Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

SUMMER!

FUN ACTIVITY BOOK

TWEENS

On TV. Online. Statewide. VISIT MichiganLearning.org

SPECIAL THANKS TO OUR
MICHIGAN LEARNING CHANNEL PARTNERSHIPS:

Content Partners:

826Michgian
American Chemical Society
Ann Arbor District Library
Battle Creek Symphoy 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
LearningScienceIsFun
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
WNET (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.

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

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**.

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.

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

On TV. Online. Statewide.

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.

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

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

On TV. Online. Statewide.

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

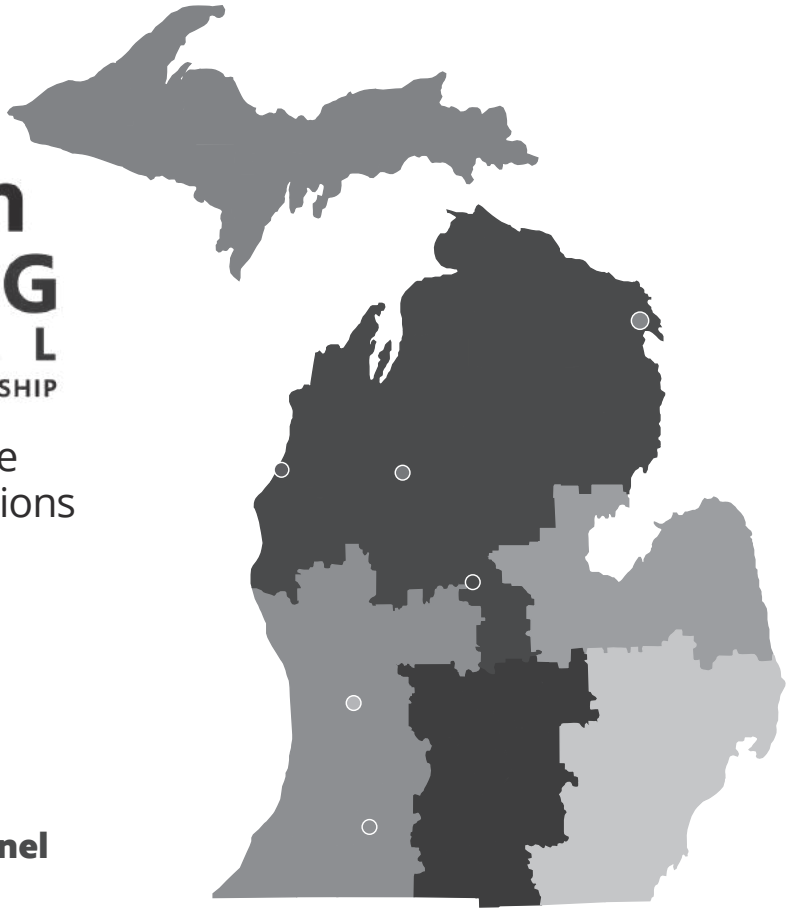
Follow @MichLearning on social media to find out more.

The Michigan Learning Channel is funded through a grant awarded by the Michigan Department of Education and the U.S. Department of Education.

Michigan LEARNING CHANNEL

A PUBLIC MEDIA PARTNERSHIP

Serving Schools Statewide
Through Your Local PBS Stations



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

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

WGVU
Grand Rapids
Channel 35.6

Kalamazoo
Channel 52.6
Rachel Cain
cainra@gvsu.edu

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

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

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

COMING SOON
to Charter Cable in Northern and Mid-Michigan and the Upper Peninsula

Rescan Your TV to watch on Broadcast

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.

rev 2/22

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

WEEKDAY SUMMER SCHEDULE

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

Details at MichiganLearning.org/schedule

rev 02/22

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

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

Learn at Home with PBS KIDS

Schedule Begins October 4, 2021

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.

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

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.

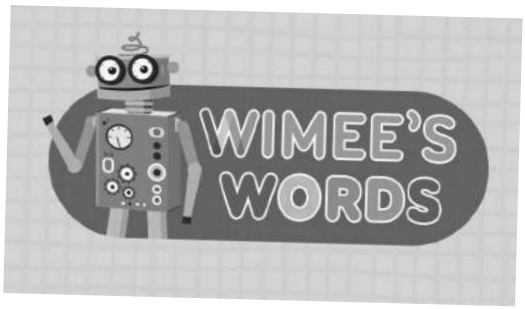
LIVE Virtual Events

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.

Wimee's Words Live!

Recommended for ages 4-8



Join the loveable robot puppet Wimee and his friends as they discover more about the weekly theme. Wimee needs your help to write stories! Give Wimee 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 "Wimee's Words" on PBS!

Wimee'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

GREATLAKESNOW

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

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

On TV. Online. Statewide.

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 apprach 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

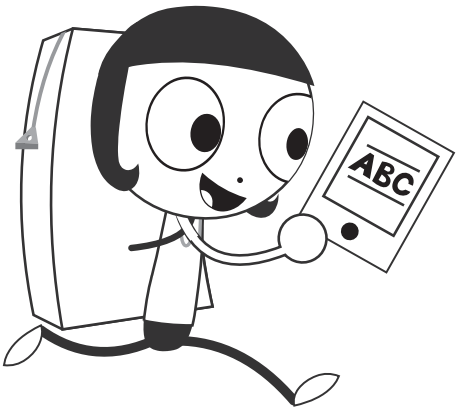
Follow @michlearning to find out more.

Learn at Home with PBS KIDS

Play and learn anytime and anywhere with free apps from PBS KIDS! Use the chart below to find the app that aligns to your child's grade, learning goal, and favorite PBS KIDS show - then download it on your on your mobile or tablet device to play online, offline, or anytime.

Apps for Social & Emotional Learning

Daniel Tiger for Parents	PK-K	Social & Emotional Learning
PBS KIDS Games app	K-2	Multiple Learning Goals
PBS KIDS Video app	K-2	Multiple Learning Goals

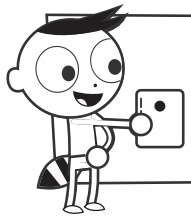


Apps for Literacy Learning

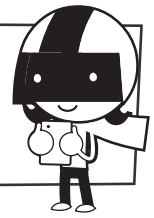
Dinosaur Train A to Z	PK-K	Literacy, Science
Molly of Denali	K-2	Literacy
PBS KIDS Games app	K-2	Multiple Learning Goals
PBS KIDS Video app	K-2	Multiple Learning Goals

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

PBS Parents Play & Learn	PK-K	Literacy, Math
Play & Learn Engineering	PK-K	Science and Engineering
PBS KIDS Measure Up!	PK-K	Math
Play & Learn Science	PK-K	Science
Splash and Bubbles for Parents	PK-K	Science
Splash and Bubbles Ocean Adventure	PK-K	Science
The Cat in the Hat Builds That!	PK-K	Science and Engineering
The Cat in the Hat Invents	PK-K	Science and Engineering
Jet's Bot Builder: Robot Games	K-2	Science and Engineering
Photo Stuff with Ruff	K-2	Science
Ready Jet Go! Space Explorer	K-2	Science
Ready Jet Go! Space Scouts	K-2	Science and Engineering
Nature Cat's Great Outdoors	K-3	Science
PBS KIDS ScratchJr	1-2	Coding
Outdoor Family Fun with Plum	1-3	Science and Engineering
Cyberchase Shape Quest	1-5	Math
PBS KIDS Games app	K-2	Multiple Learning Goals
PBS KIDS Video app	K-2	Multiple Learning Goals



pbskids.org/apps



GET IT ON Google Play

Download on the App Store

PBS KIDS and the PBS KIDS Logo are registered trademarks of Public Broadcasting Service. Used with permission.

Week 1: Take Flight June 20-26

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

Watch Math Park	60 mins. of activity	Read 20 minutes	Make a paper airplane (pg. 13)	Go swimming
Read 20 minutes	Watch Story Pirates	Look for birds	Spot a plane in the sky	60 mins. of activity
60 mins. of activity	Create a new bird (pg. 14)	HAVE FUN! (Free Space)	Watch InPACT at Home	Read 20 minutes
Watch DIY Science Time	Spot a helicopter in the sky	Ride a bike	Watch Story Pirates	Build a hovercraft (pg. 11)
Watch InPACT at Home	Read 20 minutes	Watch Extra Credit	60 mins. of activity	Watch Math Park

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

DIY Hovercraft

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!

