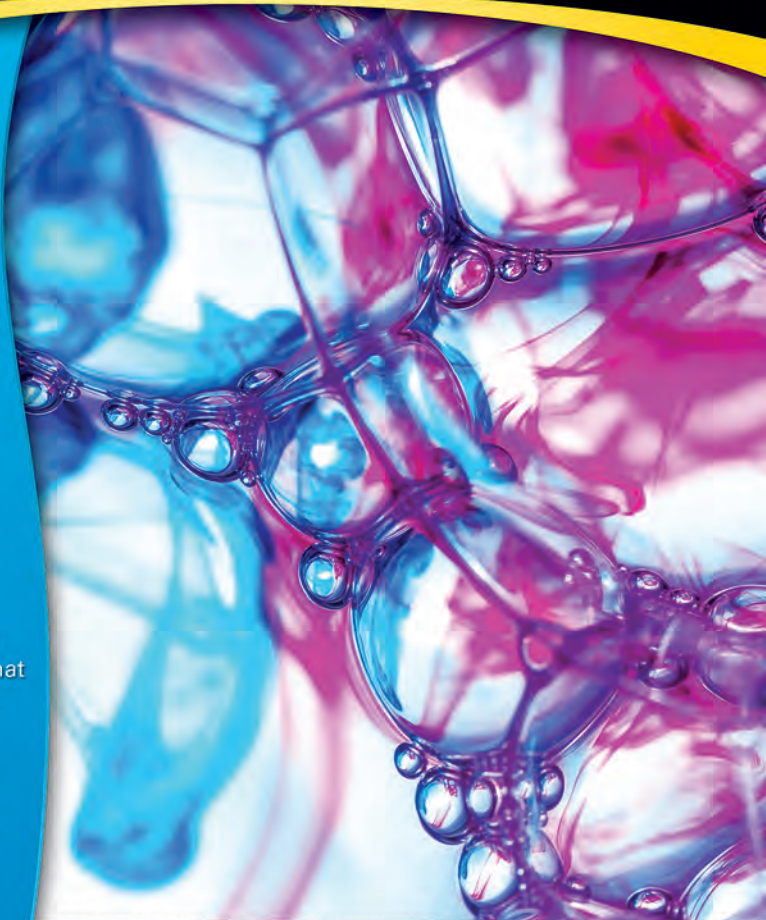


STEM

A guided-to-independent approach to STEM-based learning

- Includes hands-on science units that introduce students to the processes of inquiry, investigation, interaction, and invention
- Encourages collaboration, journaling, and discussion
- Incorporates guided unit investigations that lead to independent team challenges
- **Correlated to CCSS and NGSS**



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For teachers' inspection ONLY

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WORKING WITH TWO PENDULUMS

Directions: Work in groups of three for this activity. Read through ALL the directions for the activity before you begin. Before testing, decide which teammate will do each job on the team.

TESTING THE PENDULUMS

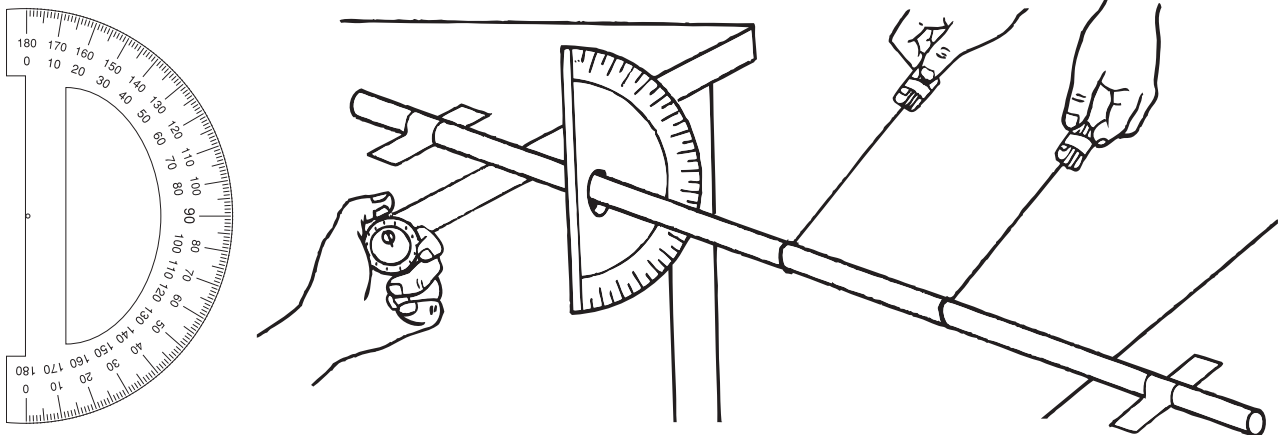
1. Fill in the name of each teammate and review each job.

TEAMMATE 1 _____ will say, “GO,” and time the test (3 minutes or less).

TEAMMATE 2 _____ will hold and release Pendulum 1 and count the oscillations.

TEAMMATE 3 _____ will hold and release Pendulum 2 and count the oscillations.

2. Each bob should be held taut at about a 60° angle. Mark 60° on the protractor.



3. When **Teammate 1** says, “GO,” **Teammate 2** and **Teammate 3** will simultaneously release the pendulums.
4. Record the number of oscillations in one minute.

PERIOD FOR PENDULUM 1 _____ oscillations in one minute

PERIOD FOR PENDULUM 2 _____ oscillations in one minute

5. Continue observing the pendulums until they are both inert. How long did it take?

6. Describe the movements of the pendulums. Did they move in the same way or differently?

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3D-SHAPE WANDS

Directions: Work in teams of two (pairs). Continue using straws and wire or fishing line to construct more complex wands. Use the illustrations to help guide your construction.

