



# Paper Roller Coaster Challenge

Design and create your own roller coaster by participating in the Illinois 4-H Paper Roller Coaster Challenge!

## In this challenge, youth will:

1. Design and construct a paper roller coaster
2. Experiment with potential and kinetic energy
3. Use their creativity to give their coaster a name and theming

## Challenge resources:

[Challenge Video](#) on YouTube (DKK 4-H)

[Paper Templates & Directions](#) (Science Buddies)

## Challenge details:

Visit <https://4h.extension.illinois.edu/programs/home-activities> to get access to the challenge materials. For this challenge you'll need: a marble, a piece of cardboard, cardstock/construction paper/paper, scissors, tape, and a printer or a pencil and ruler. Watch our challenge introduction video in our STEM Challenges playlist on YouTube:

[https://www.youtube.com/playlist?list=PLGmGsBgZlgORrHdQW7oo938Pv8gr\\_6ekD](https://www.youtube.com/playlist?list=PLGmGsBgZlgORrHdQW7oo938Pv8gr_6ekD). Then go to Science Buddies to find activity directions, download and print templates (if you have a printer at home) or get directions on how to make your own templates using a pencil and ruler: <https://www.sciencebuddies.org/stem-activities/paper-roller-coaster>.

After checking out the activity directions from Science Buddies, build your own coaster with the following constraints:

- Coaster should have at least 3 elements (drop, turn, and one other element like a loop or bunny hill)
- Coaster should have a name and sign along with decorations that go along with the name.

Once your coaster is complete, take a picture or record a video of the coaster working successfully. To protect privacy, we encourage you to just focus your video or photo on the coaster and not include any people or identifiable personal information in the video. With parent/guardian permission, share your project with your 4-H club, family, and/or friends. If you also choose to share your work on social media, with parental permission, consider using our hashtag #thats4H and/or tagging "Illinois 4-H."

## Coaster tips:

- Coasters have more structural support with thicker paper, so work with cardstock if you have it. If you don't have access to cardstock, you can use construction paper or regular paper (but may need to add additional supports to your structure).
- For many of the elements, it may be helpful for a family member to hold the piece in place while you adhere the tape to lock the shape.
- If you don't have enough speed to get through an element, you need to increase the potential energy of your coaster by starting your marble from a higher height, or steeper angle. Troubleshoot the various elements in your ride until you succeed.
- You can tape supports together to get a higher starting point. You can also cut supports into smaller pieces to help stabilize turns and shorter hills. Feel free to make your own support pieces using paper or other materials from your home.

# Illinois 4-H At-Home STEM Challenge

- Add elements to your coaster until your marble stops (runs out of energy). Challenge yourself to see how many elements you can successfully add while still keeping your marble moving.
- Don't forget that the best real roller coasters have fun names and themes that can add to your enjoyment of the ride (ex: Raging Bull, Goliath, Twisted Cyclone)! Use your creativity to bring your coaster to life with signage and decorations.

## Questions?

Email [amyh@illinois.edu](mailto:amyh@illinois.edu) or visit <https://4h.extension.illinois.edu/programs/home-activities>

## Want to learn more about 4-H near you?

Find your local 4-H office at [go.illinois.edu/FindYour4HOffice](http://go.illinois.edu/FindYour4HOffice) or learn more about Illinois 4-H at [4h.extension.illinois.edu](http://4h.extension.illinois.edu)

## Did you have fun with this challenge?

Check out <https://paperrollercoasters.com> for more professional templates (and material packets) for purchase (these are the templates we use in our Paper Roller Coaster workshops and what was used for the more elaborate marble mazes in the challenge video).



Resource originally produced by Amy Henschen for DuPage, Kane & Kendall County 4-H.

If you need a reasonable accommodation to participate in this program, please contact your local University of Illinois Extension office.

Early requests are strongly encouraged to allow sufficient time for meeting your access needs.

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