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.

VISIT
DIYSCIENCETIME.ORG
FOR MORE SCIENCE FUN!

Why are friction jokes hard to tell at school?

*Answer on the next page

ALABAMA PUBLIC TELEVISION

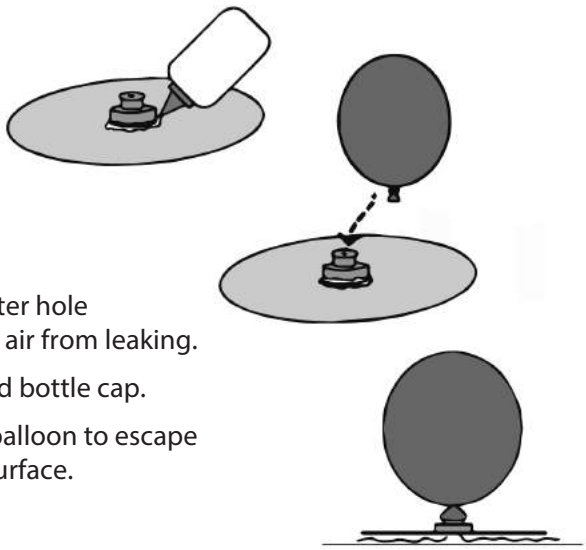
Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

*Joke Answer -
Most teachers won't let them slide!

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?

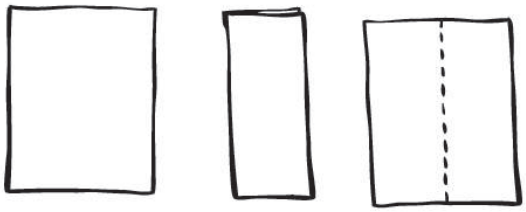
WORKFORCE CONNECTION

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.

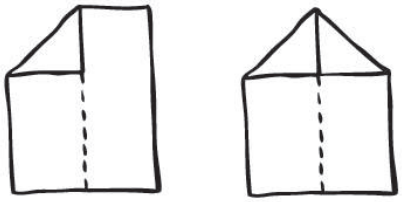
Copyright Alabama Public Television and Mister C, LLC 2021

Paper Airplane

1. Fold paper in half the long way and reopen.



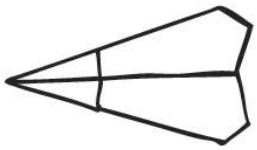
2. Fold the top two corners into the center spine of the paper.



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?

For more games and activities, visit pbskidsforparents.org

Produced by: WIND DANCER FILMS

Funded by:

The contents of this document were developed under a cooperative agreement (PR/Award No. U295A150003, CFDA No. 84.295A) from the U.S. Department of Education. However, these contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government. © 2018 Jet Propulsion, LLC. Ready Jet Go! and the Ready Jet Go! logo are registered trademarks of Jet Propulsion, LLC. The PBS KIDS logo and PBS KIDS ® PBS. Used with permission. Corporate Funding of Ready Jet Go! is brought to you by ABCmouse.com. Made available by the Corporation for Public Broadcasting, a private corporation funded by the American people.

Sponsored by: ABCmouse.com

DESIGN A BIRD

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

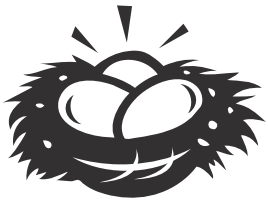

For tearing meat


For pulling worms


For eating plants under-water


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:

MATH PARK

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

SHOW NOT TELL! THE STORY PIRATES CREATOR CLUB

Character Traits

Who is your character?	Choose a character trait to describe them. There are some suggestions below!

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 "energetic"
exuberant
lively
spirited
vivacious

Other words for "friendly"
affable
amiable
gregarious
welcoming

Other words for "funny"
amusing
comical
hilarious
silly

Other words for "wise"
knowledgable
perceptive
prudent
shrewd

Other words for "unfriendly"
antisocial
disagreeable
hostile
rude

Other words for "lazy"
lackadaisical
lethargic
passive
weary

Other words for "hard-working"
diligent
industrious
persevering

Week 2: 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.

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

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

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

WORD FIND

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!

```
P Y Z
B T O G N I X V C
H S A K S Y R S D I M D Z
O B G F R B S P S E A R L W S J R
R A K H R R L A A N N E C P H S P B K
K G Y H K G Z N B D O C H S U I R E M S K
Y V A B K B C H H R B F L P F T Y B B E I
V E K M V K D T Q T D S L E Q U E G S X L J C
A N J S N I U I H U Y N S E Y G F K S U S I O
V R F D D Z O Y E G O U E G T R Q I T E N O X Q D
V D O M X M G R S J M T O L S O U S B I I U G R L
J A L O L F N U W P E U Z U L S L H B F M C U L Q
S E V U L S P Q U Q N G M X O N O Z K X A N J L F W H
Y T G A Y I Z W T R V R Z Z H G V W O C C E I G W N J
L G M R K A C O D I O A T R O U T P P H R G O C A N N
S N E U Q W A K O H L Q S H T U Z O E E F F Q L H
Y K Z A I E G R W E C R P C T D L D U R H W Y L V
G H O P U P Y J D J Z Y V R R Q X L H C C N S E J
Z O Y E G N U L L E K S U M Q B P R U S H Y Y
D P W H S I X Q N B M P X Y N K M V V M Y L E
V K E L N D W H G I T B T C I U E L E Q P
Z V I R Y D X X V A A S I W V M U I L C Y
L F L A K E S T U R G E O N W A H T U
O R B L X S A L M O N Y R O E L X
B I Q X U E D B B R X Q D
H X K G J H N P A
K K P
```

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.

Scanning this

helps you

2. You'll need:
    a. This printout
    b. Plain printer paper or canvas paper
    c. Food coloring
    d. Vegatable 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

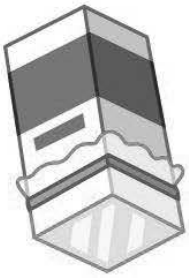
DIFFICULTY: EASY

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

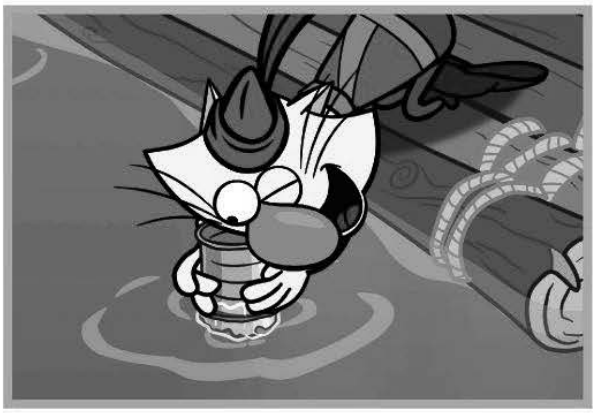
The PBS KIDS logo is a registered mark of PBS and is used with permission. © 2015 Spiffy Pictures. All rights reserved.

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.

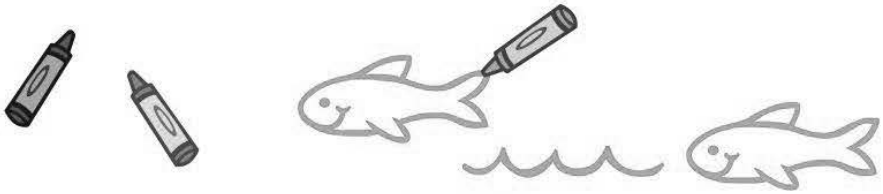
2. Despite what NatureCat says, it is noble and fun to get wet! If the shoreline is murky, slowly wade out to your knees before using your viewer where it may be less murky.

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.



pbskids.org/naturecat

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

DIY 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

ALABAMA PUBLIC TELEVISION

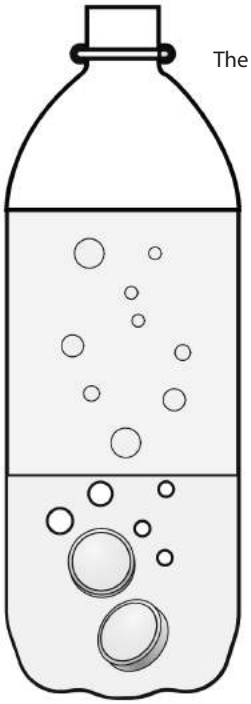
Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

*Joke Answer -
The water from your faucet!

