SPECIAL THANKS TO OUR
MICHIGAN LEARNING CHANNEL PARTNERSHIPS:

Content Partners:
- 826Michigan
- American Chemical Society
- Ann Arbor District Library
- Battle Creek Symphony Orchestra
- Career Girls
- Chris Anderson Science Around Cincy
- City Opera House
- CODE.org
- Colorado Springs Conservatory
- Detroit Institute of Arts
- Detroit Zoo
- Grand Rapids Ballet
- Huron-Clinton Metroparks
- Illustrative Mathematics
- INPACT at Home
- Kinetic Affect
- LearningSciencesFun
- Library of Congress
- Little Kids Rock
- Lucky Cat Productions
- MAISA Literacy Essentials
- Michigan Architectural Foundation
- Michigan DNR
- Michigan EGLE
- Michigan Humanities Council
- Midland Center for the Arts
- Mindful Practices
- Mr. E in the D
- MSU Extension
- NASA
- North Carolina Department of Public Instruction
- Positive Impact for Life
- SchoolKit
- Roadtrip Nation
- SciGirls
- Signing Time
- SIS4Teachers
- Speak It Forward
- Square One Education Network
- STEM Greenhouse
- Story Pirates
- Storycorps
- The Diatribe
- Traverse City Area Public Schools
- United States Air Force
- WORLD Channel
- YouCubed

Local PBS Stations
- WKAR - East Lansing
- Detroit Public Television
- WCMU - Mount Pleasant
- WDCQ - Saginaw
- WGVU - Grand Rapids
- WNIT - South Bend
- WNMU - Marquette

Partner PBS Stations
- PBS
- PBS Books
- PBS Kids
- APT (Alabama Public Television)
- LPB (Louisiana Public Broadcasting)
- PBS SoCal
- PBSNC
- TPT (Twin Cities PBS)
- WCMU
- WHRO
- WIMAGE
- WNED (New York Public Media)
- WQED
- WUCF

WATCH on the Michigan Learning Channel
or stream the channel at MichiganLearning.org

Visit MichiganLearning.org and follow @MichLearning on social media to find out more.

The Michigan Learning Channel is funded through a grant awarded by the Michigan Department of Education and the U.S. Department of Education.
Dear Grown-Ups,

Summer is full of opportunities to play and learn and we want to make it easy to find inspiring, kid-friendly activities! That’s why we’ve worked with PBS stations and content creators from across the country to bundle up some of our favorite activities into one, easy-to-carry-anywhere book. We hope you and your kids will use this to inspire learning all summer long!

Here are a few quick tips to keep your kids excited about learning this summer:

• **Ask lots of questions.** Encourage your kids to participate in conversations by asking them questions like: Why do you think that happened? What will happen next?

• **Encourage kids to search for answers.** When your children ask you “why?” see if you can work together to figure out what they need to know or do to find the answer.

• **Try something new.** Summer is a great time to try new things like reading a new kind of book, tasting a new food or exploring a new park.

• **Just have fun.** Summertime only comes along once a year, so be sure to take the time to relax and have fun while you’re learning.

• **Build lasting, positive memories that will last a lifetime!**

**How to use this book**

• Keep in mind that this book spans multiple grade levels. Your child won’t be using every single page, but choosing a few lessons each week. The goal is to keep kids’ brains engaged with a taste of reading, writing, math, art, science, and physical activity every week.

• The grade levels are merely guides to get you started. We recommend starting with the grade that your child just completed and adjusting as needed. Don’t be shy about using a different grade level or just picking and choosing lessons that look interesting. This has been a tough year for our children and we want your child to feel proud and confident.

• This book aligns with the content on the Michigan Learning Channel, which can be used on live tv or on demand. There are about 2-3 hours a week of video lessons, plus lots of activities in this book that don’t use a screen. We recommend getting outside everyday, reading everyday and having enjoyable moments together as a family!

• This book is designed to use for 8 weeks of summer. We suggest spreading it out over a few days each week and finding a time that works for your family. If you have older children they may do better in the evenings.

• As you go through the weeks, you will find each week has a theme and a link to videos that go with the activities. You can find all the video lessons, plus interactive virtual events and more at [www.michiganlearning.org/summer](http://www.michiganlearning.org/summer).

How do the students in your life use the Michigan Learning Channel? We would love your feedback! Feel free to contact us at mlc@dptv.org.

Michigan Learning Channel Team
MichiganLearning.org
Dates and Themes

The summer program runs from June 20 to August 14, 2022.
Each week has a set of lessons, plus additional programs, activities, and field trips based on the weekly theme.

Take Flight (June 20-26):
From planes and kites to butterflies and birds, discover the fables and physics of things that fly.

Under Water (June 27-July 3):
Dive deep into oceans, rivers, and our own Great Lakes to discover what it takes to live beneath the waves.

Heroes (July 4-10):
Celebrate our nation’s birthday and the people we call heroes, whether they are veterans, everyday helpers, or the kind who wear capes.

Creatures (July 11-17):
From the prehistoric to the present, learn about the fascinating features of creatures near and far.

Engineering (July 18-24):
Meet the people who design bridges, cars, and video games and learn how to think like an engineer.

Great Outdoors (July 25-31):
Explore the world outside your door and the incredible parks and waters that belong to us all.

When I Grow Up (August 1-7):
All summer we’ll learn about different careers—this week, think about all the exciting possibilities in your future!

Shoot for the Stars (August 8-14):
Look up at the night sky and into outer space and meet people who risked everything to follow their dreams.

Learn more about the Michigan Learning Channel at Facebook Live at fb.me/michlearning www.michiganlearning.org/summer

On TV. Online. Statewide.

Follow @MichLearning on social media to find out more.
Where to Find the Michigan Learning Channel
Find your favorite shows anywhere you go!

Scan the QR Code:
Scan any of the QR codes in this book to see the accompanying video right on your device.

On Demand:
Video lessons and activities at MichiganLearning.org
Click your grade level for this week's selected lessons
Or, use “Find a Lesson” to search by grade, subject, and educational standard

On the App:
Find shows on the free PBS app
The PBS App is available for mobile devices, Roku, Apple TV, and on many Smart TVs.
Search for Read Write Roar, Math Mights, Extra Credit, DIY Science Time, Wimee’s Words, InPACT at Home, Simple Gift Series, and more great programs.

On the Livestream:
Watch the 24/7 livestream at MichiganLearning.org/live-tv

On TV:
Find us on broadcast television with an antenna

Coming soon to:
Charter Cable services in Northern Michigan and the Upper Peninsula.
Visit MichiganLearning.org/Schedule for details

Learn more about the Michigan Learning Channel at
Facebook Live at fb.me/michlearning
www.michiganlearning.org/summer

On TV. Online. Statewide.

The Michigan Learning Channel is funded through a grant awarded by the Michigan Department of Education and the U.S. Department of Education.
Your remote control and TV menus may vary, but the steps are the same. Your TV will scan for all available channels.

TV sets connected to cable, satellite or other pay TV providers do not need to scan.

How to Scan
1. Press menu on your remote control.
2. Select setup.
3. Choose antenna then channel scan or auto tune.

Watch On-Demand at MichiganLearning.org
@MichLearning

The Michigan Learning Channel is Available On:

- WCMU
  Alpena Channel 6.4
  Cadillac Channel 27.4
  Manistee Channel 21.4
  Mt. Pleasant Channel 14.4
  Shelby Shawl
  Shelby.shawl@cmich.edu

- WGVU
  Grand Rapids Channel 35.6
  Kalamazoo Channel 52.6
  Rachel Cain
  cainra@gvsu.edu

- WTVS
  Detroit Public TV Channel 56.5
  Olivia Misterovich
  omisterovich@dptv.org

- WNIT
  Michiana PBS Channel 34.5
  Sheri Robertson
  srobertson@wnit.org
  Cass and Berrien counties

- WDCQ
  Delta College Public Media Channel 19.5
  Lauren Saj
  laurensaj@delta.edu
  (989) 686-9346

- WKAR
  WKAR Public Media Channel 23.5
  Summer Godette, M.Ed,
  summer@wkar.org
  (517) 884-4700

- WNMT
  WNMT-TV Channel 13.4
  Ellen Doan
  WNMT Public Media
  edoan@nmu.edu
  (906) 227-6765

COMING SOON to Charter Cable in Northern and Mid-Michigan and the Upper Peninsula
## WEEKDAY SUMMER SCHEDULE

