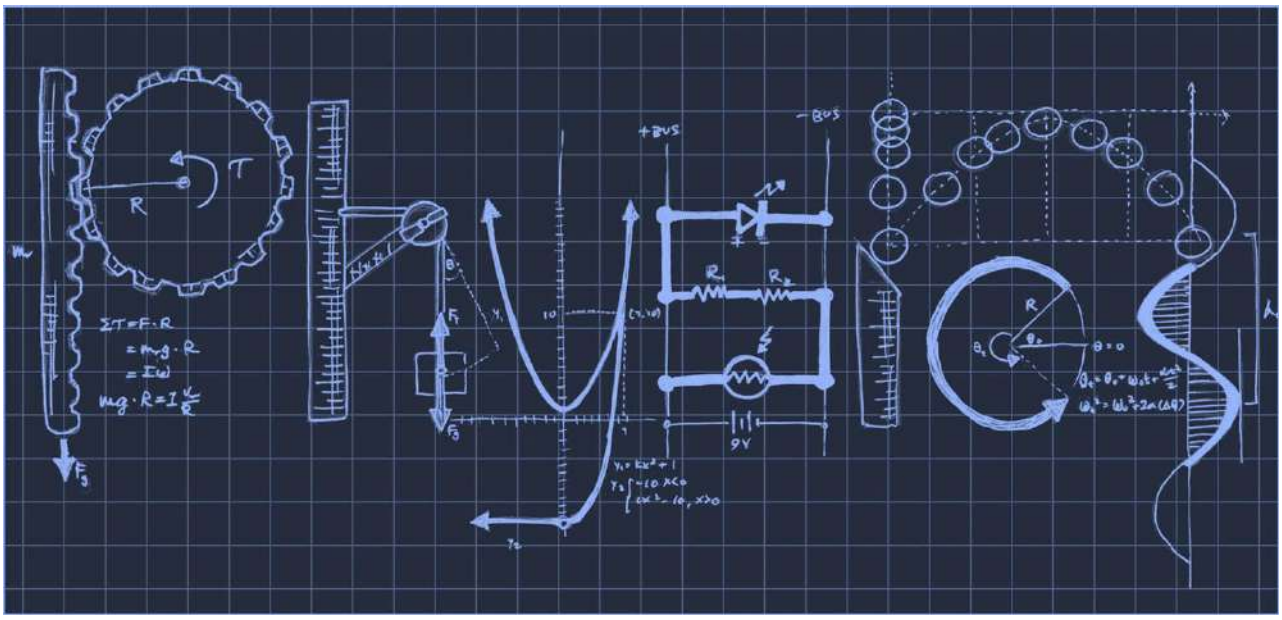


Physics Workbook

Introduction to Physics

TEACHER COPY

STUDENT NAME

Section Check for Understanding

Teacher Demo

Final Check for Understanding

Note Area

Video

Compiled by Miss Rebekah Taylor
2018

Teacher Demo 1
Physics Every-day

Cellphone
Laptop
Walking
Jumping and bending knees
Paper airplane
Rubber band

Ask students to name other everyday things.

Devices were originally developed by basic scientific research and methods. First someone asked a question or posed a problem and they set about answering it or solving it. Now, scientists are not always successful and have more failures than successes. In this class, while we are working on problems, or on homework, it is ok to fail. Failure leads to success.

Teacher Demo 2

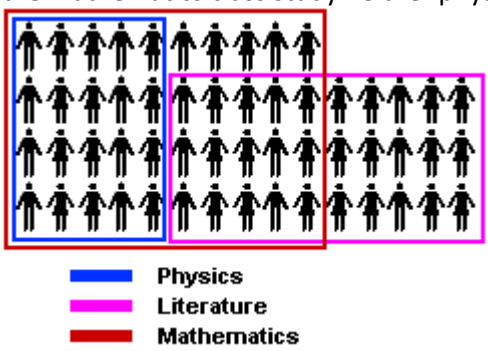
Brain Game / Marshmallow Challenge

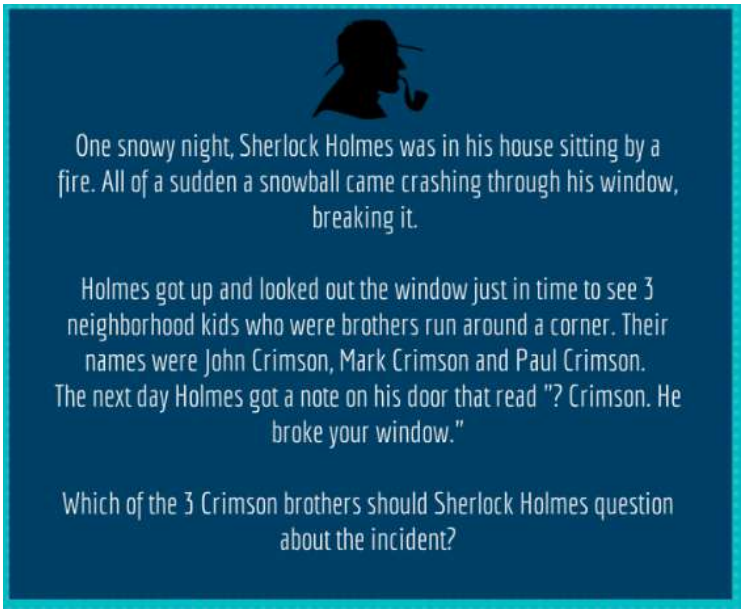
Question:

All students in the physics class also study mathematics. Half of those who study literature also study mathematics. Half of the students in the mathematics class study physics. Thirty students study literature and twenty study physics. Nobody who studies literature studies physics. How many students in the mathematics class study neither physics nor literature?

Answer:

If there are 20 physics students who all take mathematics, and half of the mathematics students study physics, there must be 40 students in the mathematics class. If half of the 30 literature students take mathematics, then 15 of them take mathematics. Since none of the literature students study physics, only five students in the mathematics class study neither physics nor literature.





Marshmallow Challenge

Materials:

20 sticks of spaghetti
1 yard of tape
1 yard of string
1 large marshmallow
scissors (to cut materials)
yard stick (to measure)

Rules:

• Your challenge is to build the tallest freestanding structure using ONLY the above listed materials.

