FOSS Balance and Motion
Planning & Pacing Guide

Investigation 1  The First Straw
  Part 1  Finding a Standard  1 - 45 minute session
  Part 2  Estimating and Measuring  1 - 45 minute session
  Part 3  Making Comparisons  1 - 45 minute session

Investigation 2  Balance
  Part 1  Trick Crayfish  1 - 45 minute session
  Part 2  Triangle and Arch  1 - 45 minute session
  Part 3  The Pencil Trick  1 - 50 minute session
  Part 4  Mobiles  1 - 50 minute session
  READ Make It Balance  1 - 40 minute session
  & complete review page in journal

Investigation 3  Spinners
  Part 1  Tops  1 - 45 minute session
  Part 2  Zoomers  1 - 30 minute session
  Part 3  Twirlers  1 - 30 minute session
  READ Push or Pull and Things That Spin  1 - 40 minute session
  & complete review page in journal

Investigation 4  Rollers
  Part 1  Rolling Wheels  1 - 50 minute session
  Part 2  Rolling Cups  1 - 50 minute session
  Part 3  Rolling Spheres  2 - 45 minute sessions
  READ Rolling, Rolling, Rolling  1 - 40 minute session
  & complete review page in journal

Investigation 5  Back and Forth
  Part 1  Sound and Vibrations  1 - 45 minute session
  Part 2  Length and Pitch  1 - 45 minute session
  READ String in Motion  1 - 40 minute session
  & complete review page in journal

Investigation 6  Magnets and Tools
  Part 1  Magnets  1 - 45 minute session
  Part 2  Tools and Machines  1 - 45 minutes session
  READ Move It, But Don't Touch It and Tools and Machines  1 - 50 minute session
  & complete review pages in journal
(Alternative) Planning schedule for Balance and Motion

#1 Investigation Standard Measurement

* Toy Facts worksheet (GEMS) Using non standard measurement 1 session (use teacher created worksheet)

* About My Toy and Me Using standard measurement 1 session (use teacher created worksheet)

* Hello Flying Aces Using standard measurement 2 sessions (use teacher created worksheet)

* How Long is It? Estimating and using standard measurement 1 session

* Making Comparisons Estimating and using standard measurement 1 session

#2 Investigation Balance

* Think of exercises that use balance/balance ball (Students can stand in a circle and take turns leading the group in balance exercises)

* Journal Question: What is balance? Describe three things you do that need balance (use teacher created worksheet)

* Crayfish Investigation sheet/sketches 1 session (use teacher created worksheet)

* Arch and Triangle investigation and sketches 1 session (I had students draw as many different ways that they could get the arch/triangle to balance)

* Arch and Triangle assessment 1 session

* Create your own Balance shapes and test them (optional)

* Balance your Pencil investigation 1 session (I had students record two or more different ways of balancing a pencil using one clothespin and two clothespins)

* Magic School Bus: Plays Ball video...What is friction? Students can write two observations from the video

* Read Balance and Motion Student Book Answer questions

* Bill Nye the Science Guy VHS: Balance

* Discuss Mobiles and Create Your Own Mobiles 1/2 sessions

* Math Extension: Investigation 2: Balance
(Alternative) Planning schedule for Balance and Motion

***Did not have time to read MIRETTE on the High Wire...next time I hope to read this and have students create their own high wire models...I would also like to incorporate the activity of letter writing to Bellini. Use the book, Gizmos and Gadgets for ideas.

#3 Investigation Spinners

*Create Tops/have students decorate top sheets if they have time (students do not create their own tops...it didn't work!) 1 session

*Math Extension: Integrates with 2nd grade math geometry: turn/rotate

*Math Extension: Investigation 3: Invent a Top

*Read Push or Pull? Student Book Answer questions

*Create Pinwheels 1 session

*Read Things That Spin Student Book Answer questions

*Watch Spinning Bill Nye the Science Guy

*Make zoomers (This can be very frustrating because it is very difficult for students to manipulate the zoomers. Students do not make their own, they don't work!) 1 session

*Create Twirlers to study gravity...test in schoolyard and make observations in journal 1 session

#4 Investigation Rollers (I was unable to start this investigation yet!)

