



Junk Drawer Mechanics Challenge

Build a vehicle to learn the basics of mechanics and principles of motion in the Illinois 4-H Junk Drawer Mechanics Challenge!

In this challenge, youth will:

1. Get familiar with friction and how it varies on different surfaces
2. Gain a basic understanding of the mechanics of moving parts
3. Create and film their very own moving vehicle

Challenge resources:

[4-H Junk Drawer Robotics curriculum](#) (4-H)
See parts B & D, pages 13, 18-19

[Inspiration Video](#)
(Michigan State University Extension/4-H)

Challenge details:

Build your own moving vehicle (alone or with other family members) from household items and/or “junk drawer” stuff. Your vehicle should meet the following specifications:

- Vehicle should use everyday objects from around your house, with parent/guardian permission.



- Vehicle should be able to move a minimum of 2 feet past the end of an incline that is no more than 6 inches high and 11.5 inches long. For example, a piece of cardboard or a scrap board with a stack of books may work well for your incline. (Look for an example on the next page.)
- Vehicle should be able to carry a payload of one tablespoon of salt without spilling or falling off. (Salt should be placed in a simple container, like an empty plastic bottle, to avoid a mess.)
- Adult supervision is required if any tools are used.
- Include a list of simple machines that are part of the challenge. (Learn more about simple machines in [this video from the Rube Goldberg Challenge](#).)
- Vehicle should be safe for operator, observers, pets and property.
- Humans should only be involved in the movement of the vehicle to get it started. Once they start the movement, they should not have to intervene to complete the task.
- Test and troubleshoot as needed until your vehicle has multiple successful runs.
- Creativity is encouraged! Consider making your vehicle a monster, dragon, animal, person, or robot. (Look for an example on the next page.)
- Don't forget to think about friction as you design your incline and your vehicle. Learn more in [this 2-minute Generation Genius video clip](#).

Illinois 4-H At-Home STEM Challenge

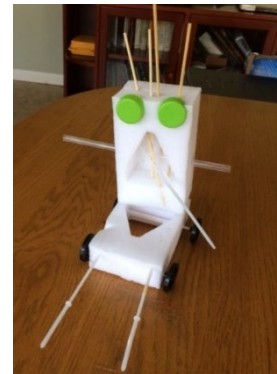
Once your vehicle is complete, you may want to record a video of it cruising successfully. To protect privacy, we encourage you to just focus your video on the vehicle and not include any people or identifiable personal information in the video. With parent/guardian permission, share your video with 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 or tagging "Illinois 4-H."

Important Notes:

Pictured below is an example of a rolling vehicle made from some household items. Small paper cups or empty plastic bottles with lids may make a good container for your salt payload. Remember to get creative with your vehicle, like this robot-themed one >>>

To set up an incline to test your vehicle. This can be done with household items too, such as cardboard, a scrap board, and a stack of books >>>

For additional learning, watch [this 2-minute Generation Genius video clip](#) about friction.



Questions?

Email dnuger@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 or learn more about Illinois 4-H at 4h.extension.illinois.edu

Did you have fun with this challenge?

For more Junk Drawer Robotics curriculum from National 4-H, visit <https://4-h.org/parents/curriculum/robotics/>



Resource originally produced by Donna Nuger 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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