•The winning team is the one that builds the tallest freestanding structure measured from the table top surface to the top of the marshmallow.

•The team's structure must stand on its own for measuring. Teams touching or supporting their structure will be disqualified.

•Teams can use as much or as little of the 20 sticks of spaghetti, tape, and string provided. Extra materials CANNOT be provided.

•The entire marshmallow must be on the top of your structure. Cutting or eating part of the marshmallow will disqualify your team.

Teacher Demo 3

Spoon in Water / Levitating Ping-Pong Ball

Show the students a glass of water with a spoon in it.

Ask: Why does the spoon appear to be broken or bent?

As light travels through a given medium, it travels in a straight line. However, when light passes from one medium into a second medium, *the light path bends*. **Refraction** takes place. The refraction occurs only at the boundary. Once the light has crossed the boundary between the two media, it continues to travel in a straight line.

Levitating Ping Pong Ball

In this activity students will work in groups to discover the phenomenon that occurs when a ping pong ball is placed above a straw and air is blown through the straw. Most people would expect the ping-pong ball to fly up and off to the side—but it doesn't. Due to Bernoulli's Principle, the ball will hover in the air above the straw. This project can end with a demonstration using a shop-vac or hair dryer with a ping-pong ball that will produce the same interesting results.

VIDEO LINK

https://www.youtube.com/watch?v=for5lSNGD6o

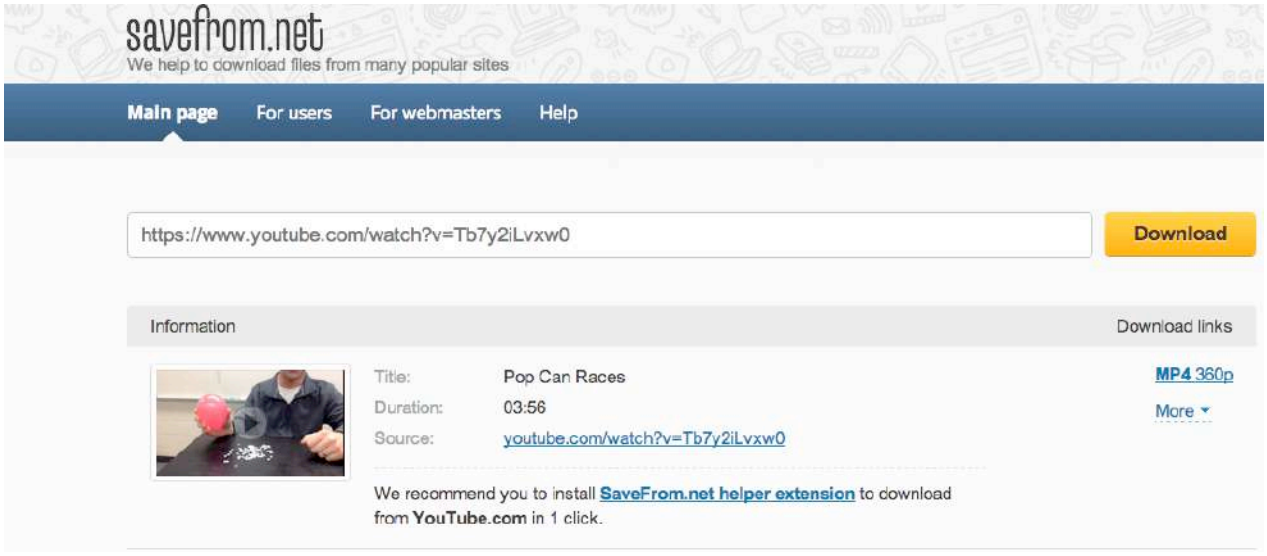
Due to the size of my videos, and the size limit that TPT and Teacher's Notebook puts on the files I can provide for you, I've included your video as an unlisted youtube link (meaning you can find it, whereas the general public can't). Some people like to have these actual video files stored on their computers as mp4s. If you would like to do this, I've provided instructions below on how to download it.

How to download my youtube video as a video file on your computer

There are numerous websites that will help you download a youtube video onto your computer. This just happens to be my favorite one. What you'll need to do is follow these 3 steps:

1. Copy the URL that I provided above
2. Paste it into the box on savefrom.net (see screenshot below)
3. Click the download button then select "MP4 360p" as the quality

After it has downloaded, it will be available in your downloads folder!



STEM CHALLENGE ACTIVITY:

Teacher Instructions (Levitating Ping Pong Ball):

There are many ways to use this activity in your classroom. Below is just one suggestion.

Set out the materials:

Straws, paper clips, tape, ping pong balls, and student instructions need to be spread out on different tables. **You will need to split your students into groups.**

Ask them if it's possible to levitate (float in the air). Ask if any of them can levitate (or float). Have any volunteers try :) Then tell them that today we are going to try to get your ping pong balls to levitate.

Give them between 3 and 10 minutes (depending on the age of your students) to construct the apparatus. (For younger students you may want to show them a picture of what the apparatus could look like).

Sharing time:

Ask for any volunteers to show what they've learned. Then encourage other students / groups to make modifications to their projects based on what they've seen

After students have had time to get their project working, ask them to brainstorm additional ways to get the ping-pong ball to levitate. Based on their responses, you could ask them how we might get the ball to levitate for a longer time.

When a students suggests a hair dryer or a shop vac, pull it out, and allow students to practice with their ball.

Ask students to think about why this happens. Tell them that it doesn't seem to make sense …. why did the ball stay in the air? After listening to some responses and answers, you can talk about "bernoulli's principle".

After teaching about bernoulli's principle, ask students to think about and share ideas where bernoulli's principle is seen in the real world. Their research question asks them to research how an airplane wing gets "lift".

NOTE: Remind students that they can only put their lips on their own straw!!!!

STEM CHALLENGE ACTIVITY:

Materials Needed - Levitating Ping Pong Ball Activity

Materials listed below are per group (3-4 students)

Straws
Paper clips
Tape
Ping pong balls
Student instructions (need to be spread out on different tables)

You will need to split your students into groups.

