preschool STEAM

SCIENCE | TECHNOLOGY | ENGINEERING | ART | MATH

WINTER 5-STAR CHALLENGES

Credit:
KG Fonts by Kimberly Geswein

WELCOME,

Engaging young learners in hands-on activities can make Science, Technology, Engineering, the Arts, and Mathematics (STEAM) both enjoyable and educational.

Holiday 5-Star challenges are designed to allow young learners to explore the STEAM disciplines while having fun.

Each challenge engages the 5-Star qualities: Curiosity, Creative Thinking, Critical Thinking, Communication, and Collaboration.

PREP

- **Gather Supplies:** Before beginning any challenge, be sure you have all the necessary materials. Common household items can often be repurposed for these challenges, making them cost-effective and convenient.

- **Safe Space**: Make sure you have a safe, designated area that provides enough room for the activity.

- **Safety Precautions**: If a challenge involves small items or substances that could be potentially hazardous (e.g., small beads, glue), ensure children are supervised at all times.

FACILITATION

- **Introduction**: Briefly explain the challenge and its goal. Introduce the materials the children will be using and explain any safety rules.

- **5-Star Guidiance:**
  - **Curiosity:** Prompt kids with questions that provoke curiosity. For example, "What do you think will happen if ...?"
  - **Creative Thinking:** Encourage children to think beyond the basics of the challenge and use their creativity. For instance, suggest adding wintery designs or decorations to their projects.
  - **Critical Thinking:** Ask questions that prompt deeper thought, such as, "Why do you think your design worked (or didn't work) the way you expected?"
  - **Communication**: Allow time for children to explain their designs and results to each other or to you.
  - **Collaboration:** Encourage teamwork if the challenge involves or allows for group activity. Not only praise the outcome but also how well the children worked together.

POST CHALLENGE

- **Show and Tell:** Give each child a chance to share their project and explain their thought process, what they learned, and what they would do differently next time.

- **Reflection:** Talk about what went well and what was challenging. Connect the activity back to real-world applications or the STEAM disciplines it touched on.

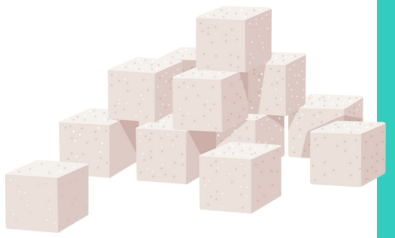
- **Clean-Up**: Ensure all materials are cleaned up, keeping reusable items for future challenges.

- **Share on Social:** We love to see your creations. Be sure to tag us on social media with a picture of your solutions @preschoolsteam.

ICE PALACE ARCHITECTS

Materials: Sugar cubes, white glue, silver glitter, light blue and white tissue paper

Challenge: Build an ice palace using sugar cubes as bricks. Glue them together and sprinkle with glitter for an icy effect. Use tissue paper to create flags and windows.



5-STAR CHALLENGE

★ **Curiosity:** Why do sugar cubes resemble ice bricks in this project?
★ **Creative Thinking:** Design an ice palace fit for a winter king or queen.
★ **Critical Thinking:** Plan the structure so it's stable and aesthetically pleasing.
★ **Communication:** Share a story of who lives in the ice palace.
★ **Collaboration:** Work in a team where each member builds a part of the palace.

HIBERNATION STATION

Materials: Cardboard boxes, fabric scraps, cotton balls, leaves, twigs

Challenge: Create a cozy hibernation den for a small stuffed animal that represents a winter animal preparing for hibernation.

5-STAR CHALLENGE

★ **Curiosity:** What animals hibernate, and why do they need a special place to sleep through the winter?
★ **Creative Thinking:** Use your materials to design the warmest, most inviting den.
★ **Critical Thinking:** Decide on the best materials and structure to keep the animal warm and safe.
★ **Communication:** Share your design choices and explain how your den helps the animal.
★ **Collaboration:** Team up with a friend to build interconnected dens for different animals.

MAGICAL SNOW GLOBES

Materials: Small jars with lids, water, glycerin, glitter, and small waterproof figurines or decorations

Challenge: Create your own snow globe using the provided materials. Shake it up and watch the snow fall.

5-STAR CHALLENGE

★ **Curiosity:** How do snow globes work? Why does the "snow" fall slowly?

★ **Creative Thinking:** Design a festive scene inside your snow globe.

★ **Critical Thinking:** Adjust the ratio of glycerin to water to change the speed of the falling glitter.