#5 Investigation Back and Forth (""")

(Since I taught 4th grade, I have some extension activities to add to this section...)

*We Hear With Our Ears worksheet

*How Ears Can Hear worksheet

*Build an ear model and use it

*A Real Humdinger

*Create a giant ear model

*Use older FOSS worksheets... -The Tuning Fork

-The Waterphone

-Sounds Through a String
(Alternative) Planning schedule for Balance and Motion

Bill Nye the Science Guy Sound VHS

#6 Investigation Magnets and Tools (I wasn't able to get to this part of the unit yet...)

Bill Nye the Science Guy Magnets VHS

Bill Nye the Science Guy Simple Machines VHS

(Since I taught 4th grade I do have some extension ideas for this section)

*Magical Magnets worksheet with the old FOSS Magnetic Observations worksheet

*Magnificent Magnets!! Center activities using magnetic supplies

*Students can try EATING NAILS FOR BREAKFAST...
Toy Facts!

Use your toy to measure different parts of your body...Write in complete sentences please...

A. What is your toy? ____________________________________________________________

1. How many toys tall are you?

_________________________________________________________________________

2. How many toys wide are you?

_________________________________________________________________________

3. What part of your body is the same size as your toy?

_________________________________________________________________________

4. How is your toy different from the other toys in the room?

_________________________________________________________________________

5. How is your toy the same as the other toys in the room?

_________________________________________________________________________
Switch your toy with someone else’s toy... do questions #1 and #2 again...

6. What is your new toy called?

7. What is it?

8. How many toys tall are you?

9. How many toys wide are you?

10. What part of your body is the same size as this toy?

On the bottom of this sheet... sketch both of your toys...
About My Toy and Me!

Using metric measurement...measure your toy!

1. How many centimeters long is your toy? ________________

2. How many centimeters wide is your toy? ________________

3. Find three things as long as your toy? ________________

4. How many centimeters tall are you? ________________

5. How many centimeters wide are you? ________________

6. How much taller are you than your toy? Show your work below.

7. How much wider are you than your toy? Show your work below.

8. Put your toy on your head and try to find something that is that tall/long in the classroom...What did you find?
Name____________________  Date________________

Hello Flying Aces! Describe your airplanes!

1. What is the name of your airplane? ______________________

2. Why did you name it that? ______________________

3. Briefly describe how you made your airplane. ______________________

4. What is the length of your airplane from the tip of its nose to its tail?
   ______________________ centimeters

5. What is the width of your airplane at its widest point?
   ______________________ centimeters

6. Make a sketch of your airplane below...
7. How far do you think it will fly? ____________________________ meters

8. Fly it...how far did it fly? ____________________________ meters

9. Why do you think it flew that far? ____________________________

10. How can you improve your airplane so that it will fly farther next time? ____________________________
Name__________________ Abracadabra! A Balanced Pencil...

Try to think of one or more ways using the aluminum wire, pencil, and clothespins to balance your pencil!

Sketch and label your ways below...
Name________________ Our Crayfish Can Do Tricks!

1. Give your crayfish a name______________________________

2. Make a mini sketch of your crayfish...Try to balance your crayfish on one finger...draw the point where you were able to balance the crayfish...

3. Can you balance the crayfish on other parts/sides of its body? Why or why not?______________________________

4. To help you to balance your crayfish in another way, you will use 2 ____________________.

5. Sketch how you were able to balance the crayfish in two or more other ways...

6. ______________________________________________________

7. How do you know when something is balanced? ______________________________________________________

8. When you use “counterweights” where do they work best? ____________________________________________________

9. On the back of this sheet, find six other things you can balance on your body...
Name_________________  What is balance?

