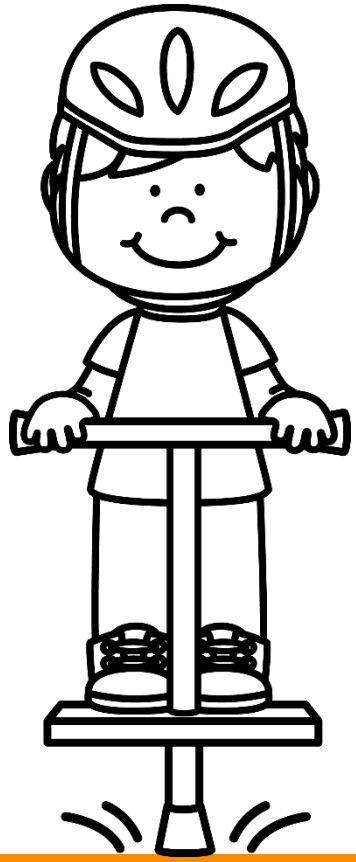
FORCE AND MOTION

a hands-on science unit for kids

TABLE OF CONTENTS



VOCABULARY POSTERS

FORCE

Kate pushes th
tetherball to
make it move

Force is the push or pull on
object. Force makes the obje
change direction

ENERGY

Susie uses
push off th
to make
skateboard

Energy is the ability to do
You need energy to make
object move

MOTION

Motion occurs when an object or person moves from one place to another.

WORK

You do work when you push a friend on the swing. Your force causes the swing to move.

pens when a force used to
an object moves another
object.

FRICTION

Friction is a force caused whe
two objects rub against each
other. Friction causes objects i
motion to slow down.

PUSH

Tomm
the g
his

Push is a force that
object. Often, pushing
moves it away fr

PULL

Pull is a force that moves
object. Often,

STRAIGHT

The bee flew in a straight path.

ight is a type of direction or

CIRCULAR

This Ferr
travels in
pattern
around a

Circular is a path or dir
in the shape of a circle,
object can move.

ZIG-ZAG

Zig-zag is a type of directio
path an object can move wit
back and forth, diagonal moti