★ **Communication:** Describe the scene inside your snow globe.

★ **Collaboration:** Pair up and create a series of snow globes that tell a story together.

PENGUIN WADDLE RELAY

Materials: Balloons, cones or markers, a stopwatch

Challenge: Carry a balloon between your knees and waddle like a penguin from one point to another, navigating around obstacles.

5-STAR CHALLENGE

★ **Curiosity:** How do penguins move in their cold habitat, and why do they waddle?

★ **Creative Thinking:** Find the most efficient way to waddle without dropping your balloon.

★ **Critical Thinking:** Create a course to challenge your penguin waddling skills.

★ **Communication:** Discuss the challenges and strategies used to navigate the course.

★ **Collaboration:** Work in teams to complete the relay, passing the balloon without using hands.

FROSTY FILTER FUN

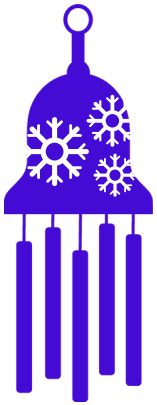
Materials: Coffee filters, scissors, washable markers, spray bottle with water

Challenge: Cut the coffee filters into snowflake designs, color them with markers, and then watch the colors blend and spread when sprayed with water.

5-STAR CHALLENGE

★ **Curiosity:** Investigate how the water affects the marker on the coffee filter and why the colors spread in a frosty pattern.
★ **Creative Thinking:** Experiment with different snowflake cuts and color patterns to create a variety of designs.
★ **Critical Thinking:** Predict how the colors will blend once the water is sprayed and observe the outcome.
★ **Communication:** Share the process and the reasoning behind the color choices with others.
★ **Collaboration:** Combine individual snowflakes to create a larger collaborative winter mural, discussing placement and overall design.

WHIMSICAL WINTER WIND CHIMES



Materials: String, beads, small bells, twigs, and assorted winter-themed charms or cutouts (like snowflakes, stars, etc.)

Challenge: Create a wind chime that produces gentle sounds reminiscent of a winter breeze. Use the twigs as the base to hang your strings of beads, bells, and charms.

5-STAR CHALLENGE

★ **Curiosity:** What sounds remind you of winter? Discover how different materials create different sounds when they collide.
★ **Creative Thinking:** Design your wind chime to visually and acoustically reflect a winter theme.
★ **Critical Thinking:** Determine the best way to balance your wind chime so it hangs properly, and each element can move freely.
★ **Communication:** Explain your choices for your wind chime, such as why you placed certain items together.
★ **Collaboration:** Work with a classmate to combine your wind chimes and create a harmonious winter melody.

SEAL'S ICY PATH CHALLENGE

Materials: Ice cubes, warm water in a squeeze bottle, a shallow tray, small toy seals or animal figures

Challenge: Arrange ice cubes in the tray to form a chilly landscape. Use the warm water to gently melt channels in the ice, creating a navigable maze for the toy seal to find its way from one end of the 'Arctic' tray to the other.

5-STAR CHALLENGE

★ **Curiosity:** How do real seals find their way through icy waters?

★ **Creative Thinking:** Design an intricate path with twists and turns for the seal's journey.

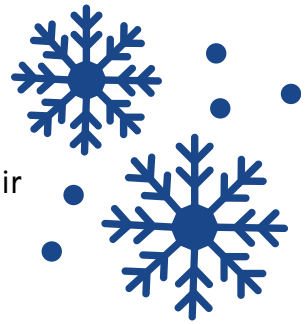
★ **Critical Thinking:** Strategically apply the warm water to create a route without completely melting the ice floes.

★ **Communication:** Explain the process of creating your seal's path and the challenges you encountered.

★ **Collaboration:** Work with a partner, taking turns to guide the seal through each other's icy paths.

SNOWY SCIENCE EXPERIMENT

Materials: Baking soda, white hair conditioner, bowl, measuring cups, holiday-themed cookie cutters.



Challenge: Mix baking soda and hair conditioner to make faux snow that can be molded. Use it with cookie cutters to create holiday shapes.

5-STAR CHALLENGE

★ **Curiosity:** What reaction makes the mixture feel cold and snow-like?

★ **Creative Thinking:** Sculpt a unique holiday scene using the faux snow.

★ **Critical Thinking:** Adjust the recipe for different snow textures - fluffier or icier.

★ **Communication:** Explain the science behind your faux snow.

★ **Collaboration:** Make a winter village display with your friends using the snow you've created.