<table>
<thead>
<tr>
<th>TIME</th>
<th>GRADE</th>
<th>WHAT'S ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>5AM</td>
<td>Preschool - Kindergarten</td>
<td>Let's Learn</td>
</tr>
<tr>
<td>6AM</td>
<td>Preschool - Kindergarten</td>
<td>PBS Kids shows</td>
</tr>
<tr>
<td>6:30AM</td>
<td>1st - 3rd Grade</td>
<td>Wimpee’s Words, Simple Gifts Series</td>
</tr>
<tr>
<td>7AM</td>
<td>Preschool - Kindergarten</td>
<td>Let’s Learn</td>
</tr>
<tr>
<td>8AM</td>
<td>Preschool - Kindergarten</td>
<td>Read, Write, ROAR! (Kindergarten)</td>
</tr>
<tr>
<td>8:30AM</td>
<td>1st - 3rd Grade</td>
<td>Math Mights (Kindergarten)</td>
</tr>
<tr>
<td>9AM</td>
<td>1st - 3rd Grade</td>
<td>Read, Write, ROAR! (1st Grade)</td>
</tr>
<tr>
<td>9:30AM</td>
<td>1st - 3rd Grade</td>
<td>Math Mights (1st Grade)</td>
</tr>
<tr>
<td>10AM</td>
<td>1st - 3rd Grade</td>
<td>Read, Write, ROAR! (2nd Grade)</td>
</tr>
<tr>
<td>10:30AM</td>
<td>1st - 3rd Grade</td>
<td>Math Mights (2nd Grade)</td>
</tr>
<tr>
<td>11AM</td>
<td>1st - 3rd Grade</td>
<td>Read, Write, ROAR! (3rd Grade)</td>
</tr>
<tr>
<td>11:30AM</td>
<td>1st - 3rd Grade</td>
<td>Math Mights (3rd Grade)</td>
</tr>
<tr>
<td>12PM</td>
<td>1st - 3rd Grade</td>
<td>Live From the City Opera House: It’s Storytime</td>
</tr>
<tr>
<td>12:30PM</td>
<td>1st - 3rd Grade</td>
<td>PBS Kids shows</td>
</tr>
<tr>
<td>1PM</td>
<td>4th - 6th Grade</td>
<td>Extra Credit</td>
</tr>
<tr>
<td>1:30PM</td>
<td>4th - 6th Grade</td>
<td>Math &amp; Movement</td>
</tr>
<tr>
<td>2PM</td>
<td>4th - 6th Grade</td>
<td>Story Pirates</td>
</tr>
<tr>
<td>2:30PM</td>
<td>4th - 6th Grade</td>
<td>DIY Science Time, SciGirls</td>
</tr>
<tr>
<td>3PM</td>
<td>4th - 6th Grade</td>
<td>Curious Crew</td>
</tr>
<tr>
<td>3:30PM</td>
<td>1st - 3rd Grade</td>
<td>Cyberchase, Into the Outdoors</td>
</tr>
<tr>
<td>4PM</td>
<td>1st - 3rd Grade</td>
<td>Read, Write, ROAR! (2nd &amp; 3rd Grade)</td>
</tr>
<tr>
<td>4:30PM</td>
<td>1st - 3rd Grade</td>
<td>Math Mights (2nd &amp; 3rd Grade)</td>
</tr>
<tr>
<td>5PM</td>
<td>Preschool - Kindergarten</td>
<td>Read, Write, ROAR! (Kindergarten &amp; 1st Grade)</td>
</tr>
<tr>
<td>5:30PM</td>
<td>Preschool - Kindergarten</td>
<td>Math Mights (Kindergarten &amp; 1st Grade)</td>
</tr>
<tr>
<td>6PM</td>
<td>Preschool - Kindergarten</td>
<td>Let’s Learn</td>
</tr>
<tr>
<td>7PM</td>
<td>4th - 6th Grade</td>
<td>Extra Credit</td>
</tr>
<tr>
<td>7:30PM</td>
<td>4th - 6th Grade</td>
<td>Math &amp; Movement</td>
</tr>
<tr>
<td>8PM</td>
<td>4th - 6th Grade</td>
<td>Story Pirates</td>
</tr>
<tr>
<td>8:30PM</td>
<td>4th - 6th Grade</td>
<td>DIY Science Time, SciGirls</td>
</tr>
<tr>
<td>9PM</td>
<td>6th - 12th Grade</td>
<td>Nature, NOVA, American Experience, Ken Burns and other PBS programming</td>
</tr>
<tr>
<td>5AM</td>
<td>6th - 12th Grade</td>
<td>Nature, NOVA, American Experience, Ken Burns and other PBS programming</td>
</tr>
</tbody>
</table>

Details at MichiganLearning.org/schedule

**WATCH on the Michigan Learning Channel.**
Episodes are available on-demand or stream the channel at MichiganLearning.org/summer
Learn at Home with PBS KIDS

Explore reading, math, science, life lessons, and more on the PBS KIDS 24/7 channel and live stream! The TV schedule below offers you and your child a chance to learn anytime alongside your friends from PBS KIDS.

**Schedule Begins October 4, 2021**

<table>
<thead>
<tr>
<th>TIME (M-F)</th>
<th>SHOW</th>
<th>GRADE</th>
<th>LEARNING GOALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/5c am</td>
<td>The Cat in the Hat Knows a Lot About That!</td>
<td>PK-1</td>
<td>Science &amp; Engineering</td>
</tr>
<tr>
<td>6:30/5:30c am</td>
<td>Ready Jet Go!</td>
<td>K-2</td>
<td>Science &amp; Engineering</td>
</tr>
<tr>
<td>7/6c am</td>
<td>Peg + Cat</td>
<td>PK-K</td>
<td>Math</td>
</tr>
<tr>
<td>7:30/6:30c am</td>
<td>Super WHY!</td>
<td>PK-K</td>
<td>Literacy</td>
</tr>
<tr>
<td>8/7c am</td>
<td>Daniel Tiger's Neighborhood</td>
<td>PK-K</td>
<td>Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>8:30/7:30c am</td>
<td>Daniel Tiger's Neighborhood</td>
<td>PK-K</td>
<td>Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>9/8c am</td>
<td>Sesame Street</td>
<td>PK-K</td>
<td>Literacy, Math, Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>9:30/8:30c am</td>
<td>Elinor Wonders Why</td>
<td>PK-K</td>
<td>Science &amp; Engineering</td>
</tr>
<tr>
<td>10/9c am</td>
<td>Clifford the Big Red Dog</td>
<td>PK-K</td>
<td>Social &amp; Emotional Learning, Literacy</td>
</tr>
<tr>
<td>10:30/9:30c am</td>
<td>Dinosaur Train</td>
<td>PK-K</td>
<td>Science</td>
</tr>
<tr>
<td>11/10c am</td>
<td>Let's Go Luna!</td>
<td>K-2</td>
<td>Social Studies</td>
</tr>
<tr>
<td>11:30/10:30c am</td>
<td>Curious George</td>
<td>PK-K</td>
<td>Math, Science &amp; Engineering</td>
</tr>
<tr>
<td>12 pm/11c am</td>
<td>Nature Cat</td>
<td>K-3</td>
<td>Science</td>
</tr>
<tr>
<td>12:30 pm/11:30c am</td>
<td>Xavier Riddle and the Secret Museum</td>
<td>K-2</td>
<td>Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>1/12c pm</td>
<td>Molly of Denali</td>
<td>K-2</td>
<td>Literacy</td>
</tr>
<tr>
<td>1:30/12:30c pm</td>
<td>Hero Elementary</td>
<td>K-2</td>
<td>Science &amp; Engineering</td>
</tr>
<tr>
<td>2/1c pm</td>
<td>Cyberchase</td>
<td>1-5</td>
<td>Math &amp; Science</td>
</tr>
<tr>
<td>2:30/1:30c pm</td>
<td>Pinkalicious &amp; Peterrific</td>
<td>PK-1</td>
<td>The Arts</td>
</tr>
<tr>
<td>3/2c pm</td>
<td>Pinkalicious &amp; Peterrific</td>
<td>PK-1</td>
<td>The Arts</td>
</tr>
<tr>
<td>3:30/2:30c pm</td>
<td>Elinor Wonders Why</td>
<td>PK-K</td>
<td>Science &amp; Engineering</td>
</tr>
<tr>
<td>4/3c pm</td>
<td>Donkey Hodie</td>
<td>PK-K</td>
<td>Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>4:30/3:30c pm</td>
<td>Curious George</td>
<td>PK-K</td>
<td>Math, Science &amp; Engineering</td>
</tr>
<tr>
<td>5/4c pm</td>
<td>Alma's Way</td>
<td>K-1</td>
<td>Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>5:30/4:30c pm</td>
<td>Xavier Riddle and the Secret Museum</td>
<td>K-2</td>
<td>Social &amp; Emotional Learning</td>
</tr>
<tr>
<td>6/5c pm</td>
<td>Molly of Denali</td>
<td>K-2</td>
<td>Literacy</td>
</tr>
<tr>
<td>6:30/5:30c pm</td>
<td>Hero Elementary</td>
<td>K-2</td>
<td>Science &amp; Engineering</td>
</tr>
</tbody>
</table>

Access FREE, at-home learning activities, tips, and more on pbskidsforparents.org

PBS KIDS and the PBS KIDS logo are registered trademarks of Public Broadcasting Service. Used with permission.
LIVE Virtual Events

As part of the Summer Program, students can participate in live virtual events via Facebook Live. Events are interactive and presenters will take student suggestions and questions in real time. Recorded versions of these events will also be available online.

Live virtual events will be hosted on the Michigan Learning Channel Facebook page.

Wimpee’s Words Live!
Recommended for ages 4-8
Join the loveable robot puppet Wimpee and his friends as they discover more about the weekly theme. Wimpee needs your help to write stories! Give Wimpee your favorite words and ideas in the comments and watch as he incorporates them into stories and songs in real time. Your ideas may even be featured in future episodes of “Wimpee’s Words” on PBS!

Wimpee’s Words Live! with the Michigan Learning Channel
Every Wednesday, June 21-August 9, 4pm
Live on the Michigan Learning Channel Facebook page

Great Lakes Now Watch Party with the Belle Isle Aquarium
Recommended for ages 8 and up
The monthly PBS show Great Lakes Now explores the water, people, and environmental issues that tie together the whole Great Lakes basin. Once a month, they team up with the Belle Isle Aquarium to take a deep dive into the themes of the show. Students will have the chance to ask questions of the guest scientists and meet fantastic fish and other creatures.

Great Lakes Now Watch Party
Friday, July 1, 1pm
Friday, August 5, 1pm
Live on the Michigan Learning Channel Facebook page

Learn more about the Michigan Learning Channel at Facebook Live at fb.me/michlearning
www.michiganlearning.org/summer

Follow @MichLearning on social media to find out more.
Learn Anywhere!
On Air. Online. On Demand.

Serving students statewide through your local PBS station, the Michigan Learning Channel has everything kids need to build their brains and engage in learning key concepts to succeed in school!

Preschool
Read, sing, and play with your little one.

**Wimee’s Words**
Join Wimee, the fun, lovable robot that inspires kids to learn through creativity.

**Simple Gift Series**
Make music, find something new, and read with Betty the Bookworm.

**POP Check**
Mindful practice tools to Pause, Own what we are feeling, and Practice relaxing.

Kindergarten to 3rd Grade
Keep kids learning with fun lessons taught by Michigan teachers.

**Read, Write, Roar**
Kids build literacy skills with engaging ELA lessons.

**Math Mights**
Build number sense and learn strategies for solving math problems.

**InPACT**
Get moving with this home-based physical activity program.

4th to 6th Grade
Short, engaging videos and hands-on lessons keep tweens engaged.

**Extra Credit**
Creative writing, math, fitness, career exploration, and more!

**Curious Crew**
Dr. Rob Stephensen and inquisitive kids take a hands-on approach to scientific exploration.

**Story Pirates**
Bite-sized literary lessons with comedians, authors, and teachers.

VISIT us online to view all shows, learn about events, and download activities!