STEM CHALLENGE ACTIVITY:

Student Instructions (Levitating Ping Pong Ball):

Student Name(s):_____

Challenge:

Can you get a ping-pong ball to levitate in the air? If so, how long can you keep it in the air without touching it?

Use the materials provided by your teacher to construct something that will help you keep the ball in the air.

Share ideas with people in your group.
When something starts to work, share this with your team!

1. What are some of the problems that we might have with this project?

2. What could we do to solve these problems?

3. **Get creative:** What fun / interesting things can you do with this activity?

Research Question:

What causes "lift" on an airplane wing? Use the internet to research this question and be ready to report back to your class.

STEM Activity Rubric

Activity / Challenge: Levitating Ping Pong

Grade ___ 20

Teacher Name: _____

Student Name: _____

CATEGORY	4	3	2	1
Problem-solving	Actively looks for and suggests solutions to problems.	Refines solutions suggested by others.	Does not suggest or refine solutions, but is willing to try out solutions suggested by others.	Does not try to solve problems or help others solve problems. Lets others do the work.
Contributions	Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort.	Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard!	Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required.	Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate.
Attitude	Never is publicly critical of the project or the work of others. Always has a positive attitude about the task(s).	Rarely is publicly critical of the project or the work of others. Often has a positive attitude about the task(s).	Occasionally is publicly critical of the project or the work of other members of the group. Usually has a positive attitude about the task(s).	Often is publicly critical of the project or the work of other members of the group. Often has a negative attitude about the task(s).
Focus on the task	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task.	Rarely focuses on the task and what needs to be done. Lets others do the work.
Working with Others	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares, with, and supports the efforts of others. Does not cause \"waves\" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.

Comments:

RELATED NGSS STANDARDS

6th – 8th Grade

MS. Forces and Interactions

Students who demonstrate understanding can:

MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]

MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]

MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]

MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]

MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.] [Assessment Boundary: Assessment is limited to electric and magnetic fields, and is limited to qualitative evidence for the existence of fields.]

MS.Engineering Design

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution,taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

For complete details, please visit the NGSS website: http://www.nextgenscience.org/

Teacher Demo 4

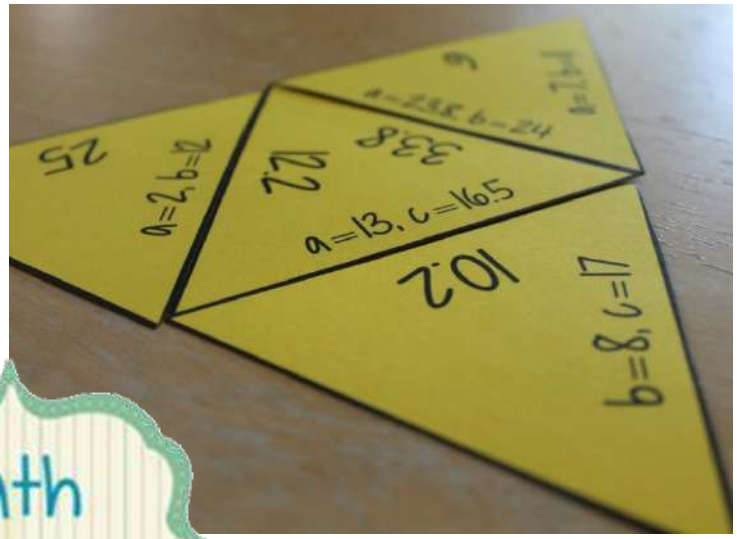
Casting Shadows and Knowing Length and hypotenuse / Activity

You will need:
Flashlight or light on stand
Ruler

Using an object cast a shadow.
Draw this model on the board.
Measure the length of the shadow
Using a string measure the distance from the top of the object to the top of the shadow.

Ask the students how to find the height using the Pythagorean theorem.

Pythagorean Theorem Puzzle

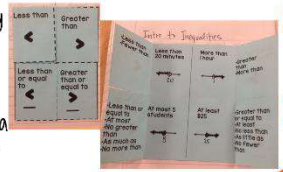


Math Dyal

Pick up these FREEBIES too!

Write and Graph Inequalities Foldable

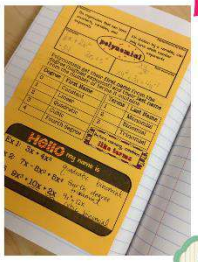
Compare key words for writing inequalities and practice graphing on a number line.



Math Dyal

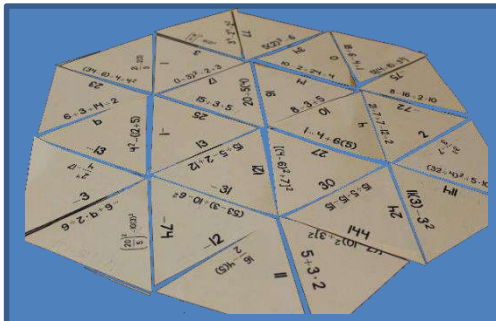
Polynomials Interactive Notes

Notes for introducing the vocabulary of polynomials.

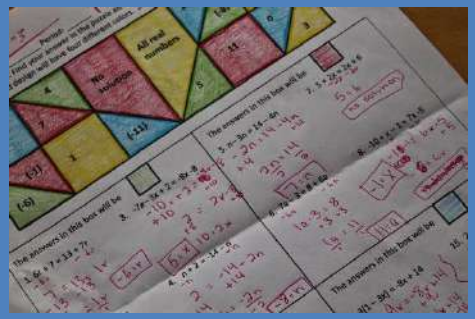


Math Dyal

Check out my TPT store for more fun :