SLIPPERY SLOPE SKI RAMP

Materials: Cardboard or foam board, cotton batting, tape, small toy figures or blocks

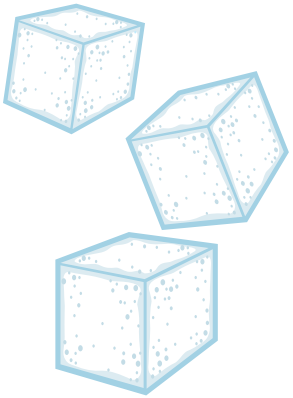
Challenge: Design and build a miniature ski ramp or slope for toys or blocks to slide down, emulating a snowy hillside.

5-STAR CHALLENGE

★ **Curiosity:** How does a hill's slope affect a slider's speed?
★ **Creative Thinking:** Craft a fun and safe ski slope with turns and soft landings.
★ **Critical Thinking:** Adjust the angle and smoothness to control the speed of the descent.
★ **Communication:** Describe how you built your slope and observed the effects of gravity and friction.
★ **Collaboration:** Work with friends to create a larger slope with different paths and race toys down them.

SNOWY SHELTER BUILDING

Materials: Sugar cubes, white icing, cardboard bases, pretzel sticks, marshmallows



Challenge: Construct a model of an animal shelter suitable for a snowy environment using edible materials

5-STAR CHALLENGE

★ **Curiosity:** How do animals keep warm and stay safe in structures during winter?
★ **Creative Thinking:** Design a shelter that can withstand the harsh conditions of a pretend winter landscape.
★ **Critical Thinking:** Choose construction methods that will make the strongest and most stable shelter.
★ **Communication:** Explain the reasons behind your design choices for your shelter.
★ **Collaboration:** Join with a partner to create a winter village of animal shelters.

ICEBERG FLOAT CHALLENGE

Materials: Blocks of styrofoam, blue watercolor or food coloring, large basin of water, small plastic animals or figures

Challenge: Color the water in the basin blue to represent the ocean, and then create an 'iceberg' using styrofoam blocks that can float on the water. Place plastic animals on the iceberg without it tipping over.

5-STAR CHALLENGE

★ **Curiosity:** Explore buoyancy by observing how styrofoam floats and can support weight in water.
★ **Creative Thinking:** Design your iceberg as realistic as possible, maybe even carving it into shape.
★ **Critical Thinking:** Strategically place animals on the iceberg to keep it from tipping. How does weight distribution affect buoyancy?
★ **Communication:** Describe your iceberg design and tell a story about the animals living on it.
★ **Collaboration:** Work with a partner to build a polar scene, taking turns placing animals and sharing the iceberg.

SNOWY SHAPE SCULPTURES

Materials: White playdough or homemade snow dough (using cornstarch and oil), assorted cookie cutters (in winter shapes like snowflakes, snowmen, etc.), sequins, and glitter for decoration.

Challenge: Use the dough to create a variety of winter-themed shapes with the cookie cutters. Decorate your shapes with sequins and glitter to sparkle like real snow.

5-STAR CHALLENGE

★ **Curiosity:** Explore how the snow dough can be used to make different shapes. Why does pressing the dough into a shape and removing the excess work to create these forms?
★ **Creative Thinking:** Think of imaginative ways to decorate and make your shapes uniquely yours.
★ **Critical Thinking:** Plan out your decorations to enhance the details of each shape without overloading it and losing the definition.
★ **Communication:** Share the story behind your shapes and decorations. What inspired your designs?
★ **Collaboration:** Work with a partner to create a snowy scene using your shapes. How can you combine your ideas to make a cohesive display?

BRRR-ILLIANT BIRD FEEDERS

Materials: Pine cones, peanut butter (or alternative spread for allergies), birdseed, string, spoons, plates

Challenge: Make a bird feeder to help winter birds find food. Spread peanut butter on pine cones, roll them in birdseed, and hang them with string.

5-STAR CHALLENGE

★ **Curiosity:** What do birds eat in the winter when the ground is covered in snow?
★ **Creative Thinking:** Design a bird feeder that feeds birds and looks decorative.
★ **Critical Thinking:** Find the best way to cover the pine cone so it holds the most birdseed.
★ **Communication:** Discuss why feeding birds in the winter is helpful to them.
★ **Collaboration:** Work with others to hang your feeders in places where birds can safely reach them.

HOOT IN THE NIGHT

Materials: Cardboard tubes, wax paper, rubber bands, hole punch, decorations like feathers and markers

Challenge: Construct an owl hooter from a cardboard tube to mimic the sounds of owls in the winter night.