[www.michiganlearning.org](http://www.michiganlearning.org)
Follow @michlearning to find out more.
### Apps for Social & Emotional Learning

<table>
<thead>
<tr>
<th>App</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daniel Tiger for Parents</td>
<td>PK-K</td>
</tr>
<tr>
<td>PBS KIDS Games app</td>
<td>K-2</td>
</tr>
<tr>
<td>PBS KIDS Video app</td>
<td>K-2</td>
</tr>
</tbody>
</table>

**Updated**

### Apps for Literacy Learning

<table>
<thead>
<tr>
<th>App</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dinosaur Train A to Z</td>
<td>PK-K</td>
</tr>
<tr>
<td>Molly of Denali</td>
<td>K-2</td>
</tr>
<tr>
<td>PBS KIDS Games app</td>
<td>K-2</td>
</tr>
<tr>
<td>PBS KIDS Video app</td>
<td>K-2</td>
</tr>
</tbody>
</table>

**Updated**

### Apps for STEM Learning (Science, Technology, Engineering & Math)

<table>
<thead>
<tr>
<th>App</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBS Parents Play &amp; Learn</td>
<td>PK-K</td>
</tr>
<tr>
<td>Play &amp; Learn Engineering</td>
<td>PK-K</td>
</tr>
<tr>
<td>PBS KIDS Measure Up!</td>
<td>PK-K</td>
</tr>
<tr>
<td>Play &amp; Learn Science</td>
<td>PK-K</td>
</tr>
<tr>
<td>Splash and Bubbles for Parents</td>
<td>PK-K</td>
</tr>
<tr>
<td>Splash and Bubbles Ocean Adventure</td>
<td>PK-K</td>
</tr>
<tr>
<td>The Cat in the Hat Builds That!</td>
<td>PK-K</td>
</tr>
<tr>
<td>The Cat in the Hat Invents</td>
<td>PK-K</td>
</tr>
<tr>
<td>Jet’s Bot Builder: Robot Games</td>
<td>K-2</td>
</tr>
<tr>
<td>Photo Stuff with Ruff</td>
<td>K-2</td>
</tr>
<tr>
<td>Ready Jet Go! Space Explorer</td>
<td>K-2</td>
</tr>
<tr>
<td>Ready Jet Go! Space Scouts</td>
<td>K-2</td>
</tr>
<tr>
<td>Nature Cat’s Great Outdoors</td>
<td>K-3</td>
</tr>
<tr>
<td>PBS KIDS ScratchJr</td>
<td>1-2</td>
</tr>
<tr>
<td>Outdoor Family Fun with Plum</td>
<td>1-3</td>
</tr>
<tr>
<td>Cyberchase Shape Quest</td>
<td>1-5</td>
</tr>
<tr>
<td>PBS KIDS Games app</td>
<td>K-2</td>
</tr>
<tr>
<td>PBS KIDS Video app</td>
<td>K-2</td>
</tr>
</tbody>
</table>

**Updated**

---

PBS KIDS and the PBS KIDS Logo are registered trademarks of Public Broadcasting Service. Used with permission.
**Week 1: Take Flight**

From planes and kites to butterflies and birds, discover the fables and physics of things that fly.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

**Playlists this week: www.michiganlearning.org/takeflight**

<table>
<thead>
<tr>
<th>Activity 1</th>
<th>Activity 2</th>
<th>Activity 3</th>
<th>Activity 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch Math Park</td>
<td>60 mins. of activity</td>
<td>Read 20 minutes</td>
<td>Make a paper airplane (pg. 13)</td>
</tr>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Look for birds</td>
<td>Spot a plane in the sky</td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td>Create a new bird (pg. 14)</td>
<td>HAVE FUN! (Free Space)</td>
<td>Watch InPACT at Home</td>
</tr>
<tr>
<td>Watch DIY Science Time</td>
<td>Spot a helicopter in the sky</td>
<td>Watch Story Pirates</td>
<td>Build a hovercraft (pg. 11)</td>
</tr>
<tr>
<td>Watch InPACT at Home</td>
<td>Read 20 minutes</td>
<td>Watch Extra Credit</td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>
**DIY Hovercraft**

**MATERIALS**
- Blank CD
- Balloons
- Glue gun
- Bottle lid (push-up type)
- Adult helper

**DIFFICULTY**

**FRICTION**

Friction is the resistance that one surface or object encounters when moving over another surface or object. Different types of materials create varying amounts of friction. Friction can be found in our everyday lives and allows us to stand without falling, drive our cars safely down the road, and allows us to even grip a racket when playing tennis.

**FUN FACT**

Lee-on-the-Solent in England is where you can find the Hovercraft Museum which holds the world's largest collection of hovercraft designs, including some of the earliest and largest hovercrafts ever created!

---

*Why are friction jokes hard to tell at school?*

*Answer on the next page*
DIY Hovercraft

EXPERIMENT

Step 1: Gather materials.
Step 2: Use glue to fasten the bottle cap directly over the center hole of the CD. Be sure it is sealed completely to prevent air from leaking.
Step 3: Blow up and connect a balloon to the top of the closed bottle cap.
Step 4: Open the bottle cap, allowing the air from inside the balloon to escape and observe how the hovercraft behaves on a flat surface.

WHY IT WORKS

Hovercrafts work by using air to lift the craft off of the surface. As the balloon deflates, the air is pushed out through the bottom of the CD. Because of the weight, shape and texture of the CD, a thin layer of air is formed between the CD and the smooth table top surface. This layer of air reduces the friction between the CD and the surface allowing the CD to move easily and hover over the table.

EXTEND YOUR LEARNING

- What would happen if you used a different shaped balloon?
- Will it work with a heavy plastic plate, or cardboard instead of the CD?
- How far can you get your hovercraft to go? What adjustments can be made to make it move faster?
- Can your hovercraft glide across any other surfaces? Carpet? Tile? Cement?
- How much weight can your hovercraft carry?

WORKFORCE CONNECTION

Fire-rescue workers use amphibious hovercraft to rescue people in flooded, muddy or icy areas. The hovercraft can easily go up to people’s homes to rescue them right at their front door and works much better than a helicopter for this purpose. Fire and rescue workers also need to understand how to operate and maneuver the craft which means part of their job is to practice these rescue scenarios in the event a real situation arises.
1. Fold paper in half the long way and reopen.

2. Fold the top two corners into the center spine of the paper.

3. Refold lengthwise and rotate the paper to lay on the table like this:

4. Fold the top left corner down to lay parallel to the bottom spine. Repeat this step on the other side.

5. Turn the paper over and repeat the last two steps. Your airplane should look like this!

6. Now, try to fly it to the moon! How far can you make the airplane fly?
Frankenstein with Feathers!

Birds have many adaptations for the type of lives they have. Species look different from one another depending upon their diet & habitat. Use the ideas below to design your own bird on the next page. Write a few sentences describing the adaptations of your “Frankenbird”. Don’t forget to draw your bird’s habitat too!

**Beaks**
- For tearing meat
- For pulling worms
- For eating plants underwater
- For cracking seeds
- For spearing fish

**Feet**
- To snatch prey
- For perching
- For swimming
- For walking around

**Feathers**
- For flight
- To keep warm
- To attract a mate

**Body Shape & Wings**
- Streamlined for flying fast
- Small and fat for staying warm
- Midsize with strong muscles for migration

**Coloring**
- Brightly colored to attract a mate (often the male is more brightly colored)
- Neutral colors to blend in with its habitat
Describe your bird’s adaptations here:

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
Multiplying by 10

Directions: Scan the QR code to watch the video, and then solve the multiplication problems.

10 x 1 = 10  
3 x 10 =  
10 x 11 =  

10 x 8 =  
10 x 2 =  
5 x 10 =  

10 x 3 =  
0 x 10 =  
9 x 10 =  

8 x 10 =  
10 x 10 =  
7 x 10 =  

10 x 9 =  
11 x 10 =  
10 x 6 =  

10 x 5 =  
4 x 10 =  
12 x 10 =  

Michigan Learning Channel  |  Math Park Episode 202
## Character Traits

<table>
<thead>
<tr>
<th>Who is your character?</th>
<th>Choose a character trait to describe them. There are some suggestions below!</th>
</tr>
</thead>
</table>

SHOW the character trait to the reader! Write about what the character is DOING because of that trait.

### Other words for "kind"
- considerate
- generous
- helpful
- thoughtful

### Other words for "funny"
- amusing
- comical
- hilarious
- silly

### Other words for "lazy"
- lackadaisical
- lethargic
- passive
- weary

### Other words for "energetic"
- exuberant
- lively
- spirited
- vivacious

### Other words for "wise"
- knowledgable
- perceptive
- prudent
- shrewd

### Other words for "hard-working"
- diligent
- industrious
- persevering

### Other words for "friendly"
- affable
- amiable
- gregarious
- welcoming

### Other words for "unfriendly"
- antisocial
- disagreeable
- hostile
- rude
Week 2: Under Water

Dive deep into oceans, rivers, and our own Great Lakes to discover what it takes to live beneath the waves.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

Playlists this week: www.michiganlearning.org/underwater

<table>
<thead>
<tr>
<th>Watch Math Park</th>
<th>60 mins. of activity</th>
<th>Read 20 minutes</th>
<th>Watch Great Lakes Now</th>
<th>Go swimming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Make density art (pg. 20)</td>
<td>Go fishing</td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td>Make a heatless lava lamp (pg. 23)</td>
<td>HAVE FUN! (Free Space)</td>
<td>Watch InPACT at Home</td>
<td>Read 20 minutes</td>
</tr>
<tr>
<td>Watch DIY Science Time</td>
<td>Go swimming</td>
<td>Watch Math Park</td>
<td>Watch Story Pirates</td>
<td>Watch Extra Credit</td>
</tr>
<tr>
<td>Watch Great Lakes Now</td>
<td>Read 20 minutes</td>
<td>Build a pond viewer (pg. 21)</td>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>
Michigander Fish

The State Park Explorer Program offers free fishing programs at many state parks throughout the summer months. Are you ready to go fishing? How well can you recognize different species of fish? Complete the word search below of fish common to Michigan. For a bonus point, circle the names of the fish you see during your stay here at the park!

