

Going to the Moon

A Three Day Lesson Plan For Preschool Students

Statement of Purpose:

This lesson is designed to help students practice various math skills and develop scientific understanding using NASA materials.

This lesson is designed using common core math standards and Next Generation Science Standards for Kindergarten. Teacher will use informal formative assessments to see which students can work independently and which students need scaffolding. Activities are designed to be done in small groups to allow for differentiation and assistance with exploration.

This lesson will allow students to practice math standards skills such as geometric shapes, counting, measuring, data, and engineering while exploring NASA's next mission to the moon.

Standards covered:

Mathematical Practices

- MP 2: Reason abstractly and quantitatively.
- MP 4: Model with mathematics.
- MP 5: Use appropriate tools strategically.
- MP 6: Attend to precision.

Measurement and Data

- K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
- K.MD.A.2: Directly compare two objects with a measurable attribute in common, to see which object has “more of”/”less of” the attribute, and describe the difference.
- 1.MD.A.2: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
- 2.MD.A.1: Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- 2.MD.A.3: Estimate lengths using units of inches, feet, centimeters, and meters.

Next Generation Science Standards

K-PS2 – Motion and Stability: Forces and Interactions Standards

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

K-PS2-2: Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

Disciplinary Core Idea

PS2.A: Forces and Motion • Pushes and pulls can have different strengths and directions. •

Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

PS2.B: Types of Interactions • When objects touch or collide, they push on one another and can change motion.

PS3.C: Relationship between Energy and Forces • A bigger push or pull makes things speed up or slow down more quickly.

CROSSCUTTING CONCEPTS: Cause and Effect • Simple tests can be designed to gather evidence to support or refute student ideas about causes.

As taken from (*How Far Will It Go*, n.d.).

Additional Standards:

Common Core Math Standards
Measurement and Data

Describe and compare measurable attributes.

CCSS.MATH.CONTENT.K.MD.A.1

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

CCSS.MATH.CONTENT.K.MD.A.2

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

Geometry

Identify and describe shapes.

CCSS.MATH.CONTENT.K.G.A.1

Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind, and next to.*

CCSS.MATH.CONTENT.K.G.A.2

Correctly name shapes regardless of their orientations or overall size.

CCSS.MATH.CONTENT.K.G.A.3

Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid"). Analyze, compare, create, and compose shapes.

CCSS.MATH.CONTENT.K.G.B.4

Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).

CCSS.MATH.CONTENT.K.G.B.5

Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

CCSS.MATH.CONTENT.K.G.B.6

Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*

Found online (*Kindergarten Math Standards*, n.d.).

Additional Common Core Standards Connections:

ELA/Literacy –

RI.K.1 With prompting and support, ask and answer questions about key details in a text. (K-PS2-2)

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1)

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2)

Additional NGSS Standards

K-2-ETS1-1) ET S1.B: Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas

Materials needed

1. Print out the NASA book
2. Electronic device to play the youtube video
3. Sensory bin with moon sand
4. Rock, space, and astronaut toys
5. Magnatiles
6. Magnetic board
7. Paper
8. Glue
9. Cut shapes
10. Pencils
11. Measuring tape
12. Chalk or masking tape
13. Large paper to write discussion points
14. Sharpie
15. Handout of moon suitcase
16. Paper and pen for informal observations assessments
17. Ribbon twirls
18. Paper
19. Markers,
20. Scissors
21. Printouts about SLS
22. Images of moon
23. Images of Artemis Rocket

24. Assessment- What would you take to the Moon?
25. Assessment- My Shape Rocket
26. Assessment- How Far did it Fly

Day one-

Engage- Begin with youtube video of rocket launch and Artemis Mission.

Explore and Explain- After watching video discuss the phenomenon of rocket launch, discuss what you noticed.

Elaborate- Read “You are Going” discuss what they notice and wonder.

https://www.nasa.gov/specials/you-are-going/img/YouAreGoing_web.pdf

Evaluate- Exit ticket- What would you take to the moon?

https://docs.google.com/document/d/1QX_IbpphXqkRQP76UsbysJ4AvUyKcpFQELk-UohvZaM/edit

Day two

Explain-Start by reviewing shapes. Teacher and students will draw shapes on large paper.

Engage-Continue with looking at info on the SLS rocket

https://www.nasa.gov/sites/default/files/atoms/files/how_far_will_it_go_508_final.pdf

What do they wonder and notice?

Explore-Students will break into small groups to build shape rockets with magna tiles on magnetic white board, on design on paper, and complete their shape rockets.

Evaluate-Activity/ Assessment - My Shape Rocket

https://docs.google.com/document/d/1IHSpotVhNyf_vF9TKaNAAWkMXoSecaJE9EpD3x19Cn4/edit

Day 3

Engage- Teacher will have a large tape measure on ground made of masking tape and chalk.

Explore- Teacher and students will discuss how they could make a rocket fly.

Explain-Teacher will lead a discussion on force and motion. Teacher and students will decide how to investigate and experiment with rockets. Teacher will offer ribbon twirls as possible idea. Materials from previous days will also be available.

Elaborate-Students will test rockets, exploring force and measuring outcomes. Students will write down results on exit ticket.

Evaluate-Teacher will create a graph on the whiteboard of results. Students will compare and analyze data. Teacher and students will finish up the unit with discussion. What did they observe? How did they change their rockets? What would they do differently if they did it again? What do they wonder?

Exit Ticket- How Far Did It Fly?

https://docs.google.com/document/d/1CFzQ9rjY--abzDex_PwQ2DWq3PqqYhEtvNV68kZPKbg/edit

References

How far will it go? (n.d.). <https://www.nasa.gov>. Retrieved July 12, 2022, from

https://www.nasa.gov/sites/default/files/atoms/files/how_far_will_it_go_508_final.pdf

How we are going to the moon. (n.d.). Youtube. Retrieved July 12, 2022, from

<https://youtu.be/T8cn2J13-4>

Kindergarten math standards. (n.d.). [www.Corestandards.Org](http://www.corestandards.org). Retrieved July 12, 2022, from

<http://www.corestandards.org/Math/Content/K/introduction/>

Kindergarten science standards. (n.d.). <https://www.Nextgenscience.Org>. Retrieved July 12, 2022, from <https://www.nextgenscience.org/sites/default/files/K%20combined%20DCI%20standardsf.pdf>

Student Project: Build a Rocket and More With Shapes. (2020, December 31). NASA/JPL Edu. Retrieved July 12, 2022, from <https://www.jpl.nasa.gov/edu/learn/project/build-a-rocket-and-more-with-shapes/>

Tolentino, S. (n.d.). *You are going*. NASA. Retrieved July 12, 2022, from https://www.nasa.gov/specials/you-are-going/img/YouAreGoing_web.pdf