1. In your own words, try to explain what is balance?

2. Draw and label three things that you do that need balance...
Name _____________________ SpIn ThIs!!!!

Try to make at least two different tops...Sketch and label them below...

#1

1. What materials did you use to make your tops? __________________________________________________________

2. How do you know when you have made a top? __________________________________________________________

3. How do you get your top to start moving? ______________________________________________________________

4. How does a top move when it is working? ______________________________________________________________

5. What kind of motion does a top make when it is going? __________________________________________________

6. What is the best design for a top that will spin for a long time? __________________________________________

7. What is the best design for a top that spins fast? _________________________________________________________
PROBLEM: How can you stop a friend from humming without hurting his feelings?

Collect materials:

1. ______________________________
2. ______________________________

Hypothesis: The humming stopped when ______________________________

A. I covered her/his eyes.
B. I covered her/his mouth.
C. I pinched her/his nose.
D. I covered her/his ears.

Procedure: Ask a friend to hum a song. Her/his mouth must be kept closed while humming. Try all four choices. Which one worked?

Conclusion: The humming stopped when ______________________________

Draw a picture of your experiment...
Name________________ Magical Magnets!

1. Write four properties (characteristics) of your magnet.__________________________________________________________

2. Get your bag of mystery objects. PREDICT (GUESS) two things you think the magnet WILL stick to.__________________________

   Why do you believe this is so? ____________________________________________________________

   Predict two things you think the magnet WON'T stick to.__________________________________________

   Why do you believe this is so? ____________________________________________________________

3. Do the magnetic observations worksheet...

4. Which objects in the room and in the bags of mystery objects stick to magnets?__________________________

5. What do you think is the same about those objects?_________________________________________________

6. Were you surprised by any of the objects?__________________________________________________________

7. What happens when magnets “attract” each other?____________________________________________________
8. What happens when magnets "repel" each other?

9. Name three things that use magnets?
Name __________________ Eating Nails for Breakfast!

*Work in pairs to share a magnet

Materials: Total brand cereal, a magnifying glass, a styrofoam plate, a zip-lock bag, warm water, and a magnet.

Directions:

1. Measure out 1/4 cup of Total cereal. Put them on your plate. Crush the cereal into tiny pieces and spread them over your plate. Bring your magnet close to the crumbs (DON’T TOUCH ANY!) BE PATIENT...what do you see...sketch and write your findings below...

I observed ___________________________________________________________

__________________________________________________________

2. Press the magnet onto the crumbs (DON’T SMOOSH AND MOVE IT!) Is there anything sticking to the bottom of the magnet? Sketch and write your findings below...

I observed ___________________________________________________________
I observed

6. Keep one end of the magnet touching the bag and draw little circles. The black specks will gather into a bigger clump. Sketch and write your findings below...

I observed

7. Read the following blurb...

If all of the iron from your body was extracted, you'd have enough iron to make only two small nails. However, iron is found in a very important component of your blood, called hemoglobin. Hemoglobin is the compound in red blood cells that carries oxygen from your lungs so that it can be utilized by your body. It's the iron in hemoglobin that gives blood its red appearance.

A diet deficient in iron can result in fatigue, reduced resistance to diseases, and increased heart and respiratory rates. Food scientists say that a healthy adult requires about 18 mg of iron each day. So, as you can see, iron is a very important part of what you and your friends and family need to stay healthy. Eat up!

*Answer the questions on the back of this sheet*
Magnificent Magnets!!!!

Name______________________

Activity #1: Magnetic Hockey...

GOAL: Your goal is to score a goal!!!

Directions: Get YOUR donut magnet. Find an opponent. Get a small round magnet as your puck. Set them all on a Hockey Field.

RULES: *If the puck flips over start again.

        *If the puck falls off the Field, start again.

After playing, answer the following questions with as much detail as possible:

1. What was fun about this game?

2. What strategy did you use to try to win?

3. What Magnetic force did you use to move the hockey puck?

4. How could this game be improved?
Activity #2: How Strong Are You?

1. Direction: 1. See how many paper clips you can hang in a line off of your magnet(s).
2. See how many paper clips can cover your magnet without falling off.