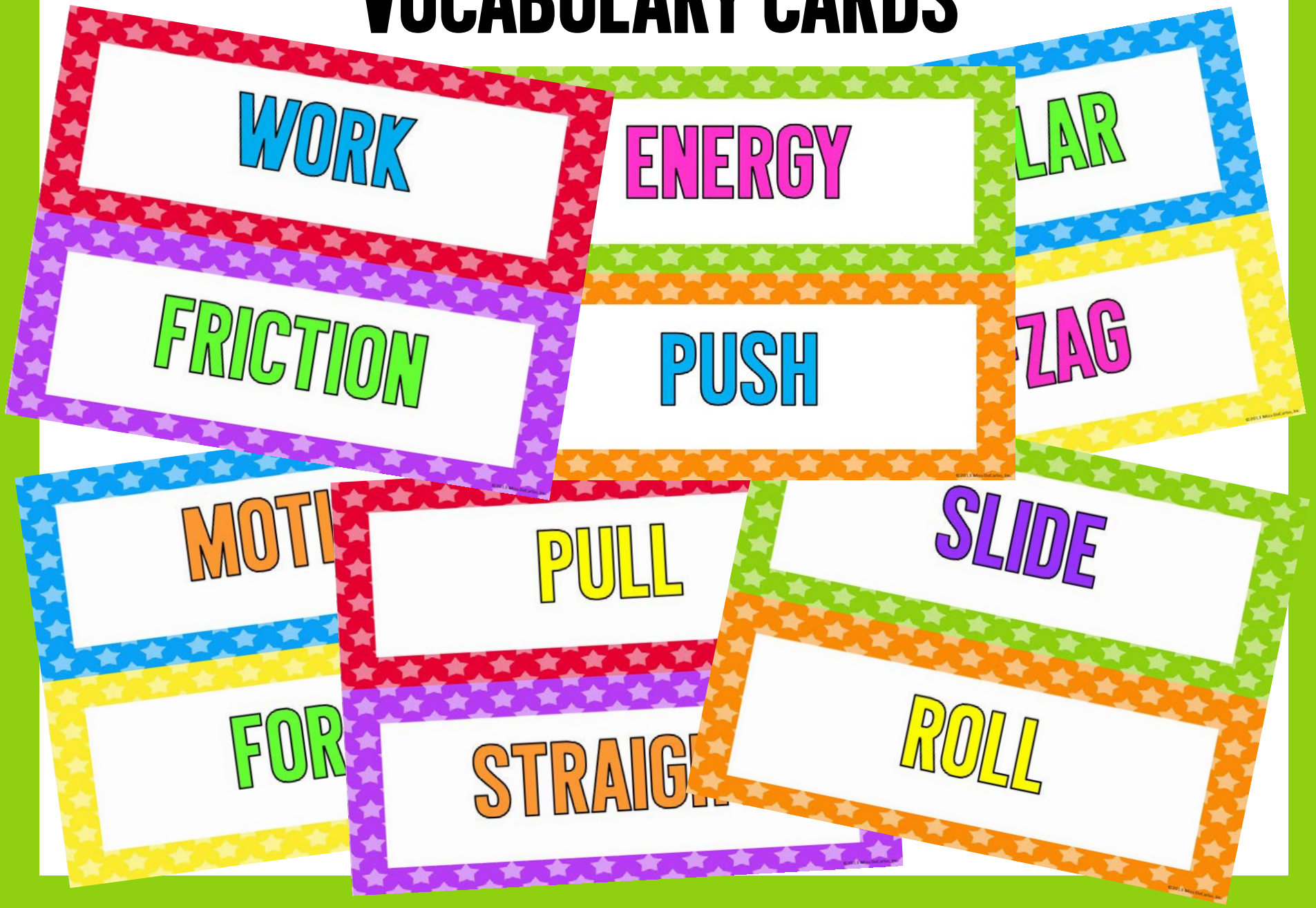
SLIDE

Slide is the movement of an
to smoothly glide or slip o
surface without rotating or

ROLL

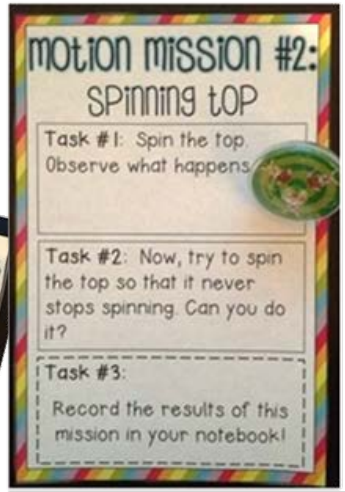
Roll is the movement of an object that turns over and over in a circular pattern.