Bluegill  Salmon  Walleye
Lake Sturgeon  Smallmouth Bass  Whitefish
Largemouth Bass  Smelt  Yellow Perch
Muskellunge  Steelhead
Northern Pike  Trout
Density Art

1. Scan the QR code on this sheet to watch the video and follow along with Mister C.

2. You’ll need:
   a. This printout
   b. Plain printer paper or canvas paper
   c. Food coloring
   d. Vegetable Oil
   e. Pipette or straw
   f. Pan

Discussion Questions:
Does the type of paper impact the art?

How can you manipulate the colors to make more colors than you originally had in the food coloring box?

What if you added something like glitter to the oil and water mixture?

Fun Fact:
Symmetry is used in photography to create beautiful images. Butterflies have a line of symmetry down the center of their bodies.
A POND WITH A VIEW

DIFFICULTY: EASY

While there is action all around a pond, what do you think is happening in the water? Ponds are filled with animal and plant life that have special qualities that help them spend all or most of their lives underwater. Make this pond viewer to bring on your next pond exploration!

MATERIALS

- One-half gallon milk carton
- Scissors
- Waterproof, strong tape (e.g. duct tape) or a sturdy rubber band
- Heavy, clear plastic wrap

LET’S MAKE A POND VIEWER!

1. Have an adult cut off the very top of the milk carton and the very bottom to create a rectangular tube.

2. Tear off a sheet of plastic wrap and place it over one of the open ends. Fold down the plastic wrap... make sure wrap is smooth and tight for clear viewing.

3. Using the tape or the rubber band, secure the plastic wrap in place. Keep the plastic wrap as tight as possible so you have a flat viewing surface.

pbskids.org/naturecat

The PBS KIDS logo is a registered mark of PBS and is used with permission. © 2015 Spiffy Pictures. All rights reserved.
POND VIEWING TIPS

1. Splashing and stirring up mud will make it difficult to see into the pond. Be as still as possible when using your viewer.

2. Despite what NatureCat says, it is noble and fun to get wet! If the shoreline is murky, slowly wade out to your knees before using your viewer where it may be less murky.

3. Other ways to view: on a dock, over the side of a canoe, or in a stream, lake or tide pool!

LET’S TAKE A CLOSER LOOK

Describe a plant or animal that you see. Draw a picture of it, and ask an adult to help you identify and label your picture.
Heatless Lava Lamp

Fun Fact
Lava lamps were invented in 1948 and were originally called “Astro Lamps.” The lava lamp made its television debut in the US in the 1960s on a show called “Doctor Who.” Sales skyrocketed after this TV appearance!

Materials
- 2-liter bottle
- Vegetable oil
- Water
- Effervescent tablets
- Food coloring
- Funnel

Difficulty

Density
Density is a measurement of the matter an object has within a given volume. Objects with more matter in a given volume have a higher density. Objects with less matter in the same amount of volume have a lower density. Density is found by dividing the mass of an object by its volume.

VISIT
DIYSCIENCETIME.ORG
FOR MORE SCIENCE FUN!

What runs but never walks?
*Answer on the next page
DIY Heatless Lava Lamp

EXPERIMENT

Step 1: Gather your materials.
Step 2: Clean and rinse your empty 2-liter bottle.
Step 3: Pour 3 cups of water into your bottle.
Step 4: Add food coloring to the water.
Step 5: Gently pour vegetable oil into the bottle and observe how the water and oil interact.
Step 6: After allowing the water and oil to settle, drop pieces of the effervescent tablets into the bottle.
Step 7: Observe what happens!

WHY IT WORKS

The oil and water stay separate because they have different densities. The oil floats on the water because it’s less dense than water. When the effervescent tablet sinks to the bottom, it mixes with the water and starts a chemical reaction that produces carbon dioxide, a gas that rises through the oil. When these bubbles rise, they pull some of the colored water up and through the oil. The gas eventually escapes at the top, but the water falls back down through the oil because it is more dense!

EXTEND YOUR LEARNING

- What happens if you add more pieces of effervescent tablet, or change the amount of water in the bottle?
- Try shining a light, like a flashlight, through the bottle. What can you see differently?
- Is there a limit to the number of times you can repeat the experiment?

WORKFORCE CONNECTION

Paint chemists are scientists who study the properties and use of paint. Most paints are made of the same basic ingredients: pigments, binders, liquids, and additives. How these ingredients interact due to their densities plays an important part in determining the way that paint performs. Paint chemists study things like how well a paint can cover a surface or how long a paint may be able to last outside in the weather.
What **emotion** would you like to "Show, Not Tell"? Pick one from the examples below, or just choose your own! If you’re not sure what some of the words mean, look at the picture of the face for a clue.

<table>
<thead>
<tr>
<th>Elated</th>
<th>Jubilant</th>
<th>Thankful</th>
<th>Gloomy</th>
<th>Sorrowful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lonely</td>
<td>Anxious</td>
<td>Petrified</td>
<td>Startled</td>
<td>Frustrated</td>
</tr>
<tr>
<td>Furious</td>
<td>Irate</td>
<td>Amazed</td>
<td>Bewildered</td>
<td>Shocked</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Who is your character?</th>
<th>SHOW the emotion to the reader. What does the character SAY because they feel that way?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>What <strong>emotion</strong> are they feeling?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Week 3: Heroes

July 4-10

Celebrate our nation’s birthday and the people we call heroes, whether they are veterans, everyday helpers, or the kind who wear capes.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

Playlists this week: www.michiganlearning.org/heroes

<table>
<thead>
<tr>
<th>Watch Math Park</th>
<th>60 mins. of activity</th>
<th>Read 20 minutes</th>
<th>Do a good deed</th>
<th>Spot a mail truck outside</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Build an inertia walker (pg. 29)</td>
<td>Watch DIY Science Time</td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td>Spot a fire truck outside</td>
<td>HAVE FUN! (Free Space)</td>
<td>Watch InPACT at Home</td>
<td>Read 20 minutes</td>
</tr>
<tr>
<td>Watch DIY Science Time</td>
<td>Do a good deed</td>
<td>Watch Math Park</td>
<td>Watch Story Pirates</td>
<td>Draw a plant superhero (pg. 27)</td>
</tr>
<tr>
<td>Watch Extra Credit</td>
<td>Read 20 minutes</td>
<td>Watch Extra Credit</td>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>
Design Your Own Plant Superhero

**Big Idea:** There are many different types of plants. Some types of plants are good at cleaning the air to make it better for us to breathe.

**Explore:** Below are three different types of plants. All of these plants are good at cleaning the air inside your house to get rid of pollutants. Pollutants are small, unhealthy things that can get into the air, sometimes from new rugs or cleaning supplies. These plants breathe in the pollutants when they take in air, making it healthier for us inside.

![Peace Lily](image1)
![Areca Palm](image2)
![Snake Plant](image3)

Look at the three plants above. What do you notice that all of these plants have in common (What color are they? What parts of the plant do you see?) What do all plants need?

How are these plants different from each other?

(continued on page 2)
Design Your Own Plant Superhero

At-Home Activity

Take turns drawing your plant superhero on this page. Start with the top section and make sure to draw down just below the dotted line. Fold over the top section when you are done and pass on to the next person for the middle section.

Fold back here when top section is done.

Fold back here when middle section is done.

(continued on page 4)
Inertia Walker

**MATERIALS**
- Inertia walker printout
- Scissors
- Tape
- Marble
- Ramp

**DIFFICULTY**

**FUN FACT**
Inertia combined with the gravitational pull from the sun, is what keeps our planet, Earth, orbiting the sun.

**INERTIA**

Newton's 1st law states an object at rest remains at rest, and an object in motion remains in motion unless acted on by an unbalanced force. In other words, we call the tendency of an object to do nothing or remain unchanged inertia.

We often experience inertia in our lives! Think about driving in a car and someone applies the brakes. Your body tries to keep moving forward, but the seatbelt holds you safely in place. Try looking at your chocolate milk while you are stirring it next time. Although you pull the spoon out, the milk keeps spinning and swirling in the cup.

**WHY DO DENTISTS LOVE RIDING ROLLER COASTERS?**

*Answer on the next page*
DIY Inertia Walker

EXPERIMENT

Step 1: Print and cut out the walker on the dashed line.
Step 2: Fold and crease the tabs on the solid lines.
Step 3: Tape the walker together where the tabs overlap. Place a marble inside the walker before taping closed.
Step 4: Build a ramp using books and a long flat surface such as a wood board or long box.
Step 5: Place your walker at the top of the ramp and release it!

WHY IT WORKS

Objects in motion want to stay in motion, and the marble inside the walker wants to roll down the ramp. The marble has enough inertia to push and force the rounded end of the walker down the ramp. Without that extra force from the marble, the walker would not be able to overcome the friction between its long side and the ramp's surface. This allows the walker to tumble and turn all the way down the ramp!

EXTEND YOUR LEARNING

- Could you design your own walker using household materials available to you?
- What happens if you use a larger or smaller marble? Can a smaller marble keep the walker moving?
- What other types of ramps could you test your walker on? Would it work on a slide at the park?
- Could you create a differently-shaped three dimensional object to be a walker? Would a cube work?

WORKFORCE CONNECTION

Biomedical engineers called kinesiologists are scientists who study how people move. Kinesiologists can help athletes improve how they perform in their sports by showing them how their motions can enhance their physical fitness and reduce chances for injuries. They must understand motion and forces, like inertia and gravity, and how they impact athletes' bodies.
Directions:

**Step 1:** Cut out the walker on the dashed line.

**Step 2:** Fold and crease the tabs on the solid lines. Place a marble inside the walker before taping it shut.

**Step 3:** Build a ramp using books and a long flat surface such as a wood board or long box.

**Step 4:** Place your walker at the top of the ramp and release it!
This page was left blank to cut out the activity on the other side.
CREATE YOUR HERO

Draw and label your hero!