1. donut magnet
   a) in a line ___________
   b) cover ___________

2. small rectangular magnet
   a) in a line ___________
   b) b) cover ___________

3. horseshoe magnet
   a) in a line ___________
   b) cover ___________

4. mini-magnet
   a) in a line ___________
   b) b) cover ___________

5. Which magnet was the strongest? ____________________________

6. Do you think size of your magnet always matters? ________________

_________________________
Activity #3  Look...No Hands!

Directions: Cut a simple design out of the tracing paper. Decorate it with a pencil drawing. Cut a piece of string about a foot and tie it to a paper clip.

We will collect the drawings and they will magically float in the air with the help of a magnet.

Activity #4  Mysterious Magnetic Designs..

Directions: Get YOUR donut magnet. Put some of the mysterious sand on it and create a mysterious magnetic design... Sketch your design below...Give it a name! Write a short, three line poem about it.

What do you think the mysterious sand is made from? Explain your idea.
Activity #5  Magnetic Force Field!

Directions: Observe one of the Mysterious Magnet Tubes

*Below, make a sketch of what you see in the tube.

1) Where does the magnet seem to be the strongest? Explain.

2) On top of the water filled glass with mysterious sand...place two magnets...Put them in the position of “repelling” each other... sketch their “magnetic field” below...

What do you notice about this “field”?

3) On top of the water filled glass with mysterious sand...place two magnets...Put them in the position of attracting each other...sketch their “magnetic field” below...

What do you notice about this “field”?
Magnetic Questions: Answer the questions below...

1. What is a magnetic force field?

2. Where are magnets usually the strongest?

3. What is the name of the mysterious sand?

4. Where does the mysterious sand come from?

5. How does it end up there?

6. How do magnets work?
Name of scientist:__________________________________________

Date of experiment:______________________________________

Find a simple machine that will:

Attach the lid of an oatmeal container to the bottom of the container.

Clues:
1. This machine has to be turned around and around to work.
2. You push this machine; you do not pull it.

What is my machine?______________________________________

Draw a picture of your machine. Draw arrows to show where you use force to push or pull it. Draw arrows to show which direction it turned.

My Simple Machine
Name of scientist:

Date of experiment:

Find a simple machine that will:

Push the slices of an orange apart.

Clues:

1. This machine has a curved part that can rock back and forth on a flat surface.
2. You push this machine for it to work; you do not pull it.

What is my machine?

Draw a picture of your machine. Draw arrows to show where you use force to push or pull it. Draw arrows to show which direction it turned.

My Simple Machine
Name of scientist:______________________________________

Date of experiment:____________________________________

Find a simple machine that will:

Allow me to push an object up onto a platform.

Clues:

1. This machine does not rotate or turn.
2. You can push things up onto this machine. Things can also slide or roll down this machine.

What is my machine?____________________________________

Draw a picture of your machine. Draw arrows to show where you use force to push or pull it. Draw arrows to show which direction it turned.

My Simple Machine

[Blank diagram space]
Name of scientist: ________________________________

Date of experiment: ______________________________

Find a simple machine that will:

Pry or take the nails out of a plastic yogurt container.

Clues:

1. This machine has a curved part that can rock back and forth on a flat surface.
2. You pull with this machine; you do not push with it.

What is my machine? ________________________________

Draw a picture of your machine. Draw arrows to show where you use force to push or pull it. Draw arrows to show which direction it turned.

My Simple Machine

_________________________
Name of scientist: ________________________________

Date of experiment: ______________________________

Find a simple machine that will:

Carry and move a heavy object across the table.

Clues:

1. This machine can be pushed or pulled.
2. This machine has rotating parts.

What is my machine? ________________________________

Draw a picture of your machine. Draw arrows to show where you use force to push or pull it. Draw arrows to show which direction it turned.

My Simple Machine