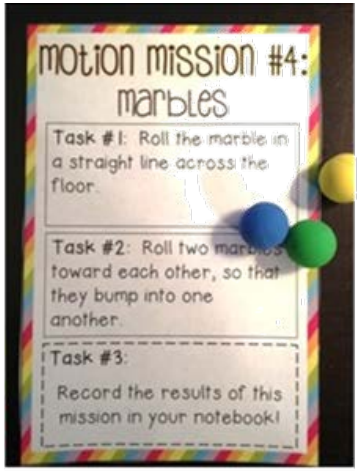
VOCABULARY CARDS



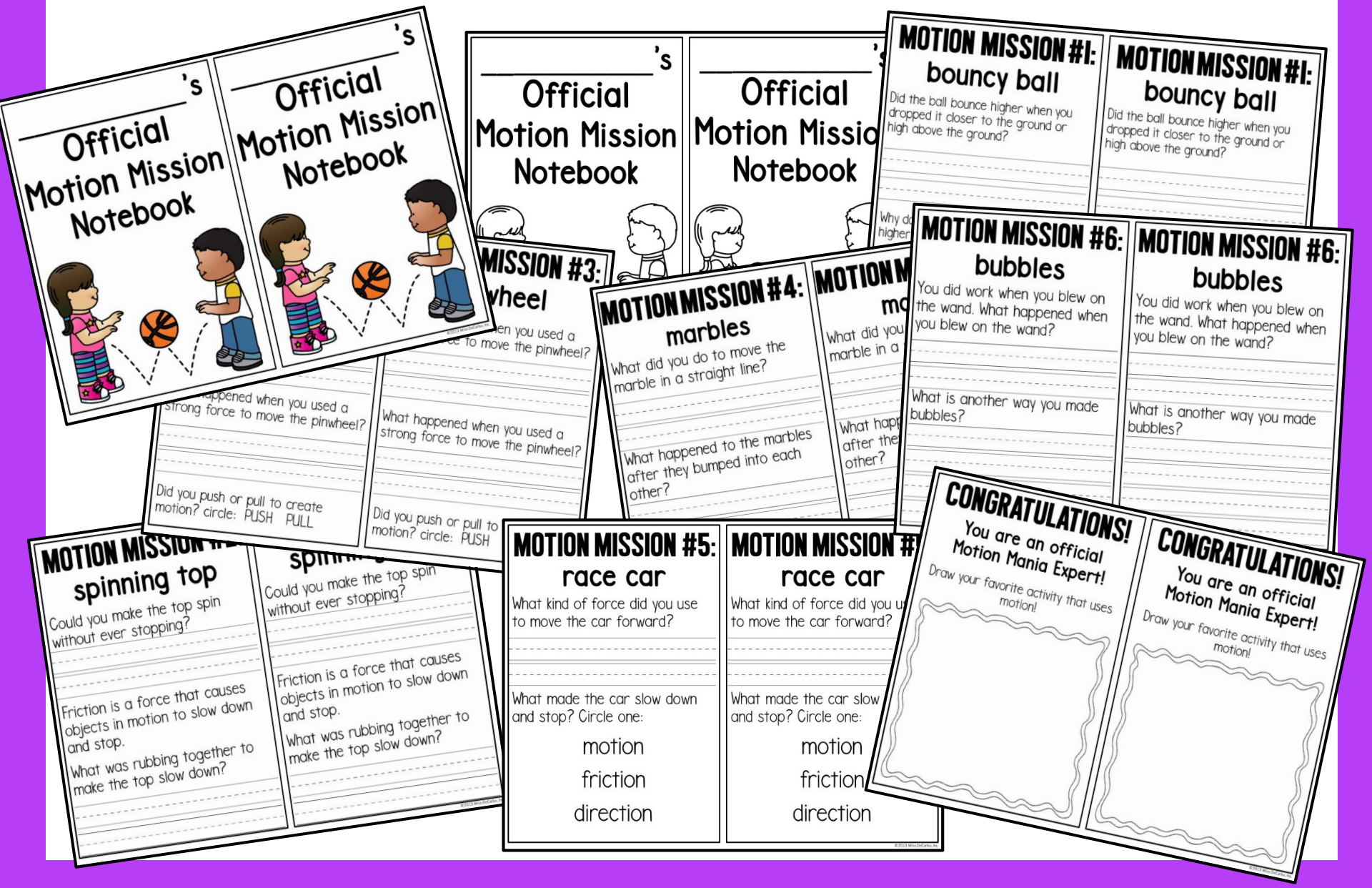
HANDS-ON LESSON PLANS & ACTIVITIES

MOTION MISSION MANIA STATIONS

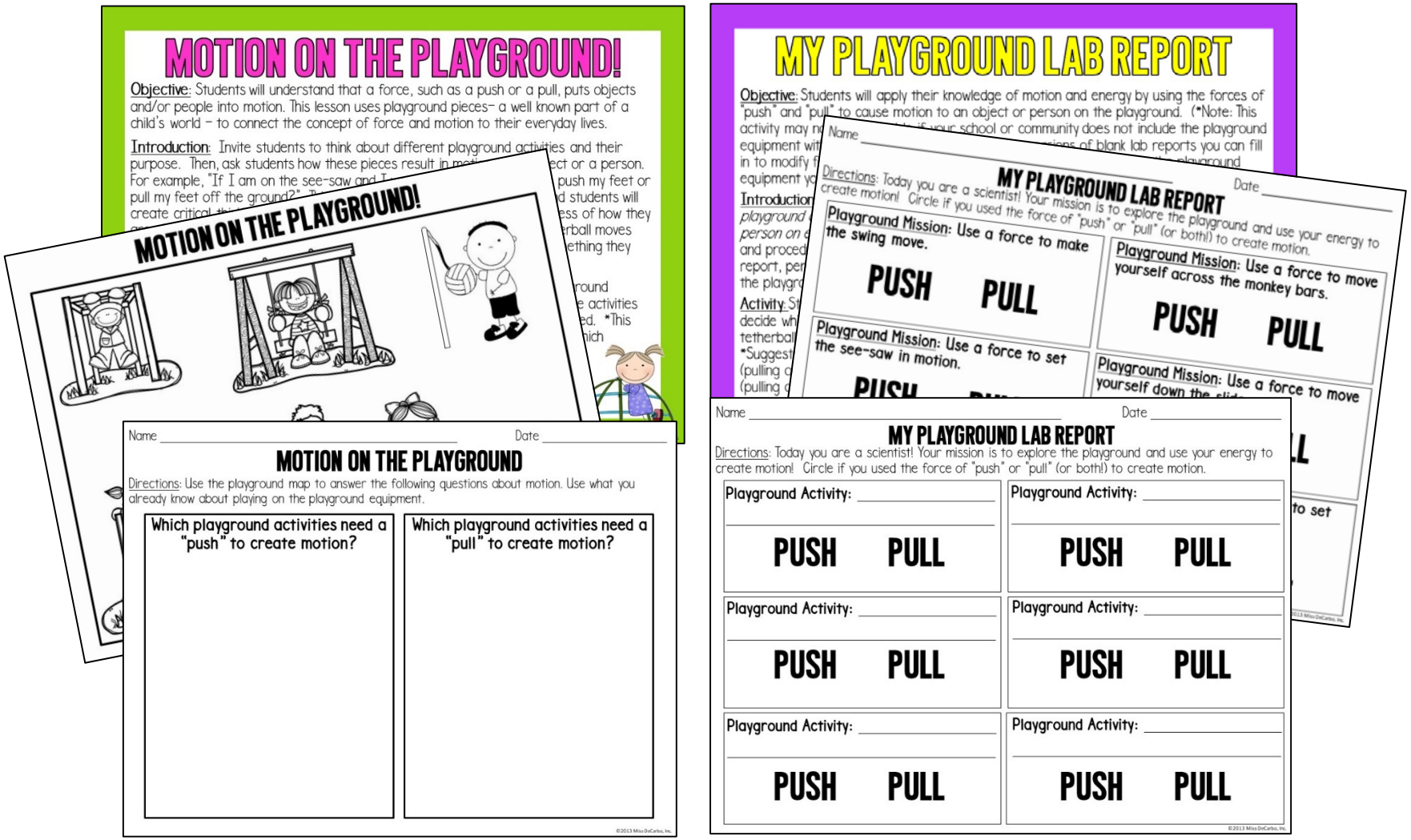




STUDENT-LED RESPONSE BOOKLETS



STUDENTS WILL USE THE PLAYGROUND TO UNDERSTAND PUSH AND PULL



EXPERIMENTS AND STUDENT LAB REPORTS

FRICTION FRENZY

Objective: Students will participate in a science experiment and c
the effect of friction in order to understand that friction is a for
objects in motion.

Introduction: Review or introduce the concept of friction to you
*force that can slow down objects in motion. Friction occurs wher
something.* Relate the concept of friction to your student's every
"If you put on ice skates, will you slide around easier on ice or or
students to discuss this question with one another. *"You will slide
because it is slippery. The sidewalk is rough. Your skates will slid
because there is less for your skates to rub against than the sid
slow your skates down. The same would be true if you had a sled,
a snowy hill better than it would if it slid down a hill on a road.
against on the snow than the road, so there is less friction slowi
are going to be Friction Frenzy Scientists and experiment friction*

Activity: Have students complete the first part of their lab report
Follow the directions in the pictures on the following pages. Afte
students should complete the remaining half of their lab reports
Have fun!

FRICTION FRENZY

Setting up: Tape the sandpaper sheets together to create a long "ramp" or "road" for the cars. Do the same for the

Tape both ends of the ramps to a low box or stack of books, like in the picture, to create a low ramp. T truction paper turn the cars.

Set the cars at the top of the "roads."

FRICTION FRENZY

You Will Need:

*4-5 pieces of construction paper, taped together to create

*4-5 pieces of course sandpaper, taped together to create a

*2 toy cars (different colored cars work best)

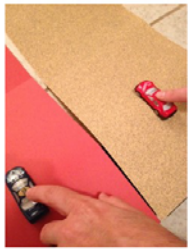
*a low box, books, or DVDs to create some height for the cars
works best when a low box is used, or only a few books are st
other.