5-STAR CHALLENGE

★ **Curiosity:** How do owls hoot, and why is it important?
★ **Creative Thinking:** Decorate your owl hooter to resemble the colors and patterns of a real owl.
★ **Critical Thinking:** Modify the size and placement of holes to change the sound of the hoot.
★ **Communication:** Share facts about owls and demonstrate how they communicate with your hooter.
★ **Collaboration:** Form an "owl orchestra" with friends to create a symphony of hoots.

POLAR BEAR PAWS

Materials: White paper, scissors, markers, glue, cotton balls, ribbon

Challenge: Create polar bear paw prints to learn about the size and shape of these large winter animals' feet.

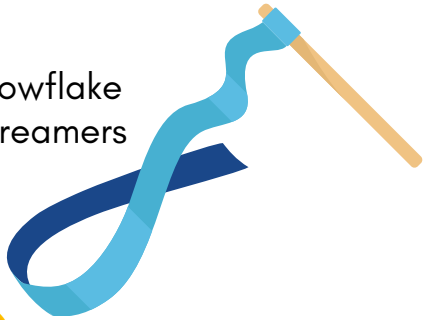
5-STAR CHALLENGE

★ **Curiosity:** Why are polar bear paws so big, and what are they used for?
★ **Creative Thinking:** Design a path of polar bear paws and use it to tell a story.
★ **Critical Thinking:** Consider how polar bears move and place the paw prints in a realistic walking pattern.
★ **Communication:** Explain the features of polar bear paws and how they help the bears survive in the cold.
★ **Collaboration:** Create a collaborative polar path with friends, each adding to the bear's journey.

FROSTY FLURRY DANCERS

Materials: Streamers, ribbons, music player, space to move

Challenge: Dance like a snowflake swirling in the wind, using streamers or ribbons to enhance your movements to music.

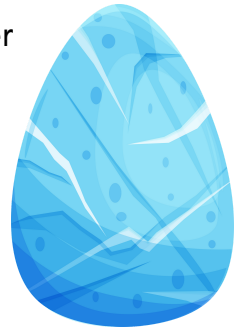


5-STAR CHALLENGE

★ **Curiosity:** How do snowflakes fall, and what patterns do they make?
★ **Creative Thinking:** Choreograph a dance that mimics the unique journey of a snowflake from the sky to the ground.
★ **Critical Thinking:** Select music that reflects the rhythm and mood of a snowfall.
★ **Communication:** Describe the feelings and images you're trying to convey through your dance.
★ **Collaboration:** Work in a group to perform a synchronized snowflake dance.

ICE AGE EXCAVATION

Materials: Small plastic animals, water, food coloring, balloons, salt, warm water droppers



Challenge: Freeze plastic animals in colored water inside balloons to create ice eggs. Children will use salt and warm water to excavate the animals from their icy shells.

5-STAR CHALLENGE

★ **Curiosity:** How does salt and warm water help to melt ice?

★ **Creative Thinking:** Choose colors and animals to freeze in your ice eggs.

★ **Critical Thinking:** Experiment with the amount of salt and warm water to find the most efficient way to rescue the animals.

★ **Communication:** Share your excavation methods and explain why they were effective.

★ **Collaboration:** Work in teams to help each other melt the ice and discuss what techniques work best.

ARCTIC HABITAT DIORAMA

Materials: Shoebox, cotton balls, construction paper, plastic wrap (for ice effects), small animal figurines or cutouts, glue, markers, scissors

Challenge: Create a three-dimensional diorama depicting an arctic scene that includes animals in their natural habitat, showcasing how they live and survive in the cold environment.

5-STAR CHALLENGE

★ **Curiosity:** Which animals live in the Arctic, and how do they adapt to the cold?

★ **Creative Thinking:** Design a detailed and realistic Arctic environment inside your shoebox.

★ **Critical Thinking:** Consider the placement and interaction of animals within the habitat.

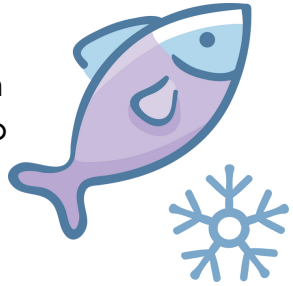
★ **Communication:** Share information about each animal and its role in the ecosystem.

★ **Collaboration:** Work with a classmate to combine dioramas, making a larger scene.

