

3Doodler LEGO Challenge Series

Challenge No. 1: Newton's Cradle



Objective:

For every action, there is an equal and opposite reaction.

Design and build your own Newton's Cradle using only LEGO, the 3Doodler and 3Doodler plastic strands. Demonstrate Newton's third law, and see how long your Newton's Cradle can swing for before stopping!

Watch the Cradle in action on [YouTube](#)



Learning Points:

- Demonstrate and teach Newton's Laws of Motion, including the transfer of energy.
- Investigation how different design solutions can change the speed or direction of the spheres.
- Compare the effects of different strengths or directions of pushes/pulls on the spheres' motion.
- Measure the spheres' motion to show that patterns can be used to predict future motion.

Advanced Challenges:

You've proved Newton's third law and are ready to take your Newton's Cradle to the next level! Here are some advanced challenges for you...

- Get your cradle to rock for 10 seconds (too easy? Try 20 seconds)
- Only using 5 marbles? Now try 7, then 9, then 11...
- How big can you build your Newton's Cradle? Time to super size it!

Reference Materials:

Bill Nye on [sophia.org](https://www.sophia.org): <https://www.sophia.org/tutorials/bill-nye-demonstration-newtons-pendulum>

How to Build a Newton's Cradle: http://www.ehow.com/how_5534301_build-newtons-cradle.html

How Stuff Works: <http://science.howstuffworks.com/newtons-cradle2.htm>

Next Generation Science Standards: MS-PS2 Motion and Stability: Forces and Interactions: <http://www.nextgenscience.org/msps2-motion-stability-forces-interactions>

Lesson: May the Force Be With You: Thrust: https://www.teachengineering.org/view_lesson.php?url=collection/cub_/lessons/cub_airplanes/cub_airplanes_lesson04.xml

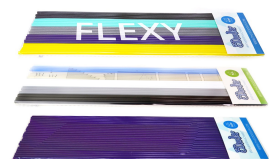
What You'll Need:



3Doodler



LEGO



ABS, PLA & FLEXY Plastic Strands



Marbles