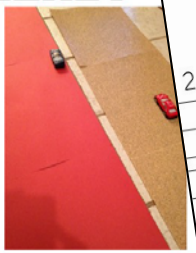
*tape

*f

FRICTION FRENZY

Set the cars at the very end of the ramp – right before they are ready to fall off. Instruct students to LIGHTLY tap the cars until they "fall" off the ramp and slide down the two roads. Students should not give the cars a push. Allow them to practice first.





Now, watch them go! As long as stude
not push the cars, the car on the sand
will slide down the road slower than th
on the paper. Eventually, the cars will
and the car on the paper will win becau
had less friction than the sandpaper ca
sandpaper car was slowed down by frict

Name _____ Date _____

MY FRICTION FRENZY LAB REPORT

1. Make a hypothesis. Do you think the car on the construction paper road or the sandpaper road will win? Circle your hypothesis.

construction paper

sandpaper

2. Why?

3. Now, test out your hypothesis. With your teacher's help, complete the racing experiment. Then answer the questions on the back of this lab report.

on the construction paper road or the

aper

out what just happened with the
n the sandpaper road or the

e car rubbed against the sandpaper more than
ction paper, which is smoother. The sandpaper caused the car the
down, so it did not move as far as the other car. The construction paper car won the race because it had less friction rubbing against it and was able to glide smoothly across the road! Well done, scientist!

CRITICAL THINKING MOTION GAMES!

MOTION MEMORY

Objective: Students will play a memory game to reinforce
words associated with the direction or pat

Introduction: This game will encourage you

MOTION DIREC

MOTION DIR

MOTION DIRECTION MEMORY GAME

Teachers: Use these cards as a science game to review the directions and paths of m
out the cards to play, or, cut and laminate the cards for durability and place in a scie
flipping two cards to make a match. The partner with the most matches wins!

slide

roll

di

straight

GPS DIRECTIONS

Directions: Read and follow the GPS directions to help Tommy get to the theme park. Use your pencil to draw the path and direction Tommy takes on his trip. *Teachers, have students rotate the paper as they "drive" so they are looking in the direction they are moving.

1. Head straight until you get to the end of the road.
2. Make a left turn.
3. Turn left again.
4. Continue straight
5. Turn ri
6. Drive s
7. Make a
8. At the
9. Turn lef
10. Continu
11. You hav
12. If you g

Name _____ Date _____

MOVE THAT CAR!

Directions: Using your pencil to draw the car's path, follow the directions on the GPS to help the car get to the theme park. Be careful!

Tickets

THEME PARK

MIDWAY

MOTION DIRECTION MEMORY GAME: PAGE 2

pull

up

ight

left

MOVIN' AND GROOVIN'