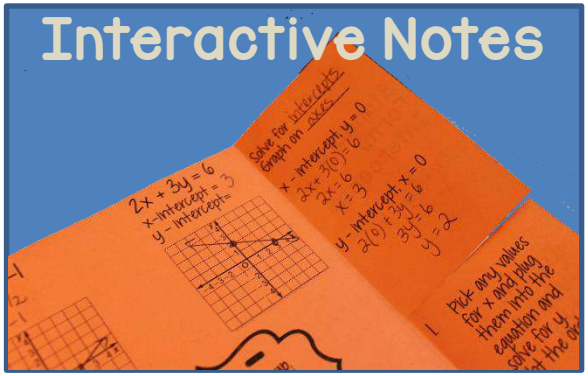


Hands on puzzles



Coloring Activities

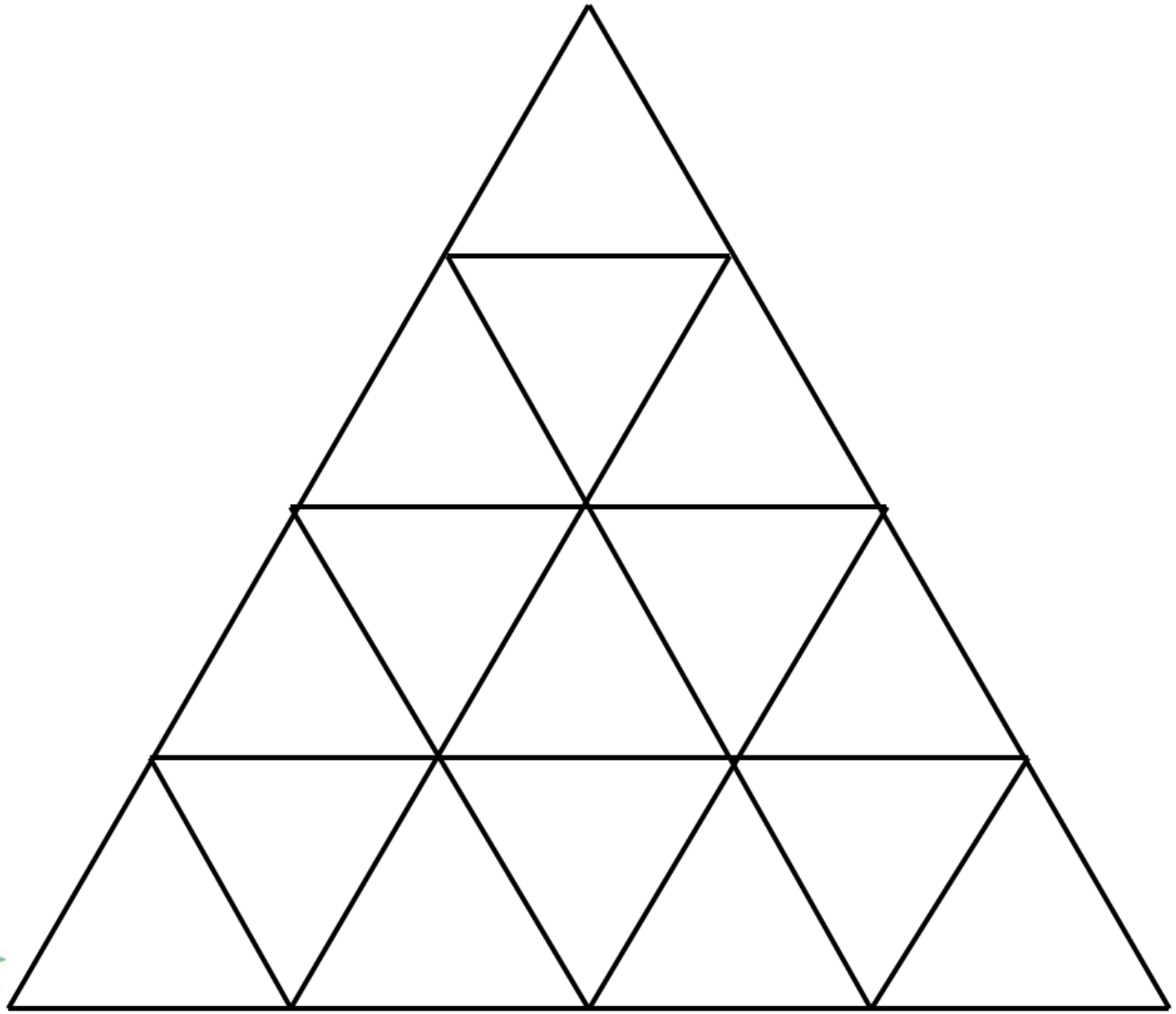
Interactive Notes



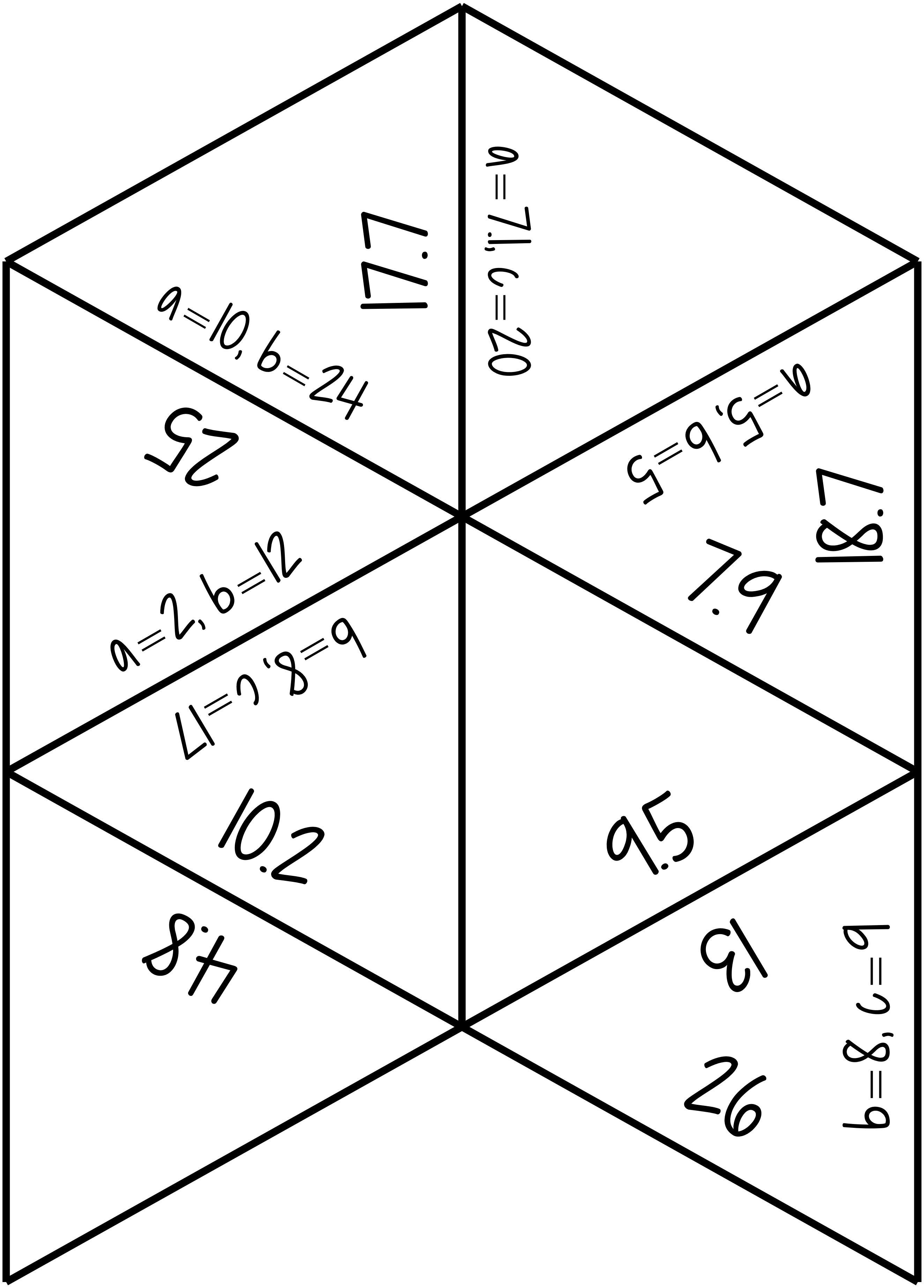
Teacher Tips

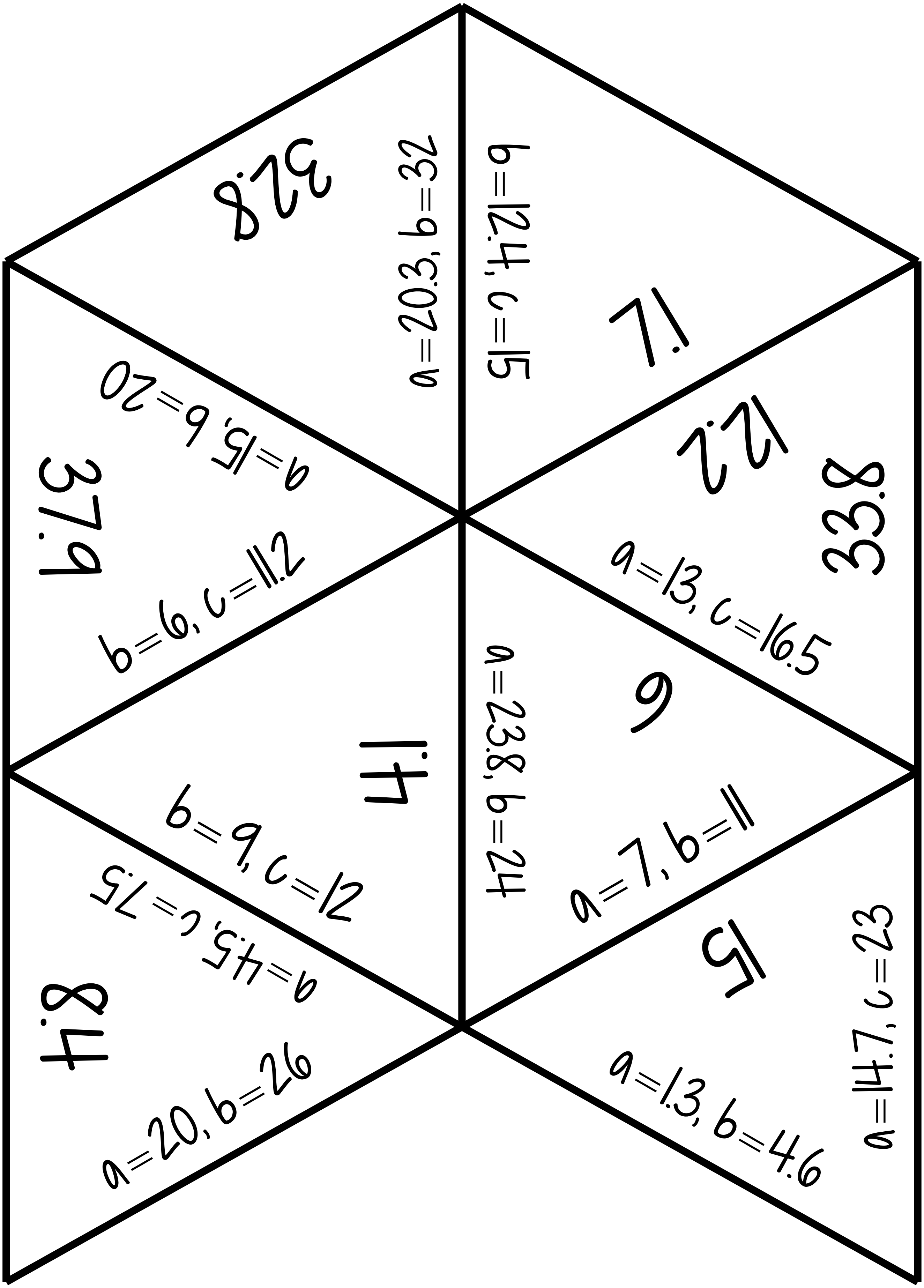
- The puzzle pieces are jumbled so you can have students cut them out without seeing the answers.
- I have also included a table of all the problems. I print this to easily check students' answers while I am circulating. I also cut off the answer column and give the problems to students who are absent.
- I display the "Finished Puzzle" while students are working so they can strategize.
- All answers are rounded to the nearest tenth.
- For more tips for using these puzzles, check out my blog post here