Hero’s name
Fractions of a Set

Directions: Scan the QR code to watch the video, and then write the fraction you see in the picture.
Week 4: Creatures  
July 11-17

From the prehistoric to the present, learn about the fascinating features of creatures near and far.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

**Playlists this week: [www.michiganlearning.org/creatures](http://www.michiganlearning.org/creatures)**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
<th>Activity</th>
<th>Time</th>
<th>Activity</th>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch Math Park</td>
<td>60 mins. of activity</td>
<td>Read 20 minutes</td>
<td>Catch a firefly</td>
<td>Make pendulum art (pg. 39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Watch Extra Credit</td>
<td>Watch DIY Science Time</td>
<td>60 mins. of activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td>Create a food web (pg. 36)</td>
<td>HAVE FUN! (Free Space)</td>
<td>Watch InPACT at Home</td>
<td>Read 20 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watch DIY Science Time</td>
<td>Watch Extra Credit</td>
<td>Watch Math Park</td>
<td>Watch Story Pirates</td>
<td>Play Trail-Tac-Toe (pg. 38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go fishing</td>
<td>Read 20 minutes</td>
<td>Make elephant toothpaste (pg. 41)</td>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We’re All Connected!

All organisms in an ecosystem depend on each other to survive; when one species starts to decline, multiple species may be affected because of the interconnectedness of life within the system. A food web shows how energy moves through a community and the relationships among the different food chains. Scientists monitor species in an ecosystem to make sure everything is in balance.

SMART START:

Create a list of plants or animals within an ecosystem in your area (woodland or temperate forest, wetland, freshwater lake or pond, ocean, rain forest, desert, prairie). Make sure to include producers, herbivores, carnivores, omnivores, decomposers, and scavengers in your list.

Explore your neighborhood to think about all the different kinds of ecosystems you see every day!

You’ll Need

- notecards
- string or yarn
- clear tape
- markers
- plain white paper
- colored paper

2 Hours

Seafood Explorer

In the Seafood Explorer project, researchers seek answers to ecologically critical questions about marine biology by studying over 30 million images of the ocean floor. Seafood Explorer is a part of the Zooniverse network of citizen science projects—projects that use volunteers’ contributions to help researchers make scientific discoveries.

seafloorexplorer.org
zooniverse.org
1. Discuss ecosystems. An ecosystem is a community of living (plants, animals, and microbes) and nonliving (air, water, and soil) components that interact. Choose an ecosystem that you are familiar with and create a list of all the living things in it. Use the list you generated in the SMART START to guide the discussion.

2. Create a food web. Draw each living thing you brainstormed on a separate notecard. Add the card “sun” to your collection, as the sun is the energy source for plants and the nexus for your food web. Put the cards in a circle around the sun card. Using a ball of yarn, begin the first food chain at the sun: The sun passes the yarn to a plant of your choice. The plant then passes it to an animal (herbivore/omnivore) that consumes that plant. The animal passes it to another animal (carnivore/omnivore) that is their predator. Build the chain, ending at the top predator, then cut the string.

3. Draw conclusions. Now apply your knowledge of ecosystems to create multiple food chains to form an interactive food web. Start again at the sun. Create multiple food chains until every card has at least one string. (See diagram below.)
## TRAIL-TAC-TOE

**CAN YOU GET THREE IN A ROW?**

When you visit a park or take a walk in your neighborhood, draw or write in the items below and tell where you saw them.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Something that could be eaten by an animal</td>
<td>A native prairie grass</td>
<td>An invasive species</td>
</tr>
<tr>
<td>Something in nature that is bright red</td>
<td>Somewhere or something that helps keep water clean</td>
<td>An insect home</td>
</tr>
<tr>
<td>Something in nature older than you.</td>
<td>A yellow flower</td>
<td>A sign that an animal was here</td>
</tr>
</tbody>
</table>

**METROPARKS.COM**
Pendulum Art

1. Scan the QR code on this sheet to watch the video and follow along with Mister C.

2. You’ll need:
   a. This printout
   b. String
   c. Squeeze bottle or plastic cup for your bob
   d. Scissors
   e. Rubber bands and paperclips
   f. Paint
   g. Paper or canvas for painting

Discussion Questions:
What might happen if you use a longer or shorter string? How does the period of the pendulum impact your art?

What might happen if you give the condiment bottle a harder or softer push?

Does the type of paint impact the flow or pattern?

Fun Fact:
Pendulum clocks lose time when it is hot because the heat causes the metal to expand lengthening the rod. This causes the period to increase affecting the ability to keep time.
What are some words to describe your hero?

What is your hero really **GOOD** at, or what is your hero’s **TALENT**?

What is your hero’s **WEAKNESS**, or what is your hero **AFRAID** of?

What does your hero like to do on a **NORMAL DAY**, when they don’t have a big problem to solve?
Fun Fact
Seaweed is in our toothpaste!
Seaweed acts as a thickening agent that allows toothpaste to be squeezed from its tube!

Materials
- Yeast
- Dish soap
- Measuring spoons
- Empty plastic bottle
- Cup with warm water
- 3% Hydrogen peroxide

Chemical Reactions
Chemical reactions take place when the molecular or ionic structure of a substance is rearranged. When a chemical reaction occurs, a new substance is created and the process is irreversible. Today we will be making elephant toothpaste!

Why are chemists great at solving problems?
*Answer on the next page
EXPERIMENT

Step 1: Gather materials.
Step 2: Place 2 tablespoons of yeast into 3 oz of warm water.
Step 3: Mix yeast and warm water, let stand until it gets frothy (about 3 minutes).
Step 4: Pour 4 ounces of hydrogen peroxide into an empty bottle.
Step 5: Squirt 1 tablespoon of dish soap into the hydrogen peroxide.
Step 6: Pour your yeast mixture into the bottle.
Step 7: Observe what happens!

WHY IT WORKS

“Elephant toothpaste” is created when a chemical reaction takes place and releases one oxygen atom from the hydrogen peroxide ($H_2O_2$). Hydrogen peroxide decomposes, or breaks down, into water ($H_2O$) and oxygen ($O_2$) naturally over time, but the yeast causes this to occur faster. The yeast has an enzyme in it called catalase. Catalase is a catalyst, something that increases the speed of the reaction. The catalyst is what causes the oxygen to be released quickly to create our “elephant toothpaste.” So why did we add soap? We wanted to capture all of the released oxygen (gas) from the chemical reaction!

EXTEND YOUR LEARNING

- Would the experiment still work if you added more yeast?
- What happens if you don’t add the soap?
- Does the shape or the size of the bottle change how the elephant toothpaste flows?

WORKFORCE CONNECTION

Cosmetologists, people who study the application of beauty treatments, work carefully with chemical reactions on a daily basis to help color people’s hair. When someone’s hair is bleached, a chemical reaction takes place to change the melanin from brown to a colorless (pale yellow) color. This irreversible process (chemical change) then allows the cosmetologist to apply a new color to the hair.
Equivalent Fractions

Directions: Scan the QR code to watch the video, and then circle the symbol that goes between them.

\[ \frac{3}{10} < \frac{5}{5} < \frac{5}{15} \]
Week 5: Engineering  
July 18-24

Meet the people who design bridges, cars, and video games and learn how to think like an engineer.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

**Playlists this week: www.michiganlearning.org/engineering**

<table>
<thead>
<tr>
<th>Spot architecture outside (pg. 47)</th>
<th>Read 20 minutes</th>
<th>Draw a family member’s car</th>
<th>Watch Extra Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 mins. of activity</td>
<td>Watch 20 minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Watch DIY Science Time</td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watch Extra Credit</td>
<td>Find a creative solution (pg. 51)</td>
<td>Watch InPACT at Home</td>
<td>Read 20 minutes</td>
</tr>
<tr>
<td>Watch DIY Science Time</td>
<td>Watch Math Park</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watch Story Pirates</td>
<td>Watch ArchiTreks</td>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>

HAVE FUN! (Free Space)
Why Consider AI Careers

The video “Why Consider AI Careers” teaches you about the role of AI in our everyday lives and the importance of encouraging women and girls to consider AI as a career possibility. AI careers work directly with computers and sometimes with different computer languages.

Try This!
One of the basic building blocks that computers use to send and receive information is called binary code. Binary code is a code with only two symbols. First, decode the message below using binary code. Then, try using binary code to send a short message to a friend!

Creating Secret Messages in Binary Code

<table>
<thead>
<tr>
<th>A</th>
<th>00001</th>
<th>J</th>
<th>01010</th>
<th>S</th>
<th>10011</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>00010</td>
<td>K</td>
<td>01011</td>
<td>T</td>
<td>10100</td>
</tr>
<tr>
<td>C</td>
<td>00011</td>
<td>L</td>
<td>01100</td>
<td>U</td>
<td>10101</td>
</tr>
<tr>
<td>D</td>
<td>00100</td>
<td>M</td>
<td>01101</td>
<td>V</td>
<td>10110</td>
</tr>
<tr>
<td>E</td>
<td>00101</td>
<td>N</td>
<td>01110</td>
<td>W</td>
<td>10111</td>
</tr>
<tr>
<td>F</td>
<td>00110</td>
<td>O</td>
<td>01111</td>
<td>X</td>
<td>11000</td>
</tr>
<tr>
<td>G</td>
<td>00111</td>
<td>P</td>
<td>10000</td>
<td>Y</td>
<td>11001</td>
</tr>
<tr>
<td>H</td>
<td>01000</td>
<td>Q</td>
<td>10001</td>
<td>Z</td>
<td>11010</td>
</tr>
<tr>
<td>I</td>
<td>01001</td>
<td>R</td>
<td>10010</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DECODE THIS: 01000 00101 01100 01100 01111

Now, try writing a short message to a friend:

__________________________________________

A = 🧑‍💻🧑‍💻🧑‍💻🧑‍💻

The 0s and 1s of this binary code aren’t the only way to make a binary code. Binary just means that there must be two options. Anything that can exist in two states or forms can be used. For example, you could replace the 0s with a heads-up penny and the 1s with a tails-up penny. What other items could you use to make a binary code?
How does your house stay standing? Architects use structures like columns, beams, and arches to make buildings strong and be sure they last for many years. Grab a grown-up or a friend and try to make columns, beams, and arches with your body!
These are examples of landmarks. What landmarks are in your neighborhood? Draw a picture of a local landmark!
FUN FACT
Before roller coasters were even invented, mountain-side railway cars carried coal in the mornings and provided joy rides for human passengers in the afternoon. The Mauch Chunk Switchback Railway was built in 1827 and could carry its passengers 50 miles per hour!

