

STEAM WITH THE PROGRAM TEAM

Paper Playgrounds *Engineering*

MATERIALS NEEDED:

- Paper (construction, old newspapers, or scrap paper) you are building with it
- Pencil
- Crayons/markers
- Tape
- Scissors

THE SCIENCE:

What is a simple machine? Defined as: a machine that helps you make work easier by using less force or by applying a push or pull in a different direction.

More definitions: Work – the amount of energy necessary to move an object.

Simple machines: lever, wheel/axle, pulley, inclined plane, wedge, screw.

Some examples:

- Pulley: blinds, garage doors, flag pole
- Lever: seesaw, pry bar, hammer
- Wedge: scissors, knife, axe, door stopper
- Wheel & axle: toy car, office chair, bicycles, rolling pin
- Inclined plane: wheel chair ramp, skateboard ramp, slide
- Screw: jar lid, drill bit, light bulb, bottle cap

Badge Steps

Take a look at the requirements and see if the activities will help you complete the following badge steps.

Daisy: Mechanical Engineering: Roller Coaster Step 2

Brownie:

Junior:

Cadette:

Senior:

Ambassador:

PA Education Standards

The content of all Girl Scout national proficiency Badges and Journeys have been correlated by grade level to national and state learning objectives.

Visit <https://www.girlscouts.org/en/adults/educators/curriculum-standards.html> for more information about how badges support the standards.

Finished with your badge? Now buy it for your uniform. Order online at <https://www.girlscoutshop.com/HEART-OF-PENNSYLVANIA-COUNCIL>.

We would love to see you in action! Snap a photo and sent it to marcomm@gshpa.org Please include name, troop #, and what she is working on.

ACTIVITY ONE: Paper Playground

- Using what we know about simple machines around our home and playgrounds. You are going to design then build your dream playground.
- First take time to plan out your park. Where is everything going to fit, will it be laid out in straight lines or with everything moving in and around each other. What elements are you going to have? A slide, swings, zip line, etc.?
- Take 5 min and sketch out your plans. Where are you going to use the simple machines from above?
- **Now it's time to build! All your elements need to be made from paper and tape.** How can you fold or change the paper to make it stronger, or bendy, or loopy?
- Want to test it out? Do you have a toy or marble that can test out your slides? Rollercoaster?
- What needs to be adjusted? Do you need more support somewhere?

REVIEW:

1. What was a way your design failed? What did you learn from that?
2. What is your favorite part of the process?
3. What was a challenge you solved?