FROZEN LAKE FISH RESCUE

Materials: Blue gelatin, gummy fish or small toy fish, large shallow pan, butter knives or small plastic tools for chiseling

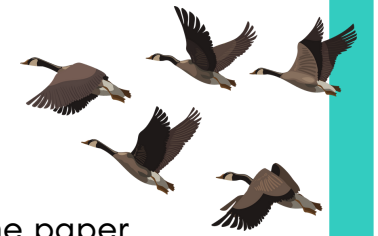
Challenge: Create a gelatin "frozen lake" with fish inside. Use the tools to carefully chisel out the fish without breaking the gelatin lake.



5-STAR CHALLENGE

★ **Curiosity:** How do animals get trapped in ice, and how might they be rescued?
★ **Creative Thinking:** Strategize different ways to remove the fish safely.
★ **Critical Thinking:** Experiment with the gentlest way to extract the fish without cracking the lake.
★ **Communication:** Share your rescue strategy and what it might feel like when real fish are under ice.
★ **Collaboration:** Work as a rescue team to figure out the best methods and help each other with the task.

MIGRATION PATTERN MAPPING



Materials: Large roll of paper, markers, animal stickers or stamps, string

Challenge: Draw a large map on the paper and use stickers or stamps to mark the migration paths of various winter animals. Use strings to indicate their routes.

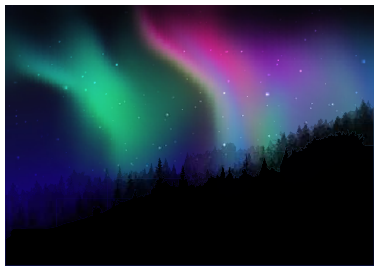
5-STAR CHALLENGE

★ **Curiosity:** Why do animals migrate, and how do they know where to go?
★ **Creative Thinking:** Create a visual map with illustrated landmarks and challenges animals might encounter.
★ **Critical Thinking:** Analyze the reasons behind each animal's migration route.
★ **Communication:** Explain the migration patterns you've mapped out and their importance.
★ **Collaboration:** Collaborate with classmates to add different animals' routes and discuss their journeys.

NORTHERN LIGHTS CANVAS

Materials: Black construction paper, chalk pastels or colored tissue paper, white glue, and glitter

Challenge: Mimic the swirling colors of the Northern Lights on black paper using chalk pastels or layered tissue paper, adding glitter to represent stars.



5-STAR CHALLENGE

★ **Curiosity:** What causes the Northern Lights, and how can we recreate their colors and movement in art?
★ **Creative Thinking:** Experiment with blending colors to create a vibrant aurora effect.
★ **Critical Thinking:** Plan your artwork to represent the dynamic flow of the Northern Lights.
★ **Communication:** Share what you've learned about this natural phenomenon and your artistic choices.
★ **Collaboration:** Join with classmates to create a large mural of the Northern Lights, with each child contributing a section.

SNOWMAN'S MELTDOWN

Materials: Baking soda, vinegar, food coloring, glitter, small plastic containers or dishes, eye droppers

Challenge: Create a meltable snowman using baking soda and decorate it with food coloring and glitter. Use vinegar drops to cause a fizzy meltdown.

5-STAR CHALLENGE

★ **Curiosity:** Why do substances like baking soda and vinegar react the way they do?
★ **Creative Thinking:** Sculpt and decorate a snowman with unique features.
★ **Critical Thinking:** Predict what will happen when vinegar is applied to the baking soda snowman.
★ **Communication:** Share observations during the meltdown reaction and explain the science behind it.
★ **Collaboration:** Work in pairs, with one child building the snowman and the other conducting the meltdown.

HIBERNATING BEAR DEN

Materials: Shoeboxes, brown paint, cotton, fabric scraps, natural materials like leaves and twigs, small bear figurines or pictures

Challenge: Create a cozy den for a bear to hibernate in during the winter months. Decorate the shoebox to look like a den and use natural materials to make it comfortable for the bear.

5-STAR CHALLENGE

★ **Curiosity:** Investigate how and why bears hibernate and what kind of environments they choose for their dens.
★ **Creative Thinking:** Imagine and design an interior for the den that a bear would find comfortable for a long winter's nap.
★ **Critical Thinking:** Choose materials that would provide insulation and comfort, considering how real bears prepare their dens.
★ **Communication:** Share your design process, explaining why you included each element for the hibernating bear.
★ **Collaboration:** Work together with classmates to create a bear den community, discussing the different needs of each bear.