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

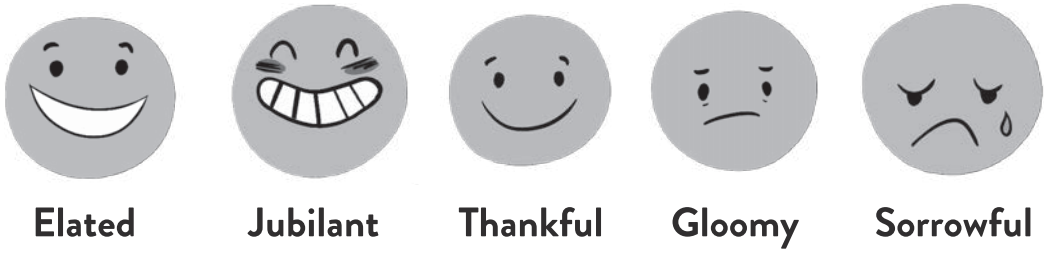
Paint chemists are scientists who study the properties and use of paint. Most paints are made of the same basic ingredients: pigments, binders, liquids, and additives. How these ingredients interact due to their densities plays an important part in determining the way that paint performs. Paint chemists 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.

Copyright Alabama Public Television and Mister C, LLC 2021

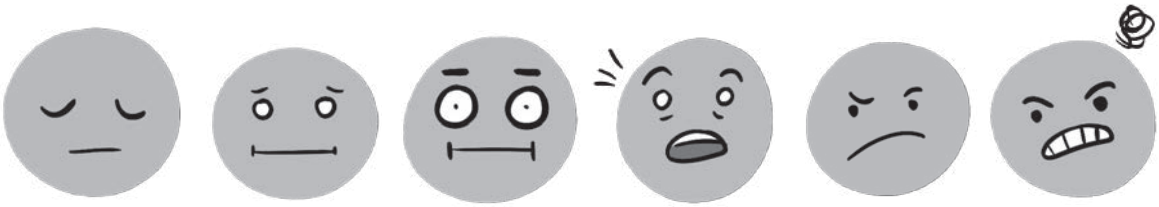
SHOW NOT TELL! Emotion

THE STORY PIRATES CREATOR CLUB

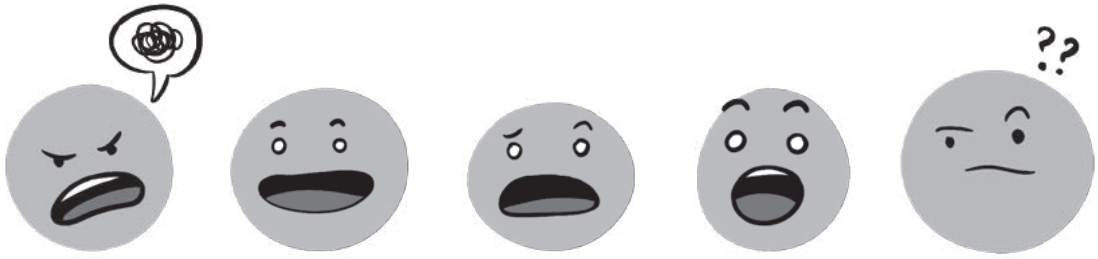
What **emotion** would you like to "Show, Not Tell"? Pick one from the examples below, or just choose your own! If you're not sure what some of the words mean, look at the picture of the face for a clue.



Elated Jubilant Thankful Gloomy Sorrowful



Lonely Anxious Petrified Startled Frustrated Furious



Irate Amazed Bewildered Shocked Inquisitive

Who is your character?	SHOW the emotion to the reader. What does the character SAY because they feel that way?
What **emotion** are they feeling?	

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

Watch Math Park	60 mins. of activity	Read 20 minutes	Do a good deed	Spot a mail truck outside
Read 20 minutes	Watch Story Pirates	Build an inertia walker (pg. 29)	Watch DIY Science Time	60 mins. of activity
60 mins. of activity	Spot a fire truck outside	HAVE FUN! (Free Space)	Watch InPACT at Home	Read 20 minutes
Watch DIY Science Time	Do a good deed	Watch Math Park	Watch Story Pirates	Draw a plant superhero (pg. 27)
Watch Extra Credit	Read 20 minutes	Watch Extra Credit	60 mins. of activity	Watch Math Park

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

AT-HOME ACTIVITY

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

Areca Palm

Snake Plant

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)

For more *Cyberchase* adventures with plants, watch "Plantasaurus" on pbskids.org/cyberchase.

Funding for *Cyberchase* is provided by The JPB Foundation, the Heising-Simons Foundation and Ernst &Young LLP.
Additional funding is provided by Lynne and Marc Benioff, the Tiger Baron Foundation, Shailaja and Umesh Nagarkatte and Ellen Marcus.

Cyberchase is a production of THIRTEEN Productions LLC for WNET. ©THIRTEEN Productions LLC. All rights reserved.PBS KIDS and the PBS KIDS logo are registered trademarks of PBS. Used with permission.

AT-HOME ACTIVITY

Design Your Own Plant Superhero

DRAW PAGE

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)

Funding for *Cyberchase* is provided by The JPB Foundation, the Heising-Simons Foundation and Ernst &Young LLP.
Additional funding is provided by Lynne and Marc Benioff, the Tiger Baron Foundation, Shailaja and Umesh Nagarkatte and Ellen Marcus.

Cyberchase is a production of THIRTEEN Productions LLC for WNET. ©THIRTEEN Productions LLC. All rights reserved.PBS KIDS and the PBS KIDS logo are registered trademarks of PBS. Used with permission.

DIY Inertia Walker

FUN FACT

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

MATERIALS

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

DIFFICULTY

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.

VISIT

DIYSCIENCETIME.ORG

FOR MORE SCIENCE FUN!

Why do dentists love riding roller coasters?

*Answer on the next page

ALABAMA PUBLIC TELEVISION

Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

*Joke Answer - They know how to BRACE themselves!

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

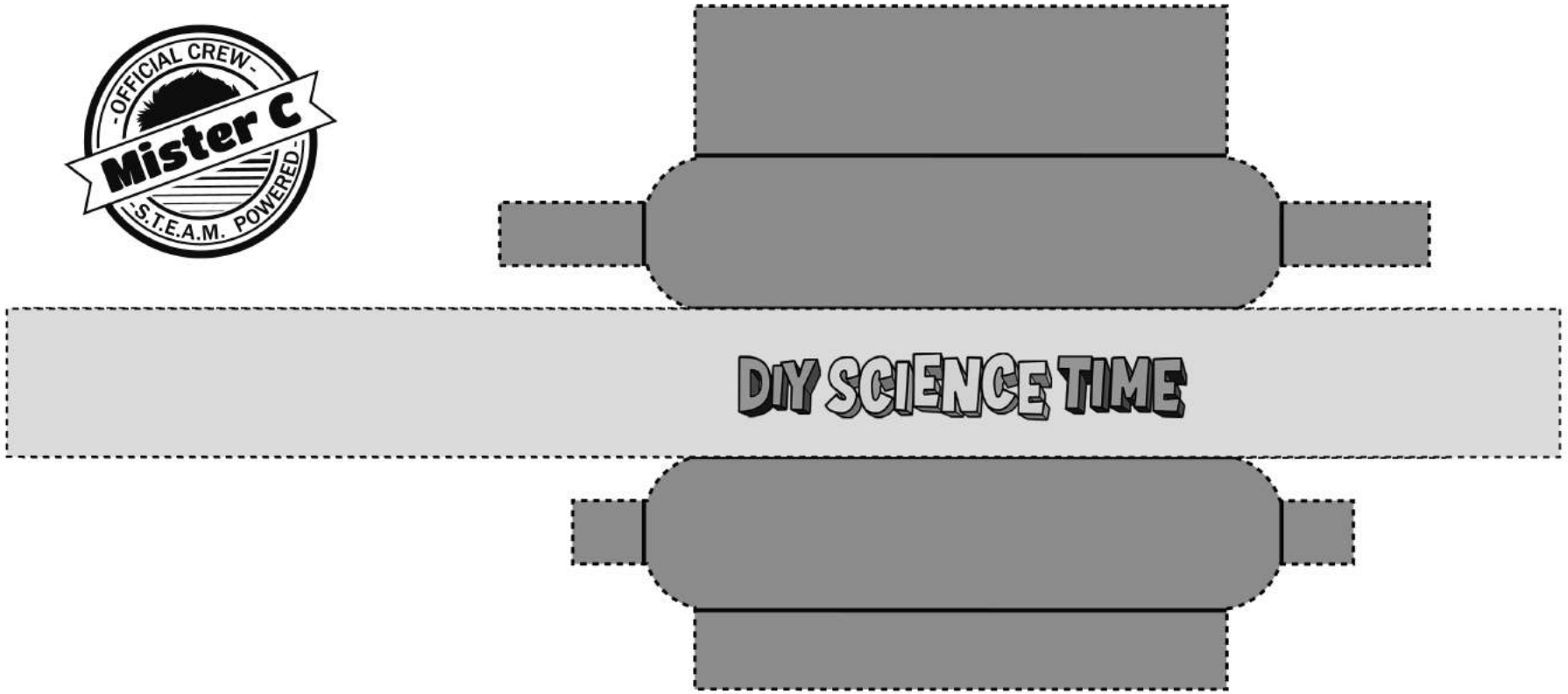
- Could you design your own walker using household materials available to you?
- What happens if you use a larger or smaller marble? Can a smaller marble keep the walker moving?
- What other types of ramps could you test your walker on? Would it work on a slide at the park?
- Could you create a differently-shaped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