POTENTIAL AND KINETIC ENERGY

Energy stored in an object due to its position is potential energy. Energy that a moving object has due to its motion is kinetic energy. We can observe potential and kinetic energy conversions in many different places. Roller coasters, sledding, and even playing with dominos are familiar examples of potential and kinetic energy.

MATERIALS
- Marbles
- Straws
- Tape

DIFFICULTY

Why is wind energy becoming so popular?
*Answer on the next page
EXPERIMENT

Step 1: Build a track that allows a marble to roll across the straws. Try to make a track 10 feet in length.
Step 2: Build a ramp for your track. This is where your marble will start and get its energy.
Step 3: Release your marble onto the track and observe the distance and speed your marble is able to reach.
Step 4: Did your marble make it the entire length of the track? How long did it take? Record your data into your science notebook.
Step 5: Redesign your track and ramp to increase the speed and distance the marble can travel.

WHY IT WORKS

Marbles have mass, and when you lift mass up off the ground, you increase the potential energy that mass has because of gravity. By adjusting the height of your ramp, you are able to increase or decrease the potential energy of the marble. Once the marble is released, it rolls down the track and the potential energy is converted into kinetic energy. If your ramp is tall enough and your track is built well, the marble may be able to successfully travel the entire track. With some simple adjustments, you can increase and decrease the speed of the marble.

EXTEND YOUR LEARNING

- What’s the longest track you can build?
- Does the size of your marble change the distance that it can travel?
- Can you add hills to your track? How does that impact how the marble travels?
- Try building a second track and race a friend.

WORKFORCE CONNECTION

Hydroelectric power plants use gravitational potential energy to turn the blades of a turbine to generate electricity. A hydroelectric power plant has a water reservoir that sits above the turbines, giving the water potential energy. Scientists precisely regulate the flow of the water down and out of the reservoir, directing it across energy generating turbines. These scientists must precisely calculate the amount of water speed necessary to get the turbines moving to generate electricity.
THE HERO SIZED PROBLEM

Every story involves some sort of problem, but in a hero story that problem is SO HUGE that a whole community is in danger, and a hero needs to save the day! For more ideas on how to create a Hero Sized Problem, check out our Hero Stories videos at storypirates.com/storypiratesuniversity.

What is the **COMMUNITY** where your story takes place? A city? A town? An underground snow fortress? Use your imagination, then draw and label a picture or map!

What is the **HERO SIZED PROBLEM** in the community?
CREATIVE SOLUTIONS

The Hero Sized Problems of today can’t be solved just by punching, kicking, and blowing things up. Heroes need to be able to use their imaginations, and come up with creative ways to solve problems that nobody has ever thought of before. For more ideas on how to invent some creative solutions, and then have your hero TRY, FAIL, AND TRY AGAIN, check out our Hero Stories videos at storypirates.com/storypiratesuniversity.

The FIRST solution the hero tried:

Unfortunately (what went wrong?):

The NEXT thing the hero tried:

Unfortunately (what went wrong?):

The solution that FINALLY worked:

It worked because:
Adding & Subtracting Fractions

Directions: Scan the QR code to watch the video, and then add and subtract the fractions.

$$\frac{4}{8} + \frac{1}{8} = \_\_\_$$

$$\frac{1}{4} + \frac{1}{4} = \_\_\_$$
Week 6: Great Outdoors

Explore the world outside your door and the incredible parks and waters that belong to us all.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

Playlists this week: [www.michiganlearning.org/greatoutdoors](http://www.michiganlearning.org/greatoutdoors)

<table>
<thead>
<tr>
<th>Crush a soda can with SCIENCE! (pg. 60)</th>
<th>Read 20 minutes</th>
<th>Watch the sunset</th>
<th>Watch Extra Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Make a composter (pg. 54)</td>
<td>Watch DIY Science Time</td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td></td>
<td></td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td>Watch Math Park</td>
<td>Watch InPACT at Home</td>
<td>Read 20 minutes</td>
<td>Make leaf rubbings (pg. 56)</td>
</tr>
<tr>
<td>Watch Extra Credit</td>
<td>Go swimming</td>
<td>Watch Math Park</td>
<td>Watch Math Park</td>
</tr>
<tr>
<td>Watch DIY Science Time</td>
<td>Read 20 minutes</td>
<td>Visit a new place</td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>
MAKE A COMPOSTER!

DIFFICULTY: EASY (REQUIRES ADULT ASSISTANCE)

What happens to a pile of old leaves outside when you add a dash of time, maybe some worms, and a healthy splash of moisture? Rich soil perfect for a garden just like Daisy’s!

MATERIALS

- 1 empty two-liter soda bottle
- Sharp knife
- Nail
- Shredded newspaper
- Dirt (not potting soil -- use dirt from outside)
- Compost materials (such as grass clippings or vegetable scraps)
- Small handful of dead leaves
- Flat dish to hold composter
- Spray bottle with water

LET’S GET COMPOSTING!

1. Rinse the bottle and peel off the label.
2. Have a grownup cut off the top of the bottle as shown. Set the top aside.
3. Have the grownup use the nail to punch 8 to 10 small air and drainage holes along the sides and bottom of the bottle.
4. Put the bottle on the tray.
5. Put some dirt, shredded newspaper and old leaves inside the composter. This is your compost starter.

6. Use the spray bottle to wet the compost starter.

7. You’re ready to add some stuff to your compost! (Try grass clippings, vegetable scraps, coffee grounds, or eggshells, but do not add dairy or meat.)

8. Turn the bottle top upside down and nest it in the open top of the bottle. It will act like a funnel for adding a little bit of water each day to keep the contents damp.

9. Place in a spot where sunlight can reach it.

10. Stir every few days, keep the contents damp, and let it rot! As your compost breaks down, you can add more kitchen scraps or plant litter, as well as some more soil from outside to mix in.

11. Cover the top of your compost with a kitchen towel when not in use.

---

**LET’S TAKE A CLOSER LOOK**

1. As you check your composter each day, describe what you observe.

2. You may see fluffy mold growing. Some people are allergic to some types of mold, so keep your compost covered when you’re not working with it.

3. Now take your rich, healthy soil, place it in a pot, add a seed and some water and grow your very own plant!

---

*pbskids.org/naturecat*

The PBS KIDS logo is a registered mark of PBS and is used with permission. © 2015 Spiffy Pictures. All rights reserved.
Make Leaf and Bark Rubbings

What to Do:

1. Find some trees: Take some blank paper, masking tape (optional), and crayons outside. Look for several trees with different types of bark and leaves.

2. Feel the bark: Close your eyes and feel the bark of the trees. How does it feel? Which one is the smoothest? The roughest?

3. Make a bark rubbing: Use tape to hold a piece of paper on the trunk or hold the paper tightly. Lightly rub a crayon horizontally over the surface of the paper on the bark, just hard enough so that the bark’s texture shows on the paper. Do this to other trees and compare the rubbings.

4. Make a leaf rubbing: Collect some leaves from different trees. Close your eyes and feel the leaves. How do they feel? Make leaf rubbings by putting the leaf on a piece of cardboard or a clipboard, covering it with the paper, and rubbing the crayon over it.

5. Make a matching game: Once you’ve made several leaf and bark rubbings, play a matching game with them. Mix them up and see if you can figure out which tree each leaf and bark rubbing came from.

What You Need:

- Trees
- Plain white paper
- Crayons with label removed
- Masking tape (optional)
- Cardboard or clipboard
- Paper bag for collecting leaves

Find more games and activities at pbskids.org/naturecat
Make your leaf and bark rubbings here.

Find more games and activities at pbskids.org/naturecat
Environmental Science Issues

The video “Environmental Science Issues” discusses the importance of our environment and the steps that we can take to help protect it. Taking care of the environment is everyone’s responsibility.

Try This!
Use the space below to draw your favorite environment. It might be a beautiful beach, a tranquil park, a wild forest, or anywhere that you would love to be. Then answer the questions that follow.

My Favorite Environment

What makes this your favorite environment?

___________________________________________________________________________________
___________________________________________________________________________________

What threats does your favorite environment face? For example, what might happen if someone came and cut down the trees or dumped trash on the beach?

___________________________________________________________________________________
___________________________________________________________________________________

What could you do to help protect your favorite environment?

___________________________________________________________________________________
___________________________________________________________________________________
A hero story needs lots of interesting dialogue. You want the reader to be able to hear it when your hero gives an inspiring speech, or whispers a secret plan, or makes a cool snappy comment. Practice writing some dialogue for your hero that you might put into a story later! For more ideas and information, watch our Hero Stories videos at storypirates.com/storypiratesuniversity.

Write some dialogue here. Use quotation marks, and check out the next page for some words you could use instead of “said”.

You can also draw your hero in an exciting scene, and add a speech bubble for what they’re saying.
**FUN FACT**

Implode is the opposite of explode. When something implodes, it quickly collapses inward. Buildings are often imploded when they need to be demolished so that the destruction doesn’t hurt nearby buildings or surroundings.

**MATERIALS**
- An adult helper
- Stovetop or burner
- Empty soda cans
- Large bowl of ice
- Water
- Tongs

**DIFFICULTY**

Air is EVERYWHERE! Air is the invisible gaseous substance that surrounds all of the Earth. There are five layers to Earth’s atmosphere and gravity is pulling down on the air molecules in each layer. That pulling is what creates atmospheric pressure.

**AIR PRESSURE**

What do you call the study of soft drinks?
*Answer on the next page*
DIY Can Crush

**EXPERIMENT**

Step 1: Gather materials.

Step 2: Fill a large bowl halfway with ice water.

Step 3: Add an 1/8 cup of water to the bottom of the can (just enough to cover the bottom).

Step 4: Place the can on the center of the burner. Once it’s stable, turn the burner on high until it has steamed for at least 1 minute.

Step 5: Use your tongs to grasp the can so that you can safely flip the can over and into the ice water.

Step 6: Quickly flip the can over and place into the ice water so that the opening is submerged. Be careful to not splash hot water as you flip the can.