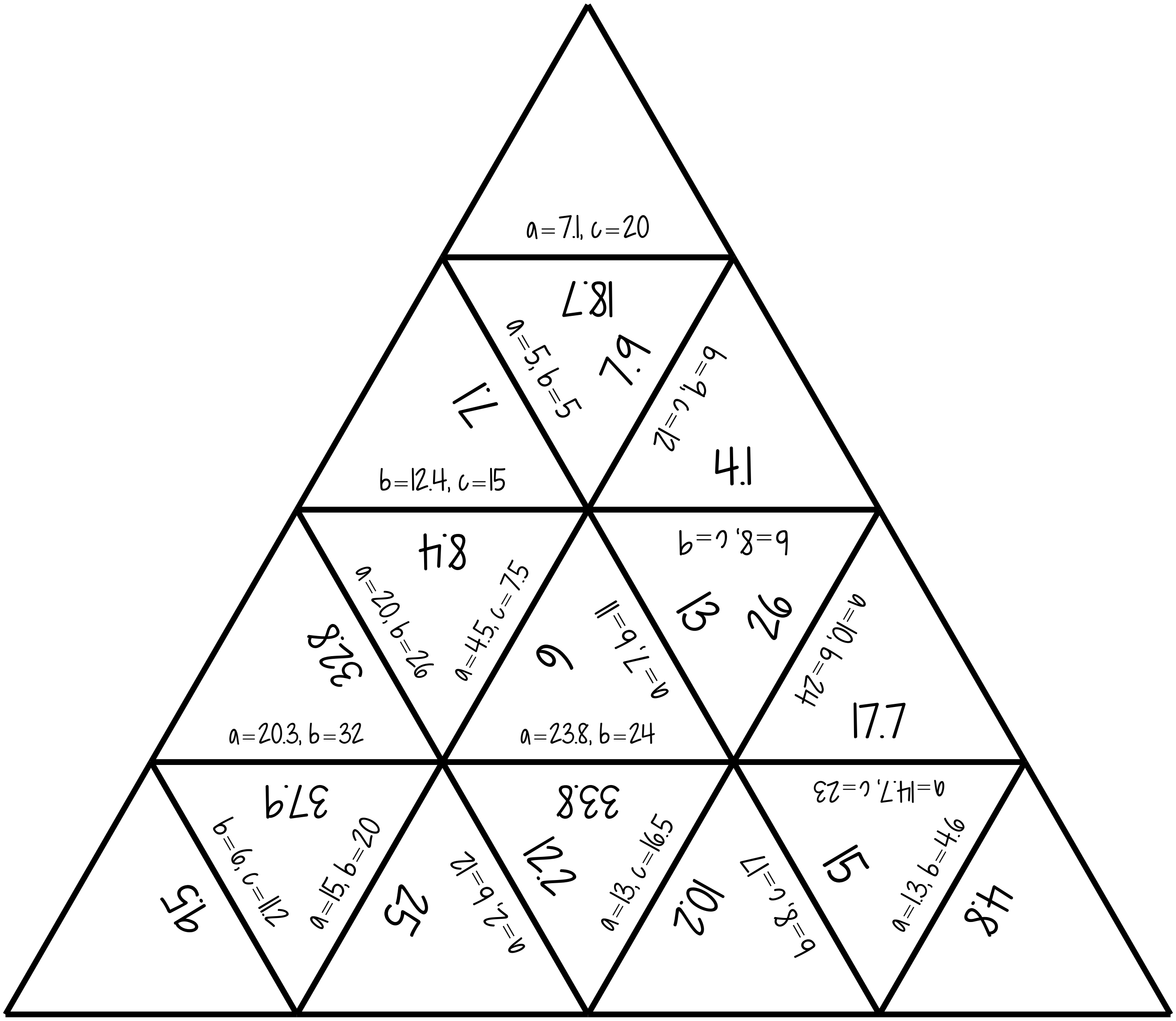
The Finished Puzzle



Math Dyal


17.7
a=7.1, c=20
a=10, b=24
25
a=5, b=5
18.7
7.9
a=2, b=12
b=8, c=17
10.2
9.5
4.8
13
b=8, c=9
26


32.8
a=20.3, b=32
b=12.4, c=15
7.1
a=15, b=20
37.9
b=6, c=11.2
12.2
33.8
a=13, c=16.5
6
14.1
a=23.8, b=24
b=9, c=12
a=7, b=11
15
a=14.7, c=23
a=4.5, c=7.5
8.4
a=20, b=26
a=1.3, b=4.6


a=7.1, c=20
18.7
a=5, b=5
7.9
7.1
b=9, c=12
4.1
b=12.4, c=15
8.14
b=8, c=9
a=20, b=26
a=4.5, c=7.5
32.8
9
a=7, b=11
13
26
a=10, b=24
17.7
a=20.3, b=32
a=23.8, b=24
37.9
33.8
a=14.7, c=23
b=6, c=11.2
a=15, b=20
9.5
25
a=2, b=12
12.2
a=13, c=16.5
10.2
b=8, c=17
15
a=13, b=4.6
4.8

$a=7.1, c=20$	18.7
$a=5, b=5$	7.1
$b=12.4, c=15$	8.4
$a=20, b=26$	32.8
$a=20.3, b=32$	37.9
$b=6, c=11.2$	9.5
$a=15, b=20$	25
$a=2, b=12$	12.2
$a=13, c=16.5$	10.2
$b=8, c=17$	15

$a=1.3, b=4.6$	4.8
$a=14.7, c=23$	17.7
$a=10, b=24$	26
$b=8, c=9$	4.1
$b=9, c=12$	7.9
$a=4.5, c=7.5$	6
$a=7, b=11$	13
$a=23.8, b=24$	33.8

Teacher Demo 5

Casting Shadows and Knowing Length and Angle / Activity

You will need:
Flashlight or light on stand
Ruler
Compass

Using an object cast a shadow.
Draw this model on the board.
Measure the length of the shadow
Tape a string from the top of the object to top of the shadow.
Using a compass measure the angle between the horizontal and string.

Ask the students how to find the height using right triangle trig.