Copyright Alabama Public Television and Mister C, LLC 2021

DIY Inertia Walker



Fold along solid lines. ✂ Cut along dashed lines.

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!

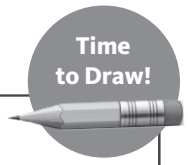
Copyright Alabama Public Television and Mister C, LLC 2021

ALABAMA PUBLIC TELEVISION

This page was left blank to cut out the activity on the other side.

THE STORY PIRATES – CREATOR CLUB

CREATE YOUR HERO



Draw and label your hero!

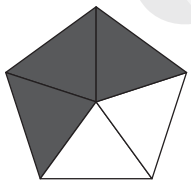
Hero's name

MATH PARK

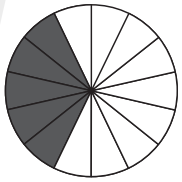
Fractions of a Set

Directions: Scan the QR code to watch the video, and then write the fraction you see in the picture.

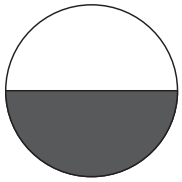
$\frac{4}{5}$



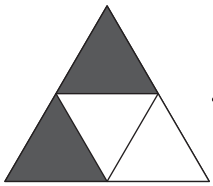
$\frac{\square}{\square}$



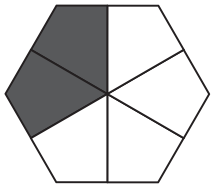
$\frac{\square}{\square}$



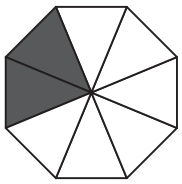
$\frac{\square}{\square}$



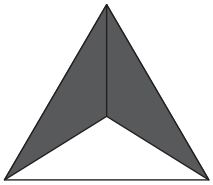
$\frac{\square}{\square}$



$\frac{\square}{\square}$



$\frac{\square}{\square}$



$\frac{\square}{\square}$

Michigan Learning Channel | Math Park Episode 304

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

Watch Math Park	60 mins. of activity	Read 20 minutes	Catch a firefly	Make pendulum art (pg. 39)
Read 20 minutes	Watch Story Pirates	Watch Extra Credit	Watch DIY Science Time	60 mins. of activity
60 mins. of activity	Create a food web (pg. 36)	HAVE FUN! (Free Space)	Watch InPACT at Home	Read 20 minutes
Watch DIY Science Time	Watch Extra Credit	Watch Math Park	Watch Story Pirates	Play Trail-Tac-Toe (pg. 38)
Go fishing	Read 20 minutes	Make elephant toothpaste (pg. 41)	60 mins. of activity	Watch Math Park

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

All Tangled Up

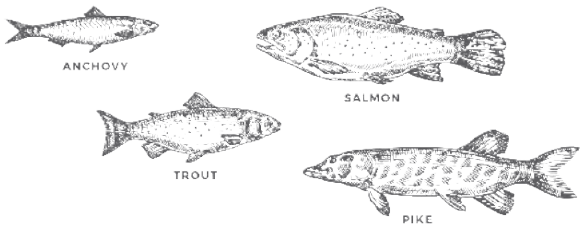
We're All Connected!

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.

You'll Need

2 Hours

- **notecards**
- **string or yarn**
- **optional:** *SciGirls Nature Nurture Journal* (You can download this booklet from scigirlsconnect.org/groups/kids).
- **clear tape**
- **markers**
- **plain white paper**
- **colored paper**



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!

SEAFLOOR EXPLORER

Seafloor Explorer

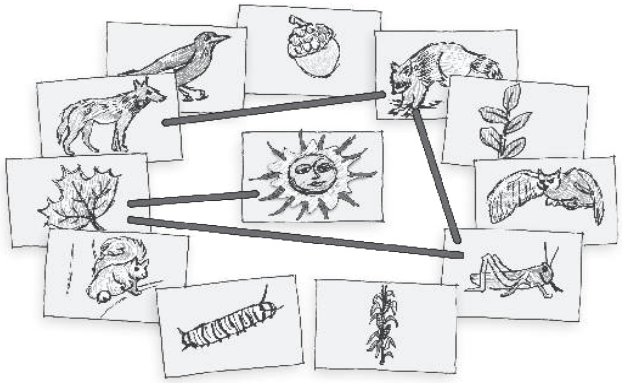
In the Seafloor Explorer project, researchers seek answers to ecologically critical questions about marine biology by studying over 30 million images of the ocean floor. Seafloor Explorer is a part of the Zooniverse network of citizen science projects—projects that use volunteers' contributions to help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

©2020 Twin Cities Public Television, Inc. All Rights Reserved.

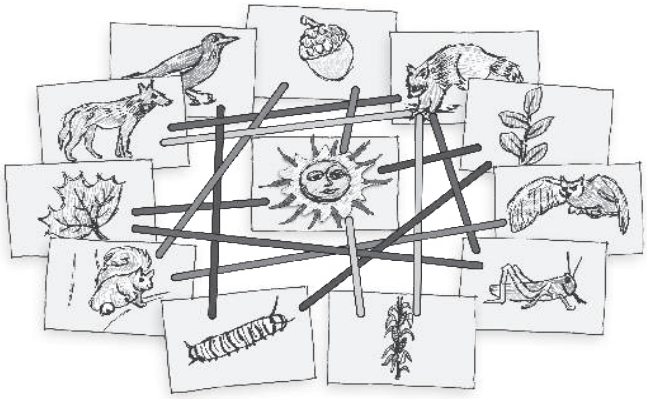
All Tangled Up

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.)



©2020 Twin Cities Public Television, Inc. All Rights Reserved.

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.

What? Where? **Something that could be eaten by an animal**	What? Where? **A native prairie grass**	What? Where? **An invasive species**
What? Where? **Something in nature that is bright red**	What? Where? **Somewhere or something that helps keep water clean**	What? Where? **An insect home**
What? Where? **Something in nature older than you.**	What? Where? **A yellow flower**	What? Where? **A sign that an animal was here**

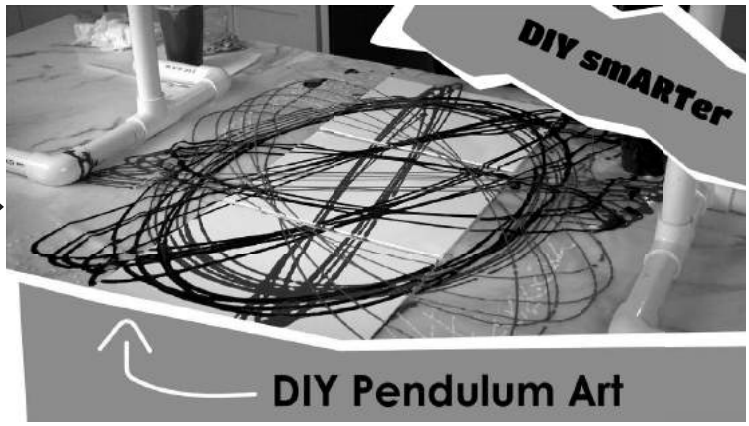
METROPARKS.COM

Pendulum Art

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

Scanning this

helps you



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.