**WHY IT WORKS**

As the water in the can heats up, it changes from a liquid to a gas, making water vapor. The water vapor pushes the air out of the can. Once the can is upside down in the ice water, the hot water vapor is trapped inside and quickly cools after it’s submerged in the ice water. The water vapor condenses leaving empty space in the can. The air outside of the can has pressure, exerting 14.7 pounds of pressure per square inch on the can! Without the air inside of the can, the air pressure is unequal and the outside air easily crushes the can.

**EXTEND YOUR LEARNING**

- What would happen if you used room temperature water instead of ice water?
- What happens if you use a different sized can?
- What happens if you don’t heat your can up before turning over into the ice water?
- Does the size of your ice impact the experiment?

**WORKFORCE CONNECTION**

Aerospace engineers have to understand how pressure and a lack of pressure (vacuum) both affect the performance of aircraft and spacecraft inside and outside of the Earth’s atmosphere. Aerospace engineers design and test aircraft and spacecraft as well as missiles and satellites to learn how air impacts flight. Aerospace engineers recently were able to test how the air pressure on Mars affects the flight of a drone!
**Week 7: When I Grow Up**

All summer we’ll learn about different careers—this week, think about all the exciting possibilities in your future!

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

**Playlists this week: [www.michiganlearning.org/growup](http://www.michiganlearning.org/growup)**

<table>
<thead>
<tr>
<th>Watch a Career Girls video (pg. 63)</th>
<th>60 mins. of activity</th>
<th>Read 20 minutes</th>
<th>Try a new food</th>
<th>Watch Extra Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td>Learn about a family member’s job</td>
<td>Make an electro-scope (pg. 67)</td>
<td>60 mins. of activity</td>
</tr>
<tr>
<td>Try an InPACT activity card (pg. 65)</td>
<td>Watch Math Park</td>
<td>HAVE FUN! (Free Space)</td>
<td>Try an InPACT Activity Card</td>
<td>Read 20 minutes</td>
</tr>
<tr>
<td>Watch Extra Credit</td>
<td>Write a story (pg. 69)</td>
<td>Watch Math Park</td>
<td>Watch Story Pirates</td>
<td>Watch InPACT at home</td>
</tr>
<tr>
<td>Learn about a family member’s job</td>
<td>Read 20 minutes</td>
<td>Watch DIY Science Time</td>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>
Career Comics 1  Career Video:

Scan the QR code to visit the Career Girls website and find a career video that interests you. Then ask yourself: What is this job like? Create a comic starring you in this career. At the top, fill in the career and sign your name. Use words and pictures to tell what happens on the job!

I Want to Be ______________________ By ______________________

If you like __________ and ___________, you might like to be ___________.

(career)

How do you get ready for this career?

You can start by ______________ and

__________________________

__________________________

__________________________

You’ll need some skills, too.

Like these:

1.

2.

3.

What else can you do to prepare?
Introducing Decimals: Tenths

Directions: Scan the QR code to watch the video, and then write each fraction as a decimal.

\[
\frac{1}{10} = 0.1 \\
\frac{3}{10} = \\
\frac{8}{10} = \\
\frac{2}{10} = \\
\frac{5}{10} = \\
\frac{9}{10} = \\
\frac{10}{10} = \\
\frac{7}{10} = \\
\frac{6}{10} = \\
\frac{4}{10} = 
\]
Activity Cards
Cut out the cards. When you're feeling antsy, try following the directions for one of the exercises!

Blast-Off Lunges
INSTRUCTIONS
1. Get into a lunge position with left leg forward, hips underneath you, and right leg behind your right hip.
2. Slowly sink into a lunge, trying to get your knee to touch the ground.
3. Immediately "blast off" by hopping upwards and into next lunge position with right leg forward and left leg behind.
4. If needed, instead of jumping into the next lunge position, jump with feet together and then bounce into lunge position.
5. Repeat as many rounds as possible.

Side Leg Lifts
INSTRUCTIONS
1. Start by laying on your side with your legs stacked on top of each other.
2. Slowly raise your top leg up towards the sky and then back down.
3. Complete 10 repetitions and then switch legs.
4. Complete 3 sets per leg.
5. For added challenge, tape a bag of water to the top leg for some added weight!

Tap Backs
INSTRUCTIONS
1. Stand up tall and proud with your feet together and hands on your hips.
2. Take your right foot and tap it right behind you, then place back to starting position.
3. Take your left foot and tap it right behind you, then place back to starting position.
4. Repeat as fast as you can to get 100 tapbacks (50 on each leg).

Ski Jumps
INSTRUCTIONS
1. Start by standing tall with your feet shoulder width apart.
2. Using only your right foot, jump to the left about 2-3 feet and land on your left foot.
3. Gather yourself and then using only your left foot, jump to the right 2-3 feet and land on your right foot.
4. Repeat this as many times as you can for 30 seconds.

Cloud Watching
INSTRUCTIONS
1. Find a day where there are a lot of clouds in the sky.
2. Lay down on your back on the ground or in the grass and look up into the sky.
3. Watch and admire all the different clouds. Look at the different shapes they make, how fast/slow they are moving, and where they are moving too!

Lay Down Hip Stretch
INSTRUCTIONS
1. Start by sitting at the edge of a bed in a relaxed position with your feet hanging off.
2. Lay back, and pull your right knee towards your chest while keeping your left leg hanging off the bed.
3. Pull your knee until you feel a stretch in your left hip and hold for 10-15 seconds.
4. Relax, switch legs, and then repeat 2-3 times per leg.

Cereal Bowl
INSTRUCTIONS
1. Lay flat on your back with feet together
2. Bring your knees together and raise both legs up so that your feet are facing the ceiling.
3. In slow motion, stir the imaginary bowl of cereal with feet and keep hands under your bottom.
4. Repeat 30 times.

Aligator Breath
INSTRUCTIONS
1. Stand with legs hip-width apart.
2. Spread arms out wide and inhale as you reach outward.
3. When you exhale, clap your hands together as many times as possible like an alligator jaws.

INSTRUCTIOINS
1. Get into a lunge position with left leg forward, hips underneath you, and right leg behind your right hip.
2. Slowly sink into a lunge, trying to get your knee to touch the ground.
3. Immediately "blast off" by hopping upwards and into next lunge position with right leg forward and left leg behind.
4. If needed, instead of jumping into the next lunge position, jump with feet together and then bounce into lunge position.
5. Repeat as many rounds as possible.

Side Leg Lifts
INSTRUCTIONS
1. Start by laying on your side with your legs stacked on top of each other.
2. Slowly raise your top leg up towards the sky and then back down.
3. Complete 10 repetitions and then switch legs.
4. Complete 3 sets per leg.
5. For added challenge, tape a bag of water to the top leg for some added weight!

Tap Backs
INSTRUCTIONS
1. Stand up tall and proud with your feet together and hands on your hips.
2. Take your right foot and tap it right behind you, then place back to starting position.
3. Take your left foot and tap it right behind you, then place back to starting position.
4. Repeat as fast as you can to get 100 tapbacks (50 on each leg).

Ski Jumps
INSTRUCTIONS
1. Start by standing tall with your feet shoulder width apart.
2. Using only your right foot, jump to the left about 2-3 feet and land on your left foot.
3. Gather yourself and then using only your left foot, jump to the right 2-3 feet and land on your right foot.
4. Repeat this as many times as you can for 30 seconds.

Cloud Watching
INSTRUCTIONS
1. Find a day where there are a lot of clouds in the sky.
2. Lay down on your back on the ground or in the grass and look up into the sky.
3. Watch and admire all the different clouds. Look at the different shapes they make, how fast/slow they are moving, and where they are moving too!

Lay Down Hip Stretch
INSTRUCTIONS
1. Start by sitting at the edge of a bed in a relaxed position with your feet hanging off.
2. Lay back, and pull your right knee towards your chest while keeping your left leg hanging off the bed.
3. Pull your knee until you feel a stretch in your left hip and hold for 10-15 seconds.
4. Relax, switch legs, and then repeat 2-3 times per leg.
This page was left blank to cut out the activity on the other side.
**Fun Fact**

Lightning is a form of static discharge and lightning strikes have been recorded at distances of 10 miles. If you are close enough to hear thunder, it’s important to take shelter.

**Static Electricity**

Static electricity is a stationary electric charge. This charge is typically produced by rubbing two objects together. The friction causes electrons to transfer from one object to another to create a build up of electrons, or static charge.

**Materials**

- Glass jar or cup
- Straw
- Cardstock
- Scissors
- Copper wire
- Pencil
- Aluminum foil
- Balloon

**Difficulty**

What happens if you plant a lightbulb in a garden?

*Answer on the next page*
**DIY Electroscope**

**EXPERIMENT**

**Step 1:** Create a card stock lid for the top of your jar (about 1 inch larger than the jar). Carefully pierce a hole in the center of your lid.

**Step 2:** Cut the straw to approximately 3 inches in length and push through the hole in your card stock lid.

**Step 3:** Cut a length of the copper wire approximately 10 inches. Use approximately 4 inches of one end of the wire to create a flat spiral. Run the straight end of the wire down, through the straw and into the jar.

**Step 4:** Carefully cut two, 1 inch oval-shaped pieces of aluminum foil. Pierce a small hole in one end of each piece and using the copper wire inside the jar as a hook, hang them next to each other inside the jar.

**Step 5:** Use your electroscope to detect static charge on different objects by placing them near the wire spiral.

**Step 6:** Hold the blown up balloon up to the wire spiral of your electroscope. Then try rubbing the balloon against your hair and then hold the balloon to the wire spiral of your electroscope and observe any differences.

**WHY IT WORKS**

Rubbing a balloon against your hair transfers electrons from your hair to the balloon. This transfer of electrons will cause the balloon to become more negatively charged. When you move the balloon closer to the electroscope, this will cause the negatively charged electrons on the copper wire to move down and away from the balloon. The electrons move down the copper wire and transfer onto the pieces of foil. Now both pieces of foil have the same charge and want to repel one another. This causes the aluminum pieces to spread apart.

**EXTEND YOUR LEARNING**

- What other objects can you test?
- Could you create a scale to measure how far your aluminum pieces separate?
- What do you think causes them to separate more or less?
- Could the aluminum foil be replaced with something like paper? Would your electroscope still detect charges?