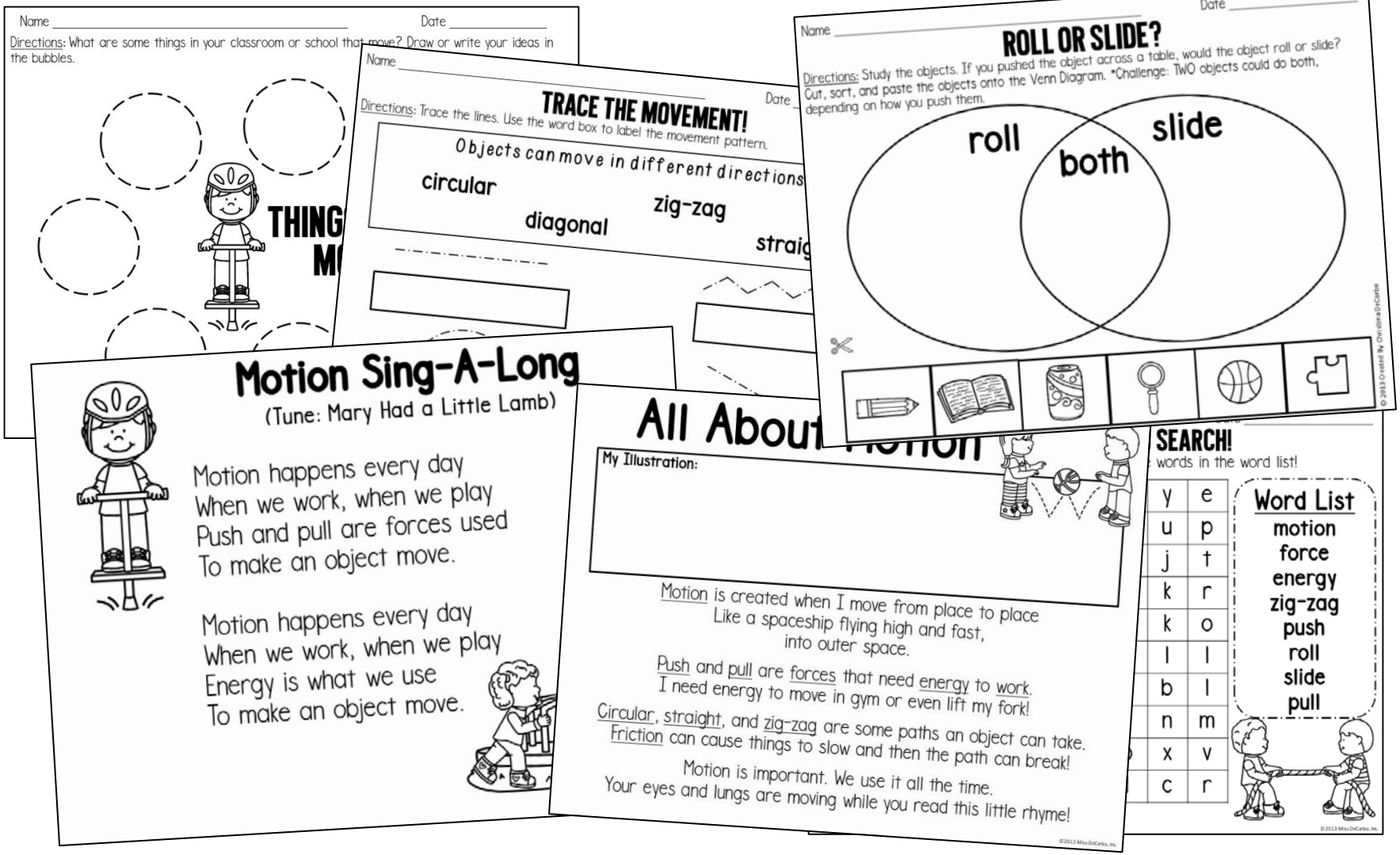
GPS DIRECTIONS

e: Students will practice following the GPS directions to practice the directions of
d left as they use their maps and pencils to draw the path Tommy takes to get to
usement park.

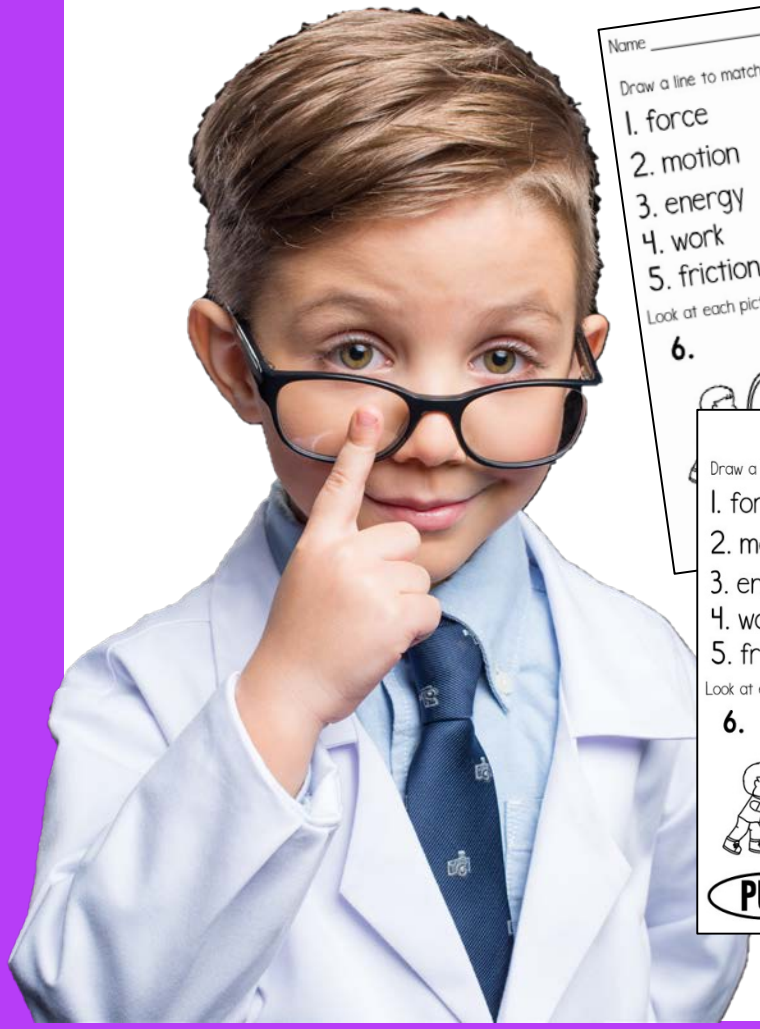
uction: (You will want to model this lesson as you complete it for younger and/or
y students. Teach them how to draw their line and then turn the paper so that they
oking at the "road" or "path" in the same way that the car would be – similar to
g a map while driving.) Explain to the students, *"Today we are going to help Tommy
is way to the amusement park! We're going to practice knowing our left and right by
wing the GPS directions and using our pencil to draw where Tommy will turn and move
ar. Here we go!"* (This would be a great time to show students that their left hand
es a correct "L" to help them remember the difference between left and right.) When
gs move, the directions "left" and "right" help to describe the movement of objects or
ple.)