THE STORY PIRATES CREATOR CLUB

DESCRIBE YOUR HERO

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?

DIY Elephant Toothpaste

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

DIFFICULTY

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!

VISIT
DIYSCIENCETIME.ORG
FOR MORE SCIENCE FUN!

Why are chemists great at solving problems?

*Answer on the next page

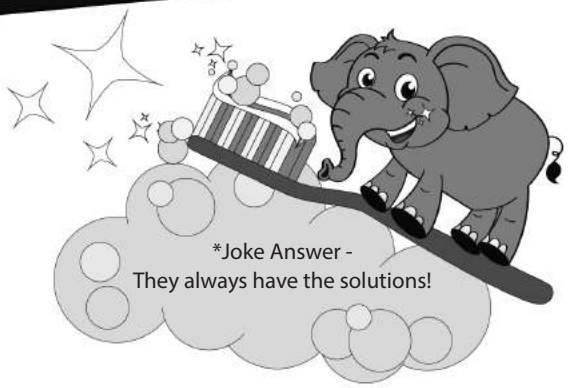
ALABAMA PUBLIC TELEVISION

Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

DIY *Elephant Toothpaste*



EXPERIMENT

Step 1: Gather materials.

Step 2: Place 2 tablespoons of yeast into 3 oz of warm water.

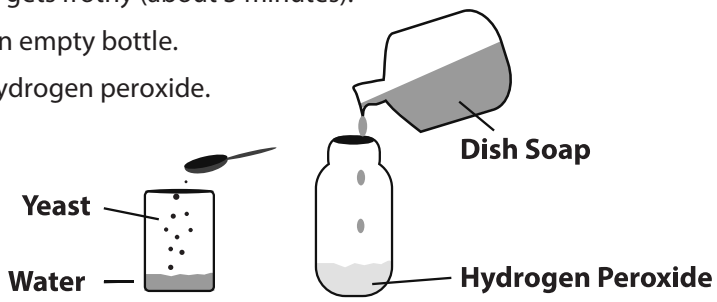
Step 3: Mix yeast and warm water, let stand until it gets frothy (about 3 minutes).

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.

Copyright Alabama Public Television and Mister C, LLC 2021

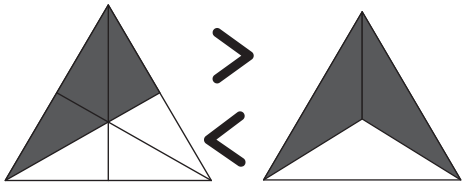
MATH PARK

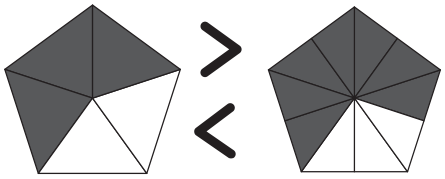
Equivalent Fractions

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

$\frac{3}{10} > < \frac{3}{5}$

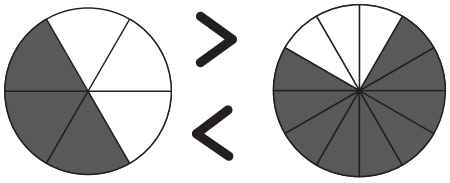
$\frac{1}{4} > < \frac{1}{8}$





$\frac{5}{5} > < \frac{5}{15}$

$\frac{1}{2} > < \frac{1}{4}$



Michigan Learning Channel | Math Park Episode 305

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

Spot architecture outside (pg. 47)	60 mins. of activity	Read 20 minutes	Draw a family member's car	Watch Extra Credit
Read 20 minutes	Watch Story Pirates	Write in binary (pg. 45)	Watch DIY Science Time	60 mins. of activity
60 mins. of activity	Watch Math Park	HAVE FUN! (Free Space)	Watch InPACT at Home	Read 20 minutes
Watch Extra Credit	Find a creative solution (pg. 51)	Watch Math Park	Watch Story Pirates	Try marble madness! (pg. 48)
Watch DIY Science Time	Read 20 minutes	Watch ArchiTreks	60 mins. of activity	Watch Math Park

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

career girls

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

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

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?

_____

_____

Copyright © 2020 Career Girls

https://michiganarchitecturalfoundation.org

ArchiTREKS: Structures

MICHIGAN ARCHITECTURAL FOUNDATION

Acting Out Structures

COLUMN

ARCH

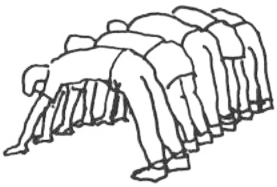
COLUMN AND BEAM

DOME

TENSION

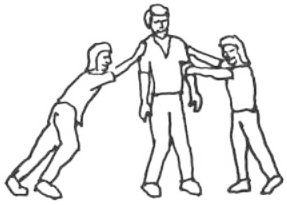
CANTILEVER

LOAD AND SUPPORT



VAULT / TUNNEL

COMPRESSION



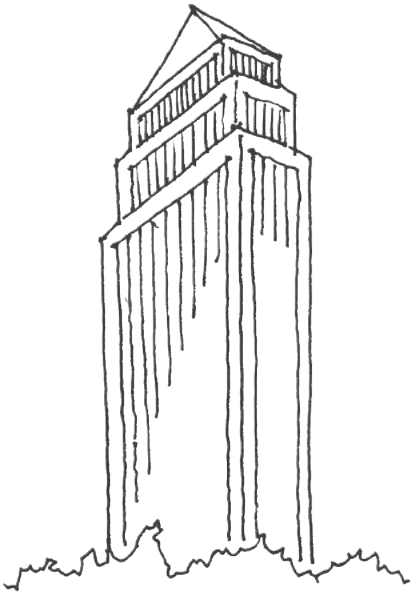
FLYING BUTTRESSES

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!

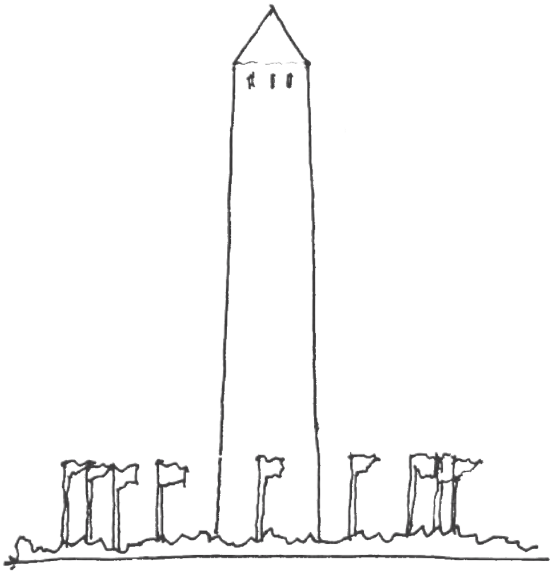
https://michiganarchitecturalfoundation.org

MICHIGAN ARCHITECTURAL FOUNDATION

ArchiTREKS: Landmarks

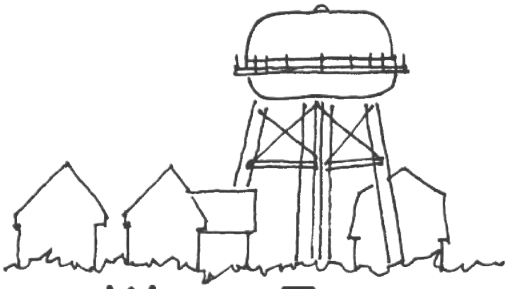


High-Rise Building



Monument

Church Steeple



Water Tower

These are examples of landmarks. What landmarks are in your neighborhood? Draw a picture of a local landmark!

DIY Marble Madness

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!

MATERIALS

- Marbles
- Straws
- Tape

DIFFICULTY

POTENTIAL AND KENETIC 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 kenetic energy.

VISIT
DIYSCIENCETIME.ORG
FOR MORE SCIENCE FUN!

Why is wind energy becoming so popular?

*Answer on the next page

ALABAMA PUBLIC TELEVISION

Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

*Joke Answer -
Because it has so many fans!

DIY *Marble Madness*

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 succesfully 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 scientist must precisely calculate the amount of water speed necessary to get the turbines moving to generate electricity.

Copyright Alabama Public Television and Mister C, LLC 2021

THE STORY PIRATES CREATOR CLUB

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?

