Science Math

Walking Paper Horse

Grade Level
2-6

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will have a better understanding of motion.

Materials Needed
- Cardstock or construction paper
- Pencils
- Scissors
- Rulers
- Foam poster board
- Books or box for ramp
- Copies of Student Worksheet
- Copies of Horse Template (optional)

Standards
Math
CC.2.MD.1-1; CC.2.G.1

NGSS
K-PS2-1; K-PS2-2; 3-PS2-1; 3-PS2-2; 4-PS3-1; 5-PS2-1; MS-PS2-2; MS-PS2-4

Lesson Summary
This lesson is a fun activity to help students use basic shapes to recognize the role gravity has when it comes to motion. Students will have to figure out what adjustments need to be made to get their horse to walk!

Suggested Sequence of Events:
1. Set Up: For younger students or to save time, print the provided template out ahead of time to give to your students.
2. Read through the IAITC Horse Ag Mag to learn more about horses! Interactive online versions can be found on our website.
3. Complete the activity following the procedures:
    - Have students use their rulers to draw their horse template, following the directions on the Student Worksheet.
    - Next have them cut out the perimeter of the rectangle, cut on the dotted lines, and also cut the diagonal lines on the corners.
    - Fold the four “legs” down at a ninety degree angle. Fold the base of the “head” upward (this would be the “neck” of the horse) and then fold a small part of the top of the “head” down to create a face. Lastly, curl the ‘tail’ upward.
    - Set up the ramps and test the horses! Students will need to make adjustments to their horse and/or the ramp if their horse doesn’t walk right away.
4. Whole class discussion and reflection of activity. Ask students what adjustments they had to make in order to get their horse to walk down the ramp.

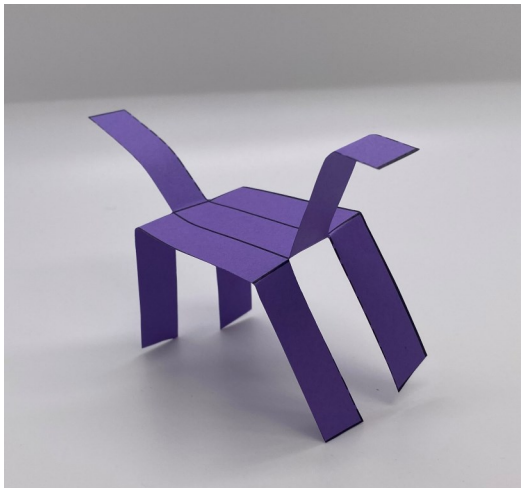
TEACHER RESOURCES

Background Information:
When the horse is placed at the top of the ramp, it has potential energy. Once the horse is nudged and it begins 'walking' down the ramp due to being pulled by gravity, the horse then has kinetic energy. The material you place on the ramp will determine the amount of friction there is, causing the horse to move faster or slower.

The 'walking' is due to the angles that were cut on the 'hooves' of the horse. These angles allow the horse to rock back and forth like a rocking chair. As the horse rocks to the right side, the left legs are lifted and gravity pulls them forward. The horse then rocks to the left side and the right legs are lifted and pulled forward.

Extension Ideas:

- Have students go to this website and learn about a variety of horse breeds! Website can be found at http://afs.okstate.edu/breeds/horses/
    - Have students color their templates to match their favorite horse coat color.
- Have students convert measurements into mm and/or inches. Have students find the area of all the squares and rectangles within the template.
- Learn about the Kentucky Derby and have students give their paper horses a derby name. When their horse is ready, have them race their horses down the ramp.
- Learn about the different types of gaits of horses and how horses are trained.
- Take a closer look at horses on farms and ranches. What are some of the purposes of having a horse? How are they used for work, for hobby, or for sport? How are horses useful beyond the farm?
    - Take this a step further and learn about how the use of horses has changed over time.
- Have students complete the "Ag-Venture With Horse" worksheet that pairs with the Horse Ag Mag to strengthen student non-fiction skills while learning more about horses.
- Read "Horses" by Gail Gibbons to learn more about horses and their history.
- Show a labeled diagram of a horse and have students label their own horse diagram.
- Invite a horse handler into the classroom.
- Have students tell a fictional story about a horse.
- Learn about what it takes to care for a horse.
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!



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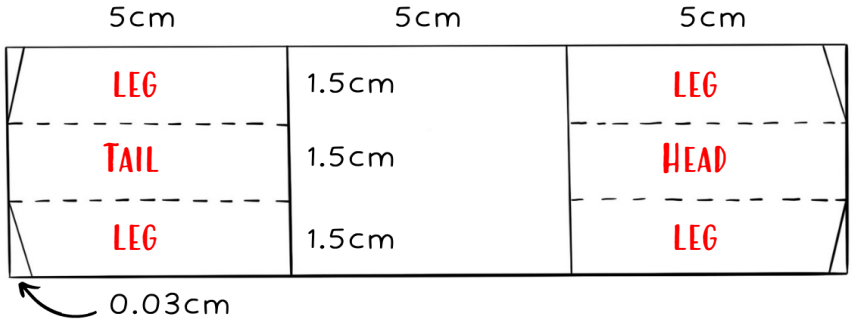
Student Worksheet

Can you engineer a walking paper horse? The answer is YES! With some basic supplies, a ramp, and patience, you can have a walking paper horse in no time. Follow the directions below to create your own walking paper horse.

Measuring:

1. Use a ruler to measure out a 15cm x 4.5cm rectangle. Finish drawing your template, using the diagram below for the correct measurements.



Cutting:

1. Cut around the perimeter of the rectangle.
2. Cut the triangles off of the four corners.
3. Cut on the dotted lines of the outside squares up to the center square.

Folding:

1. Bend the 'legs' downward at a ninety degree angle, perpendicular to the body.
2. Bend the 'tail' upward and use your finger or the edge of the table to curl it a little.
3. Bend the 'head' upward. Then, fold the top of the head downward to create a 'face'.

Testing:

1. Using the materials you have, build a ramp.
2. Place your horse at the top of the ramp and give it a slight nudge to start moving.

Science and engineering is all about trial and error so stay patient if your horse doesn't start walking right away—it's a part of the process. If your horse isn't walking, consider some of these variables and make adjustments until your horse is walking:

- The angle of the 'hooves'
- The folds of the 'legs'
- The angle of the ramp
- The material of the ramp