tivity: Read #1 on the GPS and follow the directions by drawing a straight line until your
ncil reaches the end of the "road." Turn your paper 90 degrees to the
ft so that you are now looking at the paper vertically. Read #2 on the GPS
nd follow the directions by drawing a line to the left with your pencil to tell Tommy to
urn" left with his car. Continue to follow the directions until you reach the park!

NO-PREP STUDENT PRINTABLES, POEMS, AND SONGS!



FORCE & MOTION ASSESSMENT AND TEACHER ANSWER GUIDE



Name _____ Date _____

MOTION TUNE-UP TEST

Draw a line to match each vocabulary word to its definition.

1. force
2. motion
3. energy
4. work
5. friction

Look at each picture. Will a PUSH or a PULL best put the object into motion? Circle the force.

6. 7.

MOTION TUNE-UP TEST (PAGE 2)

9. Would a marble roll faster and further on sand or on ice? Circle.

sand ice

10. Why?

11. Tommy rolls a marble down each ramp. Which ramp will make the marble roll faster? Circle the ramp.

Ramp A Ramp B

MOTION TUNE-UP TEST TEACHER ANSWER SHEET

Draw a line to match each vocabulary word to its definition.

1. force — when an object moves from one place to another
2. motion — a force caused when two objects rub against each other
3. energy — the push or pull on an object to make it move
4. work — the ability to do work
5. friction — when a force used to move an object moves another object

Look at each picture. Will a PUSH or a PULL best put the object into motion? Circle the force.

6. PUSH PULL 7. PUSH PULL 8. PUSH PULL

MOTION TUNE-UP TEST (PAGE 2)

ice

Ramp B

15. Draw a zig-zag path.

THANK YOU

for choosing a Miss DeCarbo™ educational resource

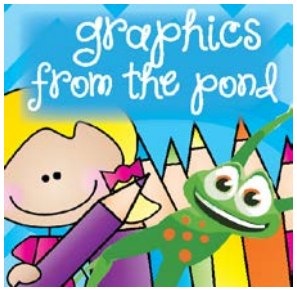
CONNECT WITH ME

TERMS OF USE:

<u>Licensing Terms:</u> This download includes a license for one educator only for personal use in his or her classroom. *Licenses are non-transferable, meaning they cannot be passed on from one teacher to another.* If you want to use this as a grade level, share it with a colleague, or use it with a school or district, *the proper number of additional licenses must be purchased.* You can purchase additional licenses at a discount in your My Purchases page when you are logged into your Teachers Pay Teachers account. If you are a coach, administrator, or curriculum director interested in transferable licenses to accommodate yearly staff changes, contact me for a quote at christina@missdecarbo.com.

<u>Copyright Terms:</u> *Every page of this document is copyrighted.* This resource may <u>not</u> be uploaded to the internet in any form, including classroom/personal websites or blogs, and district or shared servers that those who did not purchase an additional license could access. Uploading the file to the internet is a direct violation of copyright.

CLIP ART & FONT CREDITS:



Stock photographs from www.shutterstock.com