THE STORY PIRATES CREATOR CLUB

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?):

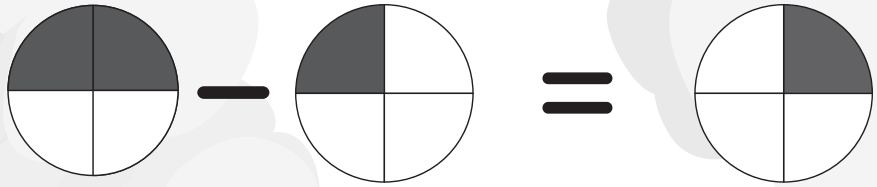
The solution that **FINALLY** worked:

It worked because:

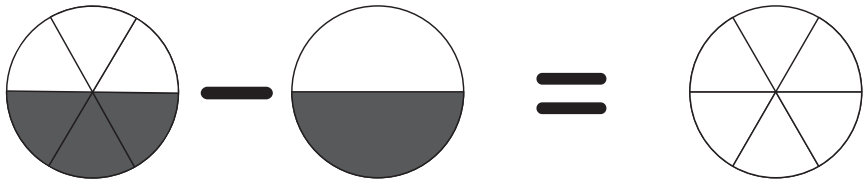
MATH PARK

Adding & Subtracting Fractions

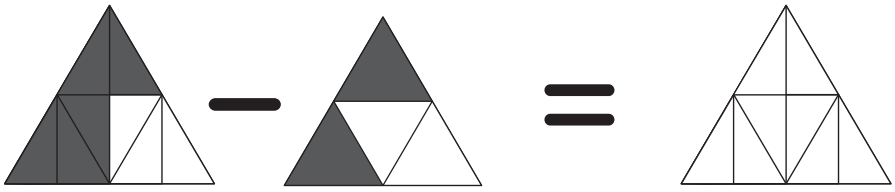
Directions: Scan the QR code to watch the video, and then add and subtract the fractions.



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



$\frac{2}{4} + \frac{1}{4} = \_\_$



Michigan Learning Channel | Math Park Episode 306

Week 6: Great Outdoors July 25-31

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

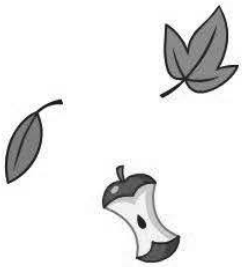
Crush a soda can with SCIENCE! (pg. 60)	60 mins. of activity	Read 20 minutes	Watch the sunset	Watch Extra Credit
Read 20 minutes	Watch Story Pirates	Make a composter (pg. 54)	Watch DIY Science Time	60 mins. of activity
60 mins. of activity	Watch Math Park	HAVE FUN! (Free Space)	Watch InPACT at Home	Read 20 minutes
Watch Extra Credit	Go swimming	Watch Math Park	Watch Story Pirates	Make leaf rubbings (pg. 56)
Watch DIY Science Time	Read 20 minutes	Visit a new place	60 mins. of activity	Watch Math Park

MAKE A COMPOSTER!

DIFFICULTY: EASY (REQUIRES ADULT ASSISTANCE)

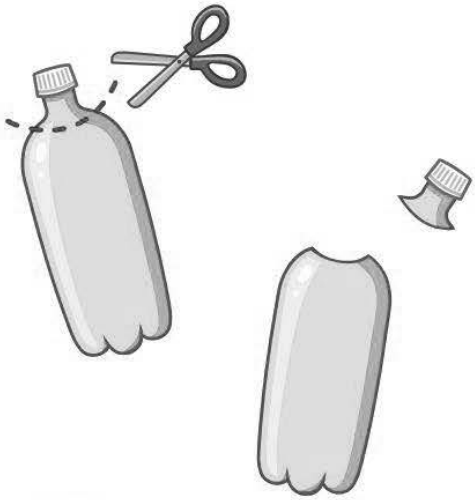
What happens to a pile of old leaves outside when you add a dash of time, maybe some worms, and a healthy splash of moisture? Rich soil perfect for a garden just like Daisy's!

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.

pbskids.org/naturecat

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

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

PBS KIDS and the PBS KIDS Logo are registered trademarks of Public Broadcasting Service. Used with permission. PBS KIDS and the PBS KIDS Logo are registered trademarks of Public Broadcasting Service. Used with permission. Major funding for the series is provided by the Corporation for Public Broadcasting (CPB) and the Van Eekeren Family, founders of Land O'Frost. Additional funding: The Hamill Family Foundation, The Segal Family Foundation, The Arthur Vining Davis Foundations, Polk Bros. Foundation, Sage Foundation, Philip F. Schoch Charitable Trust. NATURE CAT and associated characters, trademarks and design elements are owned by Spiffy Entertainment, LLC © 2020 Spiffy Entertainment, LLC, All rights reserved.

Make Leaf and Bark Rubbings

Make your leaf and bark rubbings here.

Find more games and activities at pbskids.org/naturecat

PBS KIDS and the PBS KIDS Logo are registered trademarks of Public Broadcasting Service. Used with permission. PBS KIDS and the PBS KIDS Logo are registered trademarks of Public Broadcasting Service. Used with permission. Major funding for the series is provided by the Corporation for Public Broadcasting (CPB) and the Van Eekeren Family, founders of Land O'Frost. Additional funding: The Hamill Family Foundation, The Segal Family Foundation, The Arthur Vining Davis Foundations, Polk Bros. Foundation, Sage Foundation, Philip F. Schoch Charitable Trust. NATURE CAT and associated characters, trademarks and design elements are owned by Spiffy Entertainment, LLC © 2020 Spiffy Entertainment, LLC, All rights reserved.

career girls

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?

_____

_____

Copyright © 2020 Career Girls

THE STORY PIRATES CREATOR CLUB

DIALOGUE PRACTICE

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.

DIY Can Crush

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 PRESSURE

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.

VISIT

DIYSCIENCETIME.ORG

FOR MORE SCIENCE FUN!

What do you call the study of soft drinks?

*Answer on the next page

ALABAMA PUBLIC TELEVISION

Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

*Joke Answer - Fizz-ics!

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!

Copyright Alabama Public Television and Mister C, LLC 2021

Week 7: 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!

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

Watch a Career Girls video (pg. 63)	60 mins. of activity	Read 20 minutes	Try a new food	Watch Extra Credit
Read 20 minutes	Watch Story Pirates	Learn about a family member's job	Make an electro-scope (pg. 67)	60 mins. of activity
Try an InPACT activity card (pg. 65)	Watch Math Park	HAVE FUN! (Free Space)	Try an InPACT Activity Card	Read 20 minutes
Watch Extra Credit	Write a story (pg. 69)	Watch Math Park	Watch Story Pirates	Watch InPACT at home
Learn about a family member's job	Read 20 minutes	Watch DIY Science Time	60 mins. of activity	Watch Math Park

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

career girls

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:

