger comet, add more aluminum foil!
5. Now your comet is ready to fly! Hold the stick of your comet and run around the room with enough speed so that the ribbon "tails" are flying behind you.
6. Optional: Use a hairdryer to demonstrate the solar wind – the Sun's energy as it meets the comet. Have one child be the Sun and stand in place with the hairdryer turned onto high speed. What happens to your comet as you get closer to the Sun?

Writing:

You've just opened a new travel business to take passengers on tours of the solar system. Design a flier advertising your new solar system travel business. How will you attract travelers to join you for a tour of the solar system? Want to write even more? Create a detailed itinerary (what's going to happen on the trip) that gives passengers information about the planets they will be visiting, how long it will take them to get there, and what they should pack. You can also choose one of the planets and create a travel brochure about that particular planet. What important sites will your passengers find on this planet? What important facts do they need to know?

Word Play:

- You found out that comets can have a tail. Brainstorm other words that rhyme with tail. (mail, sale)
- How many syllables are in the word comet? (2) How many other words can you think of that have two syllables? (solar, system)
- What other words can you think of that have the /k/ sound like you hear at the beginning of comet? (kitten, cat)
- Earth ends with the /th/ sound. What other words can you think of that end with the /th/ sound? (bath) How about beginning with /th/? (this, think)
- Planet starts with the pl- blend. What other words can you think of that have the pl- blend at the beginning? (Pluto)
- Revolve has the root volvere meaning "to roll" and the prefix re- meaning "again". What other words can you think of that have the prefix re- at the beginning? (retract, rewind)

Topic 3 - The Moon & Apollo 11

Humans have always been interested in the moon because it affects our tides, we can observe it change throughout the month, and we can even see the moon's many craters without a telescope. Humans first walked on the moon more than 50 years ago? On July 20, 1969, two astronauts walked on the lunar surface for the first time, part of the three-man American crew of the historic Apollo 11 mission. People are still curious about the moon today. When we look at the moon over the course of many days, it seems to change its shape - from a full circle to a half-circle to a crescent shape and then gradually back to a full circle again. The moon isn't really changing shape, though. It just appears that way from Earth. But why? It takes about a month (27 days) for the moon to orbit once around the Earth. During this time, the moon's position in relationship to the Earth and the sun is constantly changing. As the moon orbits around the Earth, the part of the moon that faces the sun will be lit up. We call the different shapes that are lit up during orbit the "phases of the moon." Watch: *Why Does the Moon Change?* (SciShow Kids) https://youtu.be/yXe0yxzYkjo

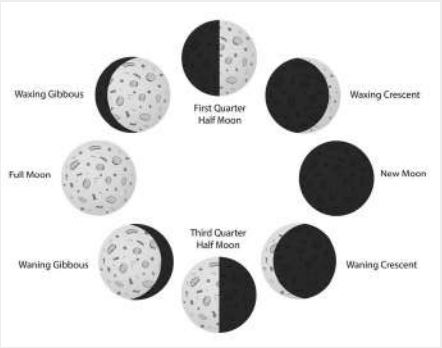
Hands On Activity:

In this activity, we will explore the moon's phases during its revolution around the Earth.

Supplies:

- Bag of Oreo cookies
- Popsicle stick for scraping the frosting
- Plates or napkins
- Moon phase chart

Moon Phase Chart



How to:

1. Refer to the moon phase chart during this activity.
2. Give each child 8 cookies on a plate or napkin and a clean popsicle stick.
3. Slowly twist the Oreos to keep most of the frosting on one side when they separate the halves (younger children may need help with this).
4. Use the popsicle stick to scoop away the frosting to illustrate the moon phases, using the moon phase chart as a guide.
5. Place the cookies in order of how they appear in the sky throughout the month, using the moon phase chart as a guide.
6. After you have finished your Moon phase display, it's snack time!
7. Extension: Look up at the sky tonight – what phase is the moon in? Share what they observe. You might even keep track of a moon phase journal over the next month to record the changes in the moon's appearance as it goes through each moon phase.

Writing:

Did you know? A unique patch is designed for every NASA mission! Following the tradition set by earlier missions, astronauts of the Apollo 11 crew were given the task of designing their mission patch. This patch was important because the mission was so historic! Here's the patch they designed:

The eagle represents both the United States and the Lunar Module and the olive branch is there as a symbol of peace.

Imagine that you are an astronaut going on a new mission to the moon. Your challenge is to design your own mission patch. Think about the elements you want on the patch and what they mean. Make a few sketches, then choose your final idea. Draw the patch in pencil first, then fill in with color. After designing your patch, write about the elements you included and their significance, or meaning.