FROSTY FLURRIES IN A JAR

Materials: Clear jars or bottles, baby oil or glycerin, white glitter or fake snow, water, super glue

Challenge: Simulate a gentle snow flurry in a jar. Fill the jar with a mixture of baby oil and water, add glitter or fake snow, and secure the lid to create a winter wonderland snow globe.

5-STAR CHALLENGE

★ **Curiosity:** Explore the concept of density and how it affects the glitter or fake snow's "flurry" effect in the liquid.
★ **Creative Thinking:** Customize your snow globe to reflect a serene snowy day or a blustery blizzard.
★ **Critical Thinking:** Experiment with baby oil, water, and glitter proportions to create the perfect swirling effect.
★ **Communication:** Talk about how the ingredients work together to mimic a real snow flurry.
★ **Collaboration:** Work in a group to create a variety of snow flurries, then display them together and observe the different effects.

WINTER WILDLIFE MURAL

Materials: A large roll of paper, paint, sponges, stamps, and markers.

Challenge: Create a large mural depicting a winter wildlife scene, with animals that are active during the cold months.

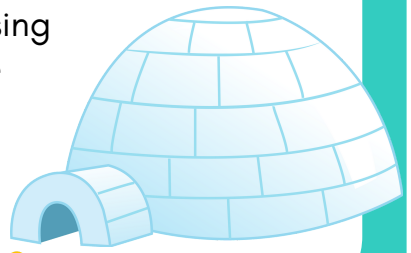
5-STAR CHALLENGE

★ **Curiosity:** Which animals are visible in winter, and how do they interact with their environment?
★ **Creative Thinking:** Plan a mural that represents a harmonious winter ecosystem.
★ **Critical Thinking:** Choose appropriate colors and tools to depict different animals and winter landscapes accurately.
★ **Communication:** Explain the role of each animal in the winter scene and any adaptations they have for the cold.
★ **Collaboration:** Divide the mural into sections, with each child responsible for different elements, then combine to create a cohesive scene.

THE INSULATING IGLOO

Materials: Sugar cubes, white craft glue, small cardboard base, cotton batting, aluminum foil.

Challenge: Construct an igloo using sugar cubes to explore how these structures keep warmth in. Use cotton batting for snow and aluminum foil to reflect light and mimic ice.



5-STAR CHALLENGE

★ **Curiosity:** Why are igloos used in cold climates, and how do they provide insulation?
★ **Creative Thinking:** Build a model igloo with an interior that reflects how it might be used by people or animals in the wild.
★ **Critical Thinking:** Choose materials that best represent an igloo's insulating properties.
★ **Communication:** Explain the construction process and how the design contributes to its insulating effect.
★ **Collaboration:** Pair up to build a small igloo village, discussing how igloos help people survive during winter.

PENGUIN MARBLE RUN

Materials: Cardboard tubes, paper towel rolls, cereal boxes, tape, scissors, marbles, blue and white paint

Challenge: Engineer a marble run where the marbles represent penguins sliding down the snowy and icy terrain of their arctic habitat. Create tunnels, ramps, and drops that the marble "penguins" can navigate through.

5-STAR CHALLENGE

★ **Curiosity:** How do the shapes and angles of the run affect the speed and direction of the marbles?
★ **Creative Thinking:** Design a marble run with creative and fun challenges that represent the penguins' journey.
★ **Critical Thinking:** Test and modify the course to ensure the marbles can successfully complete the run.
★ **Communication:** Explain the reasoning behind the design of your marble run and how it simulates the penguins' slide.
★ **Collaboration:** Collaborate with peers to connect individual marble runs into a larger penguin-themed course.

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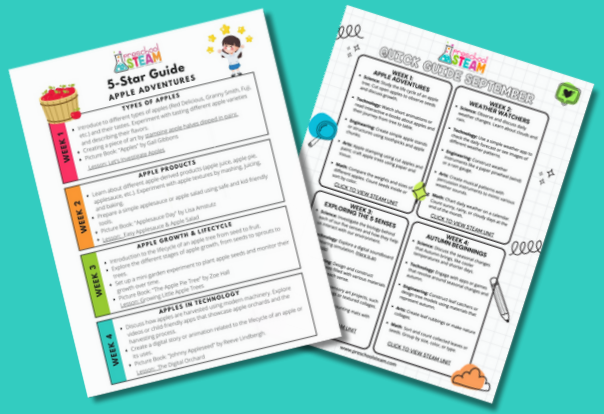

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