**WORKFORCE CONNECTION**

Electrostatic discharge engineers are scientists that focus on minimizing or eliminating electrostatic discharge. Their jobs require them to understand how the build up and discharge of electrons can impact sensitive electronics. For example, eliminating sparks created by static electricity is critical for the safety of astronauts working on space equipment. Even the slightest spark of electricity could ignite catastrophic fires when working in space.
WRITE YOUR STORY!  

Write a title in the box below, then use the characters, emotions, and dialogue from earlier in this book to create a story!
WRITE YOUR STORY!

THE STORY PIRATES
CREATOR CLUB
Week 8: Shoot for the Stars  
August 8-14

Look up at the night sky and into outer space and meet people who risked everything to follow their dreams.

Use the sheet below to mark off this week’s activities as you complete them. See if you can get a BINGO!

Playlists this week: www.michiganlearning.org/stars

<table>
<thead>
<tr>
<th>Build an air cannon (pg. 77)</th>
<th>60 mins. of activity</th>
<th>Read 20 minutes</th>
<th>Draw a cartoon story (pg. 75)</th>
<th>Watch Extra Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read 20 minutes</td>
<td>Watch Story Pirates</td>
<td></td>
<td>Draw an alien planet</td>
<td>Stargaze</td>
</tr>
<tr>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
<td></td>
<td>HAVE FUN! (Free Space)</td>
<td>Read 20 minutes</td>
</tr>
<tr>
<td>Watch Extra Credit</td>
<td>Observe the clouds (pg. 74)</td>
<td>Watch Math Park</td>
<td>Watch Story Pirates</td>
<td>Watch InPACT at home</td>
</tr>
<tr>
<td>Stargaze</td>
<td>Read 20 minutes</td>
<td>Watch DIY Science Time</td>
<td>60 mins. of activity</td>
<td>Watch Math Park</td>
</tr>
</tbody>
</table>
Can you imagine driving an all-terrain vehicle (ATV) on the moon? NASA can. It’s building a fleet of ATVs (called rovers). Some can be driven by astronauts. Others are remote-controlled. All of them can handle the moon’s dusty, rugged terrain. Talk about off-road adventure!

WE CHALLENGE YOU TO...
...design and build a rubber band-powered rover that can scramble across the floor.

BUILD
1. **First, you have to make the body.** Fold the cardboard into thirds. Each part will be about 2 inches (5 cm) across. Fold along (not across) the corrugation (the tubes inside a piece of cardboard).
2. **Then, make the front wheels.** On the two 5-inch (13-cm) cardboard squares, draw diagonal lines from corner to corner. Poke a small hole in the center (that’s where the lines cross). On the body, poke one hole close to the end of each side for the axle. Make sure the holes are directly across from each other and are big enough for the pencil to spin freely.
3. **Now attach the front wheels.** Slide the pencil through the body’s axle holes. Push a wheel onto each end. Secure with tape.
4. **Next, make the rear wheels.** Tape the straw under the back end of the rover. Slip a candy onto each end. Bend and tape the axle to stop the candies from coming off.
5. **Finally, attach the rubber band.** Loop one end around the pencil. Cut small slits into the back end of the body. Slide the free end of the rubber bands into the slits.

TEST, EVALUATE, AND REDESIGN
Test your rover. Wind up the wheels, set the rover down, and let it go. Did everything work? Can you make your rover go farther? Engineers improve their designs by testing them. This is called the design process. Try redesigning the wheel setup or rubber band system. For example, if:

- **the wheels don’t turn freely**—
  Check that the pencil turns freely in the holes. Also, make sure the wheels are firmly attached and are parallel to the sides.
• **the rover doesn’t go far**—Wind up the wheels more. Try wheels of different sizes or shapes. Or, add another rubber band or use a rubber-band chain.

• **the wheels spin out**—Add weight above the square wheels; put more wheels on the pencil; use bigger wheels; or cut open a rubber band and use only a single strand of elastic.

• **the rover won’t travel in a straight line**—Check that the pencil is straight and the front wheels are the same size.

---

**CUSTOM WHEELS**

The moon doesn’t have an atmosphere—there’s no air there! So air-filled tires like the ones on a bike or car would explode—the air inside would push through the tire to escape into outer space (where there’s no air to push back against the walls of the tire). Imagine you’re a NASA engineer who has to design a tire that:

- works in space, where there’s no atmosphere
- withstands extreme hot and cold temperatures—on the moon, they range from roughly 250°F to –250°F Fahrenheit (121°C to –157°C Celsius)
- weighs 12 pounds (5.5 kg), which is half the weight of an average car tire
- won’t get clogged with the fine dust that covers the moon

Despite these challenges, engineers designed a tire that worked perfectly when it was used on the moon. It’s made of thin bands of springy metal. That helps it be lightweight, have good traction, and work at any temperature the moon can throw at it. Plus, it flexes when it hits a rock, and it doesn’t need to be pumped up. Dependability is important. There’s no roadside service when you’re on the moon. 250,000 miles (400,000 km) from home.

---

**RIDE IN “STYLE”?**

A rover may not be the hottest-looking vehicle around, but with a price tag of over ten million dollars, it’s one of the most expensive. And it sure is convenient to bring along. Rovers can be folded and stored in a landing module the size of a small room. Look at the picture of the rover. Which features are also found on cars designed for use on Earth?

**Answers:** Chassis, wheels, fenders, motor, seats, seat belts, antenna, battery, camera (some cars), and steering controls.

---

The farthest trip anyone has ever taken on the moon with a rover is 2.8 miles (4.5 km).
DEDICATED TO EDUCATION
As a major part of our mission, Celebrating and Saving Wildlife, the Detroit Zoological Society is dedicated to conservation education. Our education programs are designed to inspire learners of all ages to make small changes and take action to protect animals and the wild places they live. Learn more at www.detroitzoo.org.

GLOBE Observer Clouds - Citizen Science
EDUCATION ACTIVITY

MATERIALS:
- Smartphone or tablet
- GLOBE Observer app

Directions:
- Download and familiarize yourself with the GLOBE Observer app (Clouds).
- Step outside, take a walk around your home, in your neighborhood or to a local park to find a good view of the sky.
- Click through the app to enter your observations on what the sky looks like, percentage of cloud cover, sky color, visibility, type of clouds present, opacity, surface conditions, and photos.

Guiding Questions:
1. What do you notice about the clouds today?
2. What predictions can you make about the weather from looking at the clouds?
3. Describe what features, shapes, and heights of the clouds you see.
4. Use the Interactive Cloud Key to answer questions that guide you to identify what clouds you may be looking at.

How it Works:
Weather is the conditions we see day to day within the atmosphere, while climate refers to conditions seen over a time. Clouds impact both local weather and climates across the planet. Clouds can provide information about temperatures, humidity, and wind throughout the atmosphere. Using this information helps to predict weather conditions.

Continue Exploring
- How do cloud conditions compare across different seasons? Different areas of the world? Make predictions, research, and make observations at different times and places.
DRAW YOUR STORY!
DIY Air Cannon

MATERIALS
- Plastic or styrofoam cups
- Scissors
- Balloon
- Various items to knock over

DIFFICULTY

Air pressure, also known as atmospheric pressure, is the force exerted on a surface by the weight of air. Even though it is invisible to our eyes, the air surrounding us puts about 14.7 pounds per square inch of pressure on everything on the surface of Earth. That’s a lot of pressure!

FUN FACT
Dolphins can create vortex rings to play with in the ocean by blowing air through their blowholes. The quick burst of air combined with the round shape of the blowhole creates a vortex ring of bubbles.

VISIT DIYSCIENTIME.ORG
FOR MORE SCIENCE FUN!

Why do scientists love renewable energy so much?
*Answer on the next page
DIY Air Cannon

EXPERIMENT

Step 1: Gather your materials.
Step 2: Cut the neck off of the balloon and keep the large part.
Step 3: Carefully cut a hole in the bottom of the cup about the size of a dime with your scissors.
Step 4: Attach the cut balloon to the mouth of the cup. Be sure to stretch it tightly and reinforce by wrapping a rubber band around the lip of the cup.
Step 5: Tap or gently pull back the balloon and let it go to force the air out of your cannon.
Step 6: Set up a target, such as hanging toilet paper, to test to see how far your air rings can reach.

WHY IT WORKS

Although you can’t see it, your cup is filled with air. When you apply a force to the air molecules by pulling back the balloon and letting it snapback, the air molecules are pushed towards the opening. This movement sets off a quick chain reaction of collisions with other air molecules and the sides of the cup. The only way for the air molecules to escape is through the opening at the bottom of the cup. The quick escape of these air molecules forms a stream of air that flows straight out of the cannon.

EXTEND YOUR LEARNING

- What might happen if you used a different sized cup? Could you cut a 2 liter bottle to make a larger cannon?
- Could you try another stretchy material to take the place of the balloon?
- Does it change the experiment if you make the hole a different shape? What if you place it in a different spot?
- Experiment with your air cannon to see what changes allow you to shoot air the furthest.
- Have a target competition with a friend.

WORKFORCE CONNECTION

A meteorologist studies interactions between temperature, humidity, air pressure, precipitation and vortices in the atmosphere. They develop an understanding of how vortices such as tornadoes, waterspouts and hurricanes form so they can predict the weather to keep people informed and safe. They also study and learn about the polar vortex and how it affects the weather during winter.

Copyright Alabama Public Television and Mister C, LLC 2021
Introducing Decimals: Hundredths

Directions: Scan the QR code to watch the video, and then write each fraction as a decimal.

\[
\frac{1}{100} = 0.01 \quad \frac{3}{100} = \\
\frac{8}{100} = \quad \frac{2}{100} = \\
\frac{5}{100} = \quad \frac{9}{100} = \\
\frac{10}{100} = \quad \frac{7}{100} = \\
\frac{6}{100} = \quad \frac{4}{100} =
\]
WHAT IS MEET UP AND EAT UP?
Meet Up and Eat Up provides FREE nutritious meals for children and teens 18 years and younger.

HOW DO I SIGN UP?
No application or sign-up needed, just come and join us!

WHERE IS IT?
To find a location near you
Visit: www.michigan.gov/meetupeatup
Call: 211
Text: Food to 304-304
Mande por texto “Comida” al 304-304