Word Play:

- Moon begins with the /m/ sound. What other words begin with the /m/ sound? (milk, munch) Can you think of any words that end with the /m/ sound? (broom, ham)
- What words can you think of that have the same beginning sound as phase? (fish, phone, fox)
- How many phonemes or sounds are in the word mission? (5) What other words can you think of that have five sounds or phonemes? (cosmo, splotch, spring, blimp)
- Space includes the sp- blend. What other words can you think of that have the sp- blend? (spark, spin)
- The word moon contains the /oo/ vowel sound. What other words have the same sound? (soon, tune, new)
- Waxing includes the suffix -ing. What other words can you think of that include the suffix -ing? (walking, talking)
- The word mission includes the suffix -ion. What other words can you think of that include the suffix -ion which turns verbs into nouns. (creation, invention)

Topic 4 - Mars: The Red Planet

Let's explore one of the planets that has really captured our imaginations: Mars. Humans have known about Mars since ancient times because you can see it without a telescope. The planet is covered in rocks and sand, colored red by iron oxide (rust). Mars has volcanoes, though they are not active. We once thought there might be life on Mars, but space orbiters, landers, and rovers have revealed a cold desert world. Scientists are still looking for clues that would tell us if Mars has (or once had) the right conditions to support even small life forms, called microbes. NASA and the Jet Propulsion Lab (JPL) are testing a supersonic parachute under Mars-like conditions for future exploration of the planet. Have you ever seen a parachute in action? What did you observe? Watch: *We Brake for Mars* (NASA and JPL) https://youtu.be/9h1NtQJ59kM

Fun Fact:
Humans have not yet been to Mars, but the first spacecrafts to land on Mars were the Viking Landers, which touched down on the surface in 1976.

Hands On Activity:

In this challenge, we will explore which material makes the best parachute for a slow, soft landing of their Mars lander. It's best to do this activity on a day that isn't windy.

Supplies:

- Mars Lander Template
- small object to act as a payload
- newspaper
- cloth
- plastic wrap
- 2 paper clips
- string
- tape

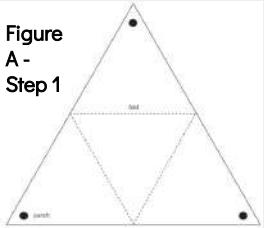


Figure A - Step 1

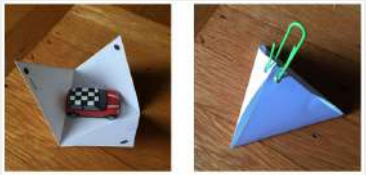


Figure B - Step 3

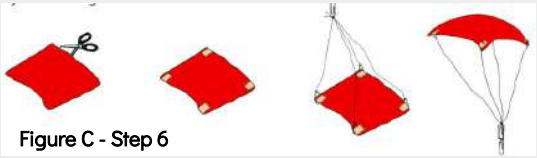


Figure C - Step 6

How to:

1. Make the Mars Lander Template triangle (*see Figure A*) using heavy weight paper or cardstock. Cut out the triangle.
2. Take one of the triangle corners and fold it over so that its point is in the middle of the triangle's other side. Crease the fold well, then unfold it. Repeat with the two remaining corners. Use the hole punch to create one hole near the tip of each point. This is your lander!
3. Next, place the small toy vehicle, crayon or large eraser (the "payload" or scientific equipment) in the lander. Insert the paper clip through the three punched holes to form a little carrier (*see Figure B).*
4. Gather the four strings and tie together in a knot at one end. Attach a large paper clip to the knotted end. The newspaper, cloth, and plastic wrap are your test parachutes. Predict which material will create the slowest landing and write it down in your notepad.
5. Choose one parachute material for the first test run and tape the ends of each string to a corner of the test parachute – being careful not to tangle up the strings.
6. Attach the lander to the parachute by interlocking the two paper clips. Now you're ready to test things out (*see Figure C)!*
7. Find a high place – stairwell, balcony, edge of a deck – to toss your lander and time it to see how long it takes to reach the ground. Record the observations in your notepad.
8. Repeat with the two other parachute materials. Which parachute slowed down the lander the most? Is that what you predicted? What other materials might make a better parachute and why?

Writing:

In this activity, kids will create their own Martian – a life form that could survive on Mars. Many science fiction stories explore the possibility of Martians and what they would be like. Now, many people use the word Martian to mean any alien creature. Design your own Martian! Have the kids draw, color and embellish their Martians, thinking about the Mars environment as they create their character. Ask kids: Is Mars hot or cold? How do animals adapt to live in very cold or very hot climates? Is Mars windy, dusty, rocky? Does it rain on Mars? What if Martians lived in special spaceships? After designing the Martian, have kids give it a name and then write a story describing the Martian's first encounter with a human visiting Mars.