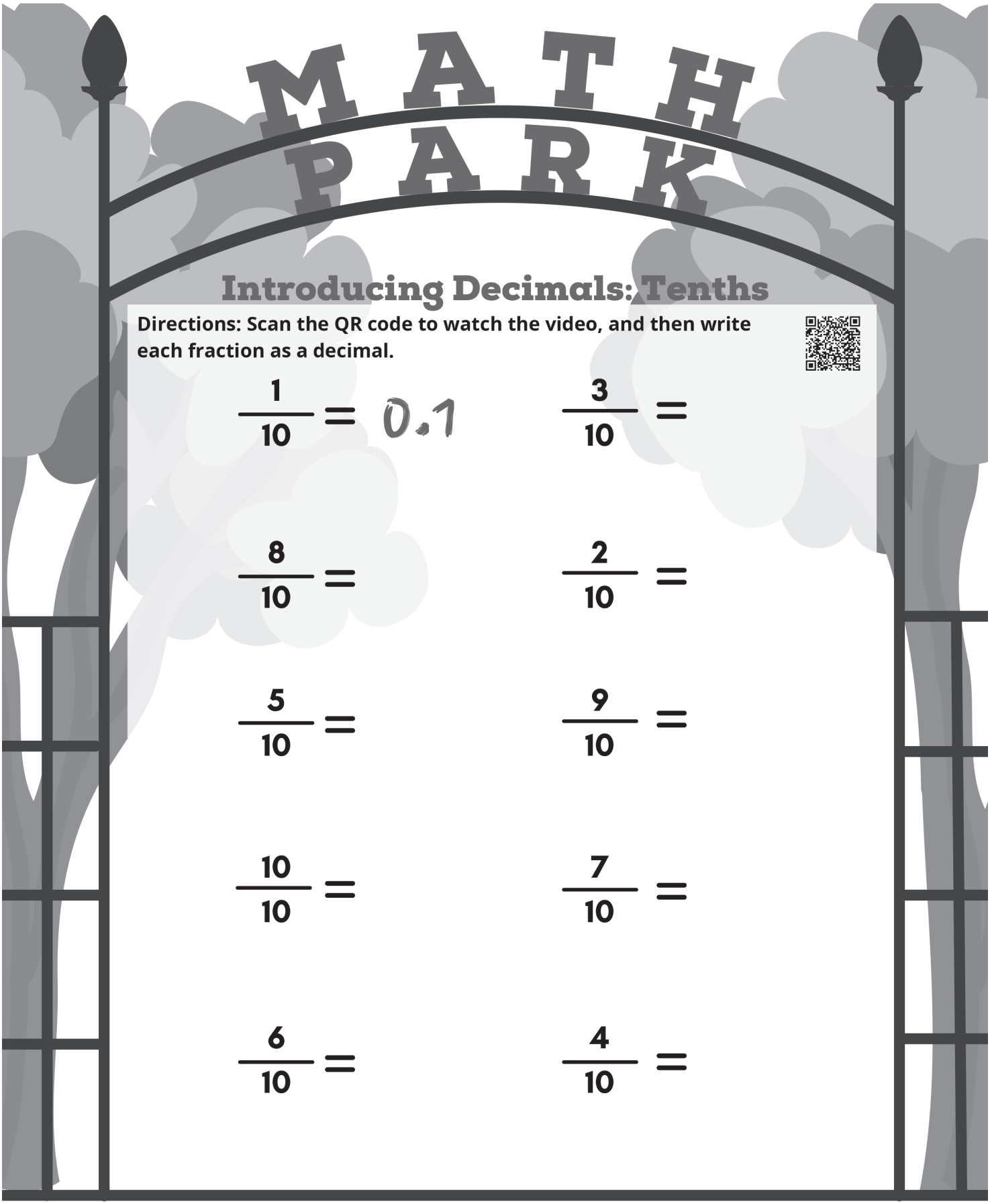
1.

2.

3.

What else can you do to prepare?

Copyright © 2016 Career Girls®



Introducing Decimals: Tenths

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

$\frac{1}{10} = 0.1$

$\frac{3}{10} =$

$\frac{8}{10} =$

$\frac{2}{10} =$

$\frac{5}{10} =$

$\frac{9}{10} =$

$\frac{10}{10} =$

$\frac{7}{10} =$

$\frac{6}{10} =$

$\frac{4}{10} =$

Michigan Learning Channel | Math Park Episode 307

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.

© 2021 Regents of the University of Michigan

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!

© 2021 Regents of the University of Michigan

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 can to get 100 tapbacks (50 on each leg).

© 2021 Regents of the University of Michigan

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.

Bonus: After each time you jump, touch the ground with the same hand as the side you landed on. Ex: Land on your left foot, touch the ground with your left hand.

© 2021 Regents of the University of Michigan

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.

© 2021 Regents of the University of Michigan

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.

© 2021 Regents of the University of Michigan

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 baby alligator jaws.

© 2021 Regents of the University of Michigan

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're moving, and where they are moving to!

© 2021 Regents of the University of Michigan

This page was left blank to cut out the activity on the other side.

DIY Electroscope

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.

MATERIALS

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

DIFFICULTY

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.

VISIT
DIYSCIENCETIME.ORG
FOR MORE SCIENCE FUN!

What happens if you plant a lightbulb in a garden?

*Answer on the next page

ALABAMA PUBLIC TELEVISION

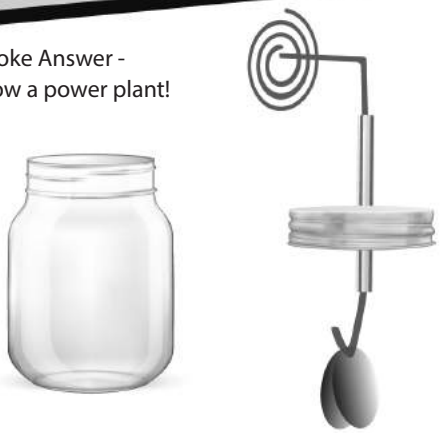
Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

*Joke Answer -
You grow a power plant!

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.

Copyright Alabama Public Television and Mister C, LLC 2021

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!

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

Build an air cannon (pg. 77)	60 mins. of activity	Read 20 minutes	Draw a cartoon story (pg. 75)	Watch Extra Credit
Read 20 minutes	Watch Story Pirates	Draw an alien planet	Stargaze	60 mins. of activity
60 mins. of activity	Watch Math Park	HAVE FUN! (Free Space)	Build a moon rover (pg. 72)	Read 20 minutes
Watch Extra Credit	Observe the clouds (pg. 74)	Watch Math Park	Watch Story Pirates	Watch InPACT at home
Stargaze	Read 20 minutes	Watch DIY Science Time	60 mins. of activity	Watch Math Park

Michigan LEARNING CHANNEL
A PUBLIC MEDIA PARTNERSHIP

A NASA/DESIGN SQUAD CHALLENGE

ROVING ON THE MOON

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.

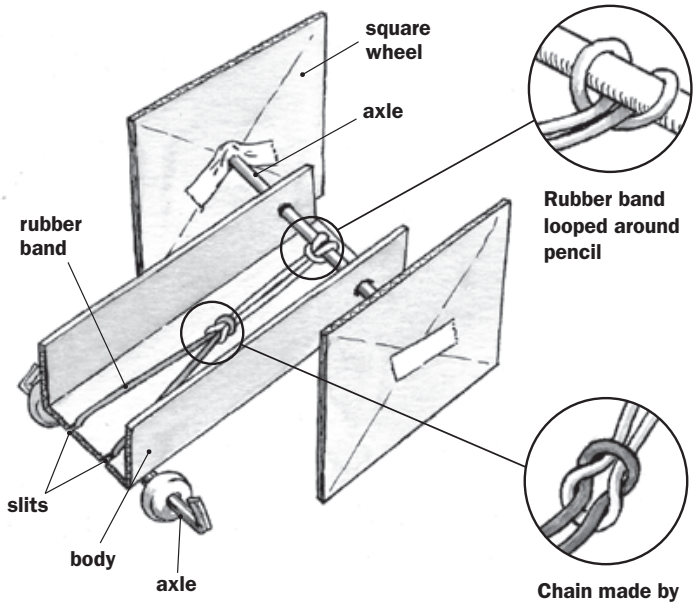
MATERIALS (per rover)

- corrugated cardboard body (6-inch/15-cm square)
- 2 corrugated cardboard wheels (5-inch/13-cm square)
- 1 sharpened round pencil
- 2 rubber bands
- ruler
- tape
- 2 round candies (the hard, white, mint ones with a hole in the middle)
- 1 plastic drinking straw
- scissors

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.*



Design Squad TM/© 2008 WGBH Educational Foundation

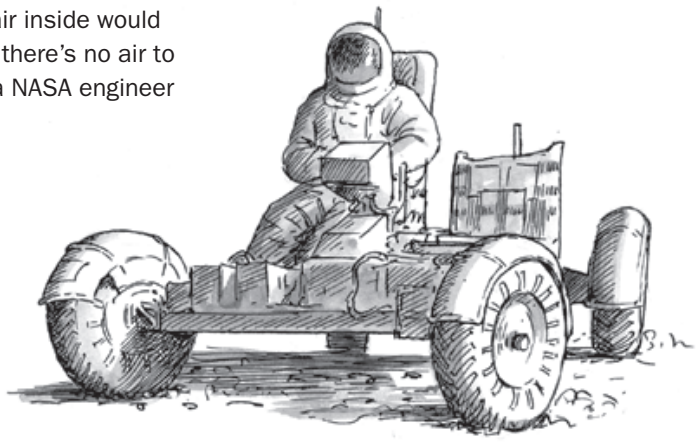
- **the rover doesn't go far**—*Wind up the wheels more. Try wheels of different sizes or shapes. Or, add another rubber band or use a rubber-band chain.*
- **the wheels spin out**—*Add weight above the square wheels; put more wheels on the pencil; use bigger wheels; or cut open a rubber band and use 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.*

Check out NASA's moon missions at moon.msfc.nasa.gov.