Name: _____

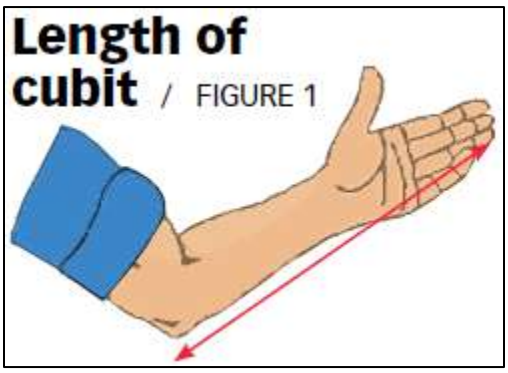
Right Traingle Trig. Real-World Problem

✞ *Trigonometry is often helpful in solving "real-world" problems. Many careers such as engineering, construction, structural design, architecture, crime scene investigation, electrician, forestry, etc. actually often use trigonometry to solve problems!* ☺

A firefighter needs to lean a ladder against a wall of a building to reach a window. How far away from the base of the building should he/she place the foot of the ladder?

Teacher Demo 6

Measuring Forearms



You will need:
Ruler

Create a table on the board and ask students to measure their forearms and write the data into the table.

Ask: What are the advantages and disadvantages of using a standard like this?

Advantage: Easy to visualize and use
Disadvantage: Everyone is different.

Teacher Demo 7

Position v. Time

You will need:
Tape Measure
Stop watch

Mark off 5 meters.
Try to duplicate the position v. time graph.

0-5s move 5 meters
5-10s do not move
10-12.5s move 5 meters

Ask others to try and attempt.

Teacher Demo 8

Lazy Scientists

The distance from Earth to the edge of our solar system is 9,000,000,000 miles.

Scientists are lazy and use Scientific Notation and Prefixes to abbreviate numbers.

Ask: How many zeros does this number have?

9

We can write 9,000,000,000 miles using base 10 and exponents.

Ask: What is 10^9?

1,000,000,000

Now all we need is a coefficient: 9.0

Therefore 9,000,000,000 can be abbreviated as:

$9.0 \ x \ 10^9$ miles

Teacher Demo 9

Accuracy and Precision

You will need:
Scale
Known masses

Measure a mass on a scale and compare it to its known mass.
Ask: How accurate was I?

Crumple up 5 pieces of paper and try to make it in the trash. Same throwing style and distance.
Ask: How precise was I?

Remember:

Accuracy refers to the closeness of a measured value to a standard or known value. For example, you obtain a mass of 3.2 kg for a given substance, but the actual or known mass is 10 kg, then your measurement is not accurate.

Precision refers to the closeness of two or more measurements to each other. Using the example above, if you measured the mass of a given substance five times, and get 3.2 kg each time, then your measurement is very precise. Precision is independent of accuracy.

Teacher Demo 10

Even Lazier Scientists

The distance from Earth to the edge of our solar system is 9,000,000,000 miles.

Scientists are lazy and use Scientific Notation and Prefixes to abbreviate numbers.

Ask: How many zeros does this number have?

9

We can write 9,000,000,000 miles using base 10 and exponents.

Ask: What is 10^9?

1,000,000,000

Now all we need is a coefficient: 9.0

Therefore 9,000,000,000 can be abbreviated as:

$9.0 \ x \ 10^9$ miles

How can 9,000,000,000 also be abbreviated?

9 million miles

Teacher Demo 11

Sig. Fig. Measuring

You will need:
Digital Caliper
Dial Caliper

Measure the thickness of something.
Ask: How precise are these?

Which is more precise?

Write down the numbers you get.

Which numbers are significant?

How does this help us write in scientific notation?

Teacher Demo 12

Ruler

Look at a ruler and a meter stick.

Ask: Which side are you more familiar with?

Inches (Imperial)
Centimeters (Metric)

Lay out a measuring tape and measure a student using inches and ask what they are in meters and cm.

What if I gave a measurement to you in meters and centimeters could you accurately tell me it's compliment in feet and inches without looking at a measuring tape?

We can do this by converting.

Teacher Demo 13

Unit Conversion

Write the following examples on the board and work through them as a class:

Conversions

1 hour = 3600 seconds	1 mile = 5280 feet	1 yard = 3 feet
1 day = 24 hours	1 meter = 3.28 feet	1 km = 0.62 miles
1 meter = 100 centimeters	1 lbs = 453.6 grams	1 kg = 1000 grams
1 quart = 0.946 liters	1 m/s = 2.2 miles/hour	1 foot = 12 inches
1 inch = 2.54 cm = 25.4 mm	1 km = 1000 meters	1 mile = 1609.34 meters

62 inches is how many feet?

60 kg is how many pounds?

2.2 miles/hour is how many meters/second?

Teacher Demo 14

Solving Variables

$$\Delta x = x_f - x_i$$

$$v_{avg} = \frac{\Delta x}{\Delta t}$$

$$a_{avg} = \frac{\Delta v}{\Delta t}$$

Discuss Δ and subscripts.

Work through solving for T (period):

$$f = \frac{1}{T}$$

Teacher Demo 15

Astronaut

Share your story on always wanting to be an astronaut.

ANSWERS

Page 4

MATCHING

Biology	Study of matter, energy, space and time.
Chemistry	Study of Earth.
Physics	Study of the interactions between elements and compounds
Earth Sciences	Study of the universe.
Space Sciences	Study of living organisms

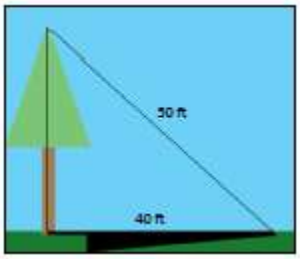
ANSWERS

Page 5

Example of a critical thinking skill used in your everyday life:

ANSWERS

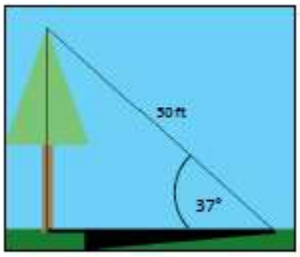
Page 8



Using the picture on the left, find the height of the tree.

ANSWERS

Page 9



Using the picture on the left, find the height of the tree.

ANSWERS

Page 11

Use the Position v. Time Graph to Create a Data Table:

Time (s)	Position (m)
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

From your starting position to 5s what is the distance that you traveled? _____

When were you not moving? _____

What is the total distance that you traveled? _____

Compare between your movement from 0 – 5s and 10 – 12.5s using evidence from the graph or table.