Word Play:

- The planet Mars looks red. Brainstorm other words that rhyme with red. (bed, said, Ted)
- Earth has two phonemes or sounds. What other words can you think of with two phonemes? (me, day, moo, by, each)
- How many syllables are in the word astronaut? (3) What other words can you think of that have three syllables? (meteor, orbitor, parachute)
- The word red has a short e vowel sound. What other words can you think of that have the short e sound? (jet, west, bread)
- The word space includes the long a vowel sound. What other words can you think of that have the long a sound? (play, weigh, ranger)
- Gravity begins with the gr- blend. What other words can you think of that have the gr- blend at the beginning? (great, grand)
- Telescope has the prefix tele- meaning far. How many other words can you think of that use the root tele-? (telephone, telegraph, teleport)

Topic 5 - Space Exploration

To get to live and work on the International Space Station, astronauts train to improve their overall physical fitness. Why is that important? What kinds of work do astronauts do that require good strength and balance? How does living in space affect an astronaut's body? How would you get prepared to go to space? When exploring space, astronauts complete many physical tasks and must be able to twist, bend, lift, and carry massive objects to do their work. Even "walking" takes different physical effort in the reduced gravity environment of space, with astronauts pushing and pulling themselves from one place to another. And being physically fit and continuing regular exercise is the most effective way to counteract the effects of weightlessness on the human body to maintain muscle strength and good bone health. Astronauts must exercise 2 hours a day in space! Watch: *Exercise in Space* (NASA eClips) https://nasaeclips.arc.nasa.gov/video/ourworld/our-world-exercise-in-space

Hands On Activity:

In this activity, we will complete a short astronaut workout to see how they get fit for space flight.

1. **Stretch:** In the reduced gravity environment of space, NASA has found that the height of astronauts increases approximately 3% over the first 3 to 4 days in space. Everybody's body stretches in space! Stretch with your arms high above your head and hold for 30 seconds. Repeat 4 times.
2. **Balance:** How long can you balance on one leg? Try to balance on your right leg for 60 seconds. Now try to balance on your left leg for 60 seconds. Try each leg again, this time with eyes closed. Extra challenge: Pass a ball back and forth with a friend while balancing on one leg.
3. **Float:** Get used to the position of floating in space. Lie on your stomach and stretch your arms out like an airplane. Hold for 30 seconds. Relax, then repeat 4 times. Extra challenge: Raise your chest up and move your arms like you are swimming using the breaststroke.
4. **Bear Crawl:** Get down on your hands and feet (facing the floor) and walk on all fours like a bear, without your knees touching the ground. Try to go 20 feet. Rest for a minute. Bear crawl back to where you started. Repeat.
5. **Crab Walk:** Sit on the ground and put your arms and hands behind you, with your knees bent and feet on the floor. Lift yourself off the ground (facing upwards). Try to go 20 feet. Rest for a minute. Crab walk back to where you started. Repeat.
6. **Jump:** Jump as high off the floor as you can, and land lightly. Keep jumping for 30 seconds. Extra challenge: Start your jump in a squat position and return to squat when you land. Jump for 30 seconds.
7. **Breathe:** Life in space can be stressful. Breathing exercises can relax you. Take a deep breath in as you raise your arms over your head. Let the breath out as you drop your arms down. Repeat for one minute or more.

Writing:

Write a short story about discovering a spaceship. You wake up one morning to find a broken spaceship in your backyard. Write a story that tells what happens next.

Fun Fact: The International Space Station was launched back in 1998 and astronauts have been living on board ever since. An international crew of seven people live and work while traveling at a speed of five miles per second, orbiting Earth about every 90 minutes. It's 357 ft long from end to end - that's about the same as a football field. After the moon, the ISS is the second brightest object in our night sky - you don't even need a telescope to see it zoom over your house!

Word Play:

- Brainstorm other words that rhyme with space. (race, place)
- Astronaut begins with the short a sound. Can you think of other words that have the short a sound at the beginning like astronaut? (apple, asteroid, ax)
- How many phonemes are in the word space? (4) What other words can you think of that have four phonemes? (jump, solar, rover)
- Try this word chain: Say *space*. Say space, but don't say /s/. (pace). Say *pace*. Change the /p/ to a /r/. (race). Say *race*. Change the /r/ to a /ch/. (chase). Say *chase*. Change the /ch/ to an /b/. (base). Say *base*. Now say *base*, but don't say /s/. (bay). Say *bay*. Change /ā/ to /oo/. (boo). Now say *boo*. Change the /b/ to /m/. (moo). Say *moo*. Now say *moo*, but add a /n/ to the end. (moon)
- The word weightlessness includes two suffixes -less and -ness. Can you think of other words that use the -less as the word weighless? (hopeless, fruitless)
- The word exploration as the prefix ex- which means "out." Can you think of other words that use the prefix ex- meaning "out"? (extend, exceed, exclude)