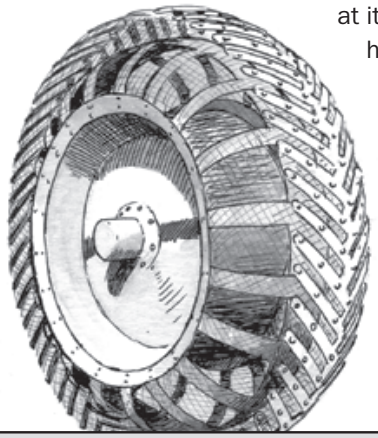
CUSTOM WHEELS

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° to –250° Fahrenheit (121° to –157° 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).

Watch DESIGN SQUAD on PBS or online at pbs.org/designsquad.

Major funding for *Design Squad* provided by

Corporation for Public Broadcasting. A private corporation funded by the American people. intel Education

Additional funding for *Design Squad* provided by

NCEES National Council of Examiners for Engineering and Surveying. Noyce Foundation. Northrop Grumman Foundation. IEEE

Design Squad is produced by WGBH Boston. *Design Squad*, AS BUILT ON TV, and associated logos are trademarks of WGBH. All rights reserved.
This NASA/*Design Squad* challenge was produced through the support of the National Aeronautics and Space Administration (NASA).

For more information about NASA missions and educational programs, visit nasa.gov.

DETROIT ZOOLOGICAL SOCIETY®
DETROIT ZOO • BELLE ISLE NATURE CENTER

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!

THE STORY PIRATES CREATOR CLUB

DRAW YOUR STORY!

DIY Air Cannon

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.

AIR PRESSURE

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!

MATERIALS

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

DIFFICULTY

VISIT

DIYSCIENCETIME.ORG

FOR MORE SCIENCE FUN!

Why do scientists love renewable energy so much?

*Answer on the next page

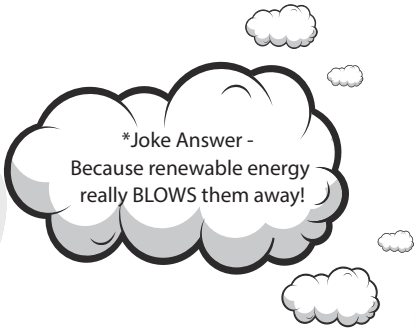
ALABAMA PUBLIC TELEVISION

Copyright Alabama Public Television and Mister C, LLC 2021

DIY SCIENCE TIME

"Science is wherever YOU are!"

DIY Air Cannon



EXPERIMENT

Step 1: Gather your materials.

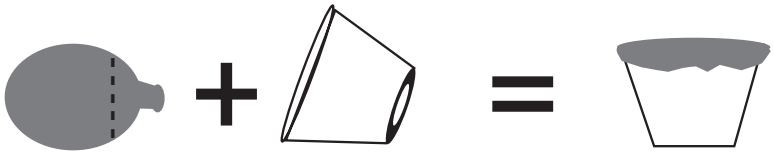
Step 2: Cut the neck off of the balloon and keep the large part.

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.

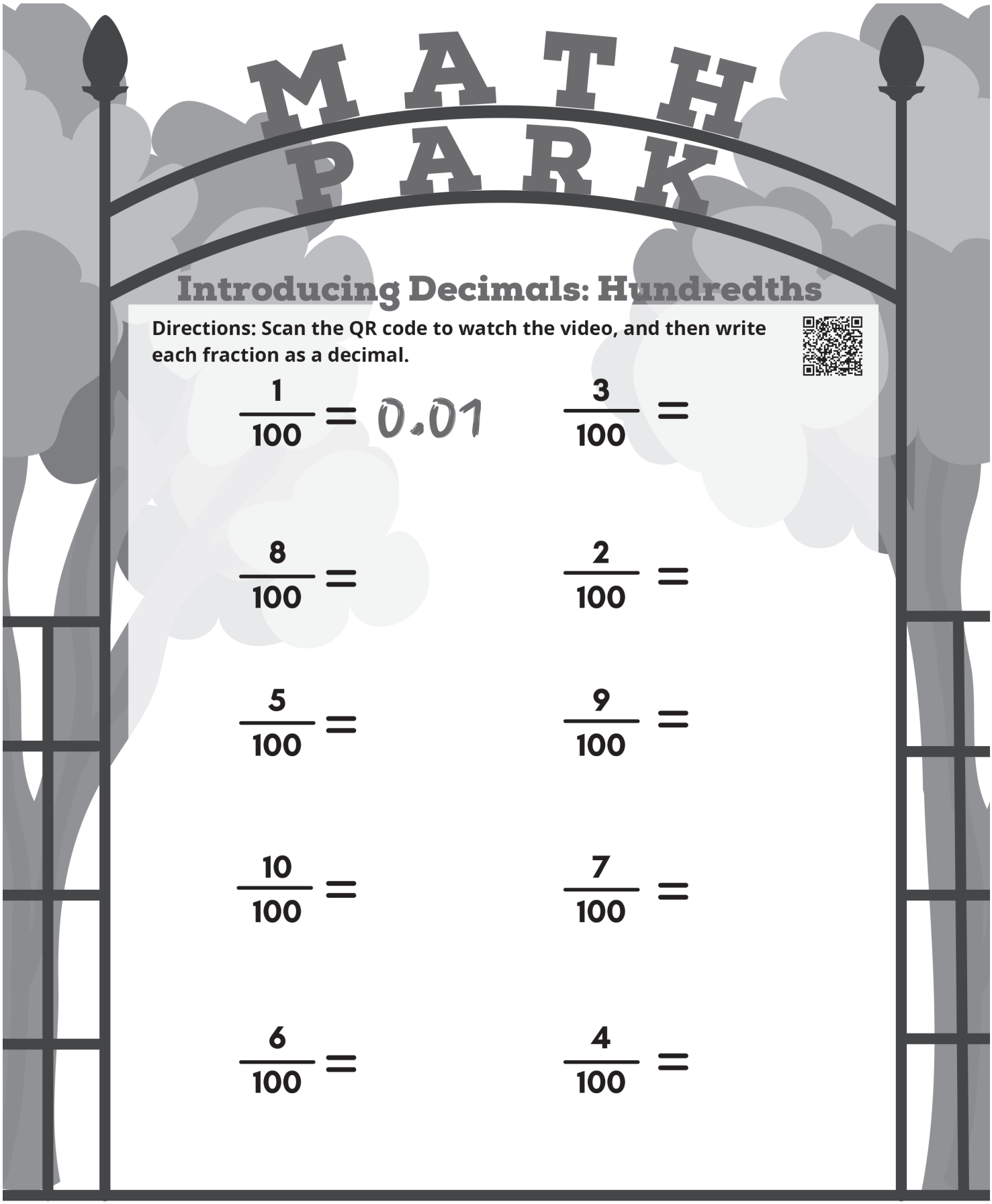
EXTEND YOUR LEARNING

- 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.

$\frac{1}{100} = 0.01$

$\frac{3}{100} =$

$\frac{8}{100} =$

$\frac{2}{100} =$

$\frac{5}{100} =$

$\frac{9}{100} =$

$\frac{10}{100} =$

$\frac{7}{100} =$

$\frac{6}{100} =$

$\frac{4}{100} =$

Michigan Learning Channel | Math Park Episode 308

SPECIAL THANKS TO OUR
MICHIGAN LEARNING CHANNEL FUNDERS:

Corporation for Public Broadcasting

M&MFisher
Max M. & Marjorie S. Fisher Foundation

THE KRESGE FOUNDATION

W.K. KELLOGG FOUNDATION™
A Partner With Communities Where Children Come First

PBS KIDS cpb
Powered by a Ready To Learn Grant

MICHIGAN Department of Education

The State of Michigan

Elaine and Leo Stern Foundation

The Donald and Mary Kosch Foundation

MEET UP and EAT UP

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

Michigan LEARNING CHANNEL

A PUBLIC MEDIA PARTNERSHIP

SUMMER!

FUN ACTIVITY BOOK

On TV. Online. Statewide.

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

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

TWEENS

The contents of this book were developed under a grant from the U.S. Department of Education. However, those contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government. The project is funded by a Ready To Learn grant (PR/Award No. S295A200004, CFDA No. 84.295A) provided by the Department of Education to the Corporation for Public Broadcasting.