MAKING A SQUARE-BASED PYRAMID

1. Gather straws, fishing line or wire, scissors, and a ruler to construct a square-based pyramid.
2. Cut eight 4" straws.
3. Arrange four 4" straws for the base and connect them with wire or fishing line. (See Diagram 1.)
4. Connect a length of wire or fishing line to each corner of the square.
5. Feed each line through a straw and lay them flat.
6. Gather two of the straws and tie them together to form a point. Do the same thing with the remaining two straws. (See Diagram 2.)
7. Connect the two straw triangles at the top to construct the pyramid. Make sure that the structure is sound.

Diagram 1

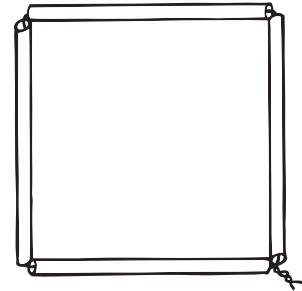
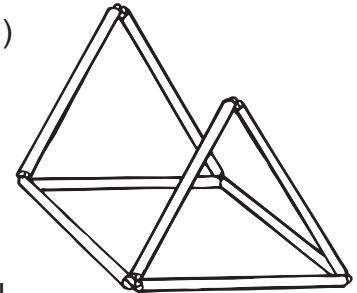


Diagram 2



TEST THE SQUARE-BASED PYRAMID

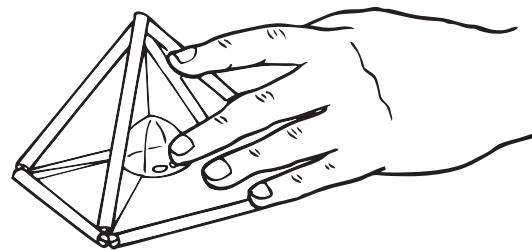
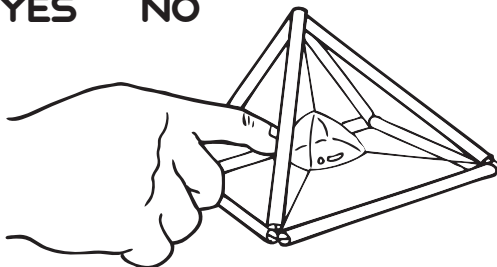
1. Take turns dipping the pyramid bubble frame into the soap-bubble solution. You may have to dip the pyramid several times to cover all the faces.
2. Record what you see. What happens when you blow on the square-based pyramid or wave it through the air?

3. Try dipping your hand in the solution and then gently pushing it through one of the faces.

Can you get your finger in the shape wand without popping the soap film?

Your hand? **YES** **NO**

YES **NO**



★ **SAVE THE SOAP-BUBBLE SOLUTION AND BUS TRAYS FOR THE NEXT ACTIVITY** ★

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COIN MENISCUS

Directions

- Fill in the name of the coin your team will use in the blank at the top of the chart below.
Note: If you prefer, recreate this chart on your tablet or computer. See page 42 for basic directions.
- Fill in the number of drops on the coin in the second column.
- Write your initials next to your number of drops in the Tester column.
- Continue until all team members have added drops to their coins and filled in the chart. Add more rows to the chart if necessary. Use the back of the page.

HOW MANY DROPS FIT ON A _____?		
COIN	NUMBER OF DROPS	TESTER
Coin 1		
Coin 2		
Coin 3		
Coin 4		
Coin 5		
Coin 6		

ANALYZE THE DATA—LOOK AT THE MATH

- What was the greatest number of drops on the coin? _____
- What was the smallest number of drops on the coin? _____

3.	Find the <i>difference</i> between the largest and the smallest number of drops. _____

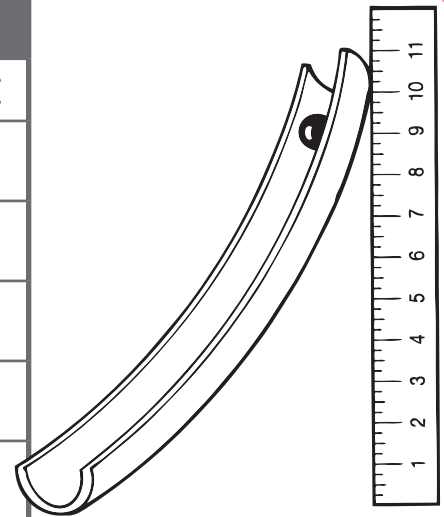
4.	Find the <i>average number of drops</i> for the coin. _____

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MARBLE RUNWAYS

MARBLE RUNWAY—TESTING

DISTANCES MARBLES TRAVEL		
HEIGHT	SMALL MARBLE	LARGE MARBLE
2"		
4"		
6"		
8"		
10"		



ADD MORE MARBLES—TEST MOMENTUM

1. Raise the slide of the runway to a height of 10".
2. Place one marble halfway down the runway (on the flat part). That will be the “sitting” marble.
3. Launch a second marble, the striker, from the top of the slide.
4. What happens to the “sitting” marble when it is hit by the striker? _____

5. Place two marbles halfway down a runway and launch the striker. What happens to the two sitting marbles?

VARY THE SIZE OF THE MARBLES—TEST MOMENTUM

1. Observe linear momentum using the set-ups below for the sitting marbles. **S** represents a small marble and **L** represents a large marble.
2. Describe what happens to each group of marbles when hit by the striker.