_____

_____

ANSWERS

Page 13

Compile a list of real-world examples where it is important that measurements be done accurately and precisely.

ANSWERS

Page 14

Scientific Notation Practice

1. The speed of light in a vacuum (no air) is 300,000,000 m/s. How can we write this value of speed of light in scientific notation?

2. The mass of the Earth is 5,970,000,000,000,000,000,000,000 kg. Write this value in scientific notation.

3. The constant of universal gravitation is found to be $0.00000000006673 \frac{N \cdot m^2}{kg^2}$. Write this value in scientific notation.

ANSWERS

Page 15

You may use your calculator.

Addition Practice:

1. $(9.81\ x\ 10^{3}) + (10\ x\ 10^{-5})$

2. $(9.81\ x\ 10^{3}) + (10\ x\ 10^{5})$

ANSWERS

Page 16

You may use your calculator.

Subtraction Practice:

1. $(9.81\ x\ 10^{-3}) - (10\ x\ 10^{-5})$

2. $(10\ x\ 10^{5}) - (9.81)$

ANSWERS

Page 17

You may use your calculator.

Multiplication Practice:

1. $(9.81 \; x \; 10^{5}) \bullet (10 \; x \; 10^{-5})$

2. $(10 \; x \; 10^{5}) \bullet (9.81 \; x \; 10^{23})$

ANSWERS

Page 18

You may use your calculator.

Division Practice:

1. $(9.81 \times 10^{5})/(10 \times 10^{-6})$

2. $(10 \times 10^{5})/(9.81 \times 10^{23})$

ANSWERS

Page 19

You may use your calculator.

Practice:

1. $\frac{(4\times10^{6})(5\times10^{-3})}{(8\times10^{-4})(5\times10^{3})}=$

2. $\frac{(4\times10^{6})(2\times10^{3})}{(8\times10^{-4})(2\times10^{4})}=$

ANSWERS

Page 20

Prefixes Practice

Write the following in scientific notation:
10 µg

Write the following using a prefix:
1,200 m

ANSWERS

Page 24

Significant Figures Practice

1. Determine the number of significant figures in each of the following:

a) 3427

b) 0.00456

c) 123,453

d) 172

e) 0.000984

f) 0.502

2. Calculate the following. Give the answer in correct scientific notation.

a) $\frac{3.95\times10^{2}}{1.5\times10^{6}}$

b) $\frac{1.05\times10^{-26}}{4.2\times10^{56}}$

c) $(3.5\times10^{2})(6.45\times10^{10})$

d) $(4.50\times10^{-12})(3.67\times10^{-12})$

ANSWERS

Page 28

Unit Conversion Practice

Conversions

1 hour = 3600 seconds	1 mile = 5280 feet	1 yard = 3 feet
1 day = 24 hours	1 meter = 3.28 feet	1 km = 0.62 miles
1 meter = 100 centimeters	1 lbs = 453.6 grams	1 kg = 1000 grams
1 quart = 0.946 liters	1 m/s = 2.2 miles/hour	1 foot = 12 inches
1 inch = 2.54 cm = 25.4 mm	1 km = 1000 meters	1 mile = 1609.34 meters

1. 565,900 seconds is how many seconds?

2. 17 years is how many minutes?

3. Convert 130 meters per second into miles per hour

4. Convert 721 lbs per week into kg per second

5. Convert 186,282 miles per second into meters per second

ANSWERS

Page 30

Practice Solving Variables:

Solve the following equation for Δv.

$$a_{avg} = \frac{\Delta v}{\Delta t}$$

Practice Solving Variables:

Solve the following equation for Δt.

$$a_{avg} = \frac{\Delta v}{\Delta t}$$

ANSWERS

Page 31

Practice Solving Variables:

Solve the following equation for t.

$v_f = v_i + a \bullet t$

ANSWERS

Page 34

Introduction to Physics Check for Understanding

1. In your own words, what is the definition of physics and why is it important?

2. In your own words, what is a real-world phenomenon? Give an example.

3. What type of unit would you give to a measurement of distance?

4. Solve the following

   Answer boxed and in scientific notation.

   a. $\dfrac{(5\times10^{6})(2\times10^{3})(3\times10^{3})}{(5\times10^{4})} =$

   b. $\dfrac{(4\times10^{6})(2\times10^{3})}{(8\times10^{-4})(2\times10^{4})} =$

ANSWERS

Page 35

Conversions		
1 hour = 3600 seconds	1 mile = 5280 feet	1 yard = 3 feet
1 meter = 3.28 feet	1 km = 0.62 miles	1 light second = 300,000,000 meters
1 kg = 2.2 lbs	1 lb = 0.45 kg	1 quart = 0.946 liters
1 m/s = 2.2 miles/hour	1 foot = 12 inches	1 inch = 2.54 cm = 25.4 mm

5. Write the following using prefixes. Box your answer.

a. 2×10^{3}

b. 2×10^{-3}

Prefix	Symbol	Multiplier
exa	E	10^{18}
peta	P	10^{15}
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
hecto	h	10^{2}
deka	da	10^{1}
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}

6. Convert the following:

Answer boxed and in scientific notation.

a. 100 yards into meters

b. 22,647 inches into miles

c. 2678 cm into feet

d. 1100 feet per second into miles per hour

e. 53 yards per hour into inches per week

f. 721 lbs per week into kg per second

ANSWERS

Page 36

7. Determine the number of significant figures in each of the following:

a. 3100.0×10^{2}

b. 0.0114×10^{4}

c. 107.2

d. 0.0000455

e. 2205.2

f. 30.0×10^{-2}

8. Calculate the following. Give the answer in correct scientific notation.

a. $\dfrac{4.44\times10^{7}}{2.25\times10^{5}}$

b. $\dfrac{6.022\times10^{23}}{3.011\times10^{-56}}$

c. $(2.5\times10^{9})(6.45\times10^{4})$

c. $(6.88\times10^{2})(3.45\times10^{-10})$

ANSWERS

Page 37

9. Solve the following equation for the variable v_x

$$\Delta x = v_x \bullet \Delta t$$

10. Solve the following equation for the variable a

$$v_f^2 = v_i^2 + 2 \bullet a \bullet \Delta x$$