

MATH and PHYSICS

ENERGY
A chain reaction is a process in which the **ENERGY** of one action sets off a **STATE** that moves the next object.

FORCE
 $F = ma$
Write the equation for force, and identify each variable.

MOTION
Who wrote the 3 laws of motion? Embellish his name below in creative lettering:
Newton >>>
An object remains either at rest or in straight, uniform motion unless acted on by a force.

PRISMS
Color code it!
What angles between the two branches of a "split" do you think can be successful? Guess and test angles that you think will work.

ANGLES
What angles between the two branches of a "split" do you think can be successful? Guess and test angles that you think will work.

DOMINO TOPPLES
How many dominos do you think the winning build in the show will end up needing to use? Tune-in to watch the action & find out!
Guess it!

SEQUENCES
 $a_n = a_1 + (n-1)d$
How tall could the sequence be?
12th domino is 4.8 (1.5")
 ≈ 45.25

GRAVITY
The -16 in the quadratic equation is based on the pull of gravity! Gravity pulls the projectile **back to earth** in a predictable way.

QUADRATICS
 $-16x^2 + 35x$
Plot points on the grid for each 0.25 sec. of time.

Time (sec)	Height (feet)
0	0
0.25	1.06
0.5	2.06
0.75	3.06
1.0	4.06
1.25	5.06
1.5	6.06
1.75	7.06
2.0	8.06
2.25	9.06
2.5	10.06
2.75	11.06
3.0	12.06

Geometric

GRAVITY
Down 16t² feet

DOODLE NOTES:

THE PHYSICS & MATH OF DOMINO TOPPLING



How to Use

This printable “doodle note” lesson is a wonderful supplement to FOX’s new competition reality show Domino Masters. We’ve partnered together to help you blend the fun of domino topples with some STEM content that integrates with physics and math.

Hosted by actor and comedian Eric Stonestreet, DOMINO MASTERS brings imagination and creative ingenuity to life when teams of domino enthusiasts go head-to-head in a toppling tournament to create mind-blowing masterpieces, with infinite possibilities and thousands of tiles and unique kinetic devices. Watch Domino Masters Wednesdays at 9/8c on FOX.

Print both printable sheets, or just choose one if only one of these fits the needs of your students. The first printable page (p.6 of this PDF) can be used by students as young as 5th grade, and the second (p.7 of this PDF) is perfect to add on for 7th-11th graders. Look over the content and print just the first sheet for younger students, or both pages if your class is ready for the next level concepts. (See skills below.)



Math and Physics Skills / Objectives Included:

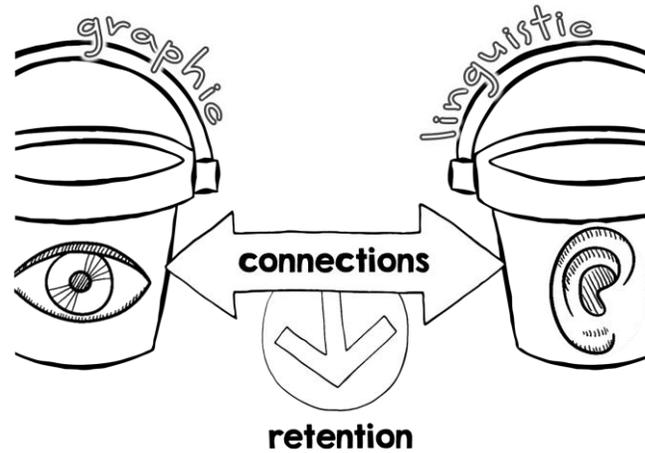
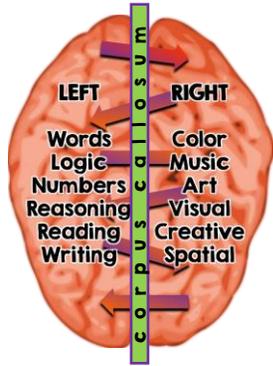
Page 1:
Force Equation $F = ma$
Newton's 1st Law of Motion
Drawing a Net for a 3d Figure
Finding Surface Area of a Rectangular Prism
Chain Reactions
Angle Classification

Page 2:
Using a Quadratic Equation
Graphing the Height of a Projectile
Force of Gravity
Introduction to a Geometric Sequence
Math Applications & Critical Thinking



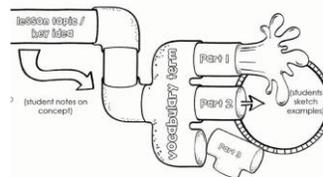
About Using the "Doodle Note" Method

The "doodle note" strategy activates both hemispheres of a student's brain at the same time. When a student engages in coloring, doodling, or artistic embellishment of their lesson material, the two sides of the brain work together! This leads to stronger focus and retention.



This guide to getting started, called "Doodle Notes Demystified," offers a simplified plan to starting teaching with doodle notes in your own classroom right away, without any confusion! (Click the images below to read through it and download the free schedule.)

It includes links to what you will need along the way, and breaks it down into simple baby steps, just offering what you need one day at a time.



Jump Right In and Start with Your Very Next Lesson Plan!

A Step-By-Step Simplified Guide

doodle notes™

increased focus



retention through dual coding



mental links



boost in problem solving skills



activated neural pathways



picture superiority effect



creativity & alertness



communication between brain hemispheres



Learn more at doodlenotes.org

doodling takes just enough

attention to keep the brain from daydreaming without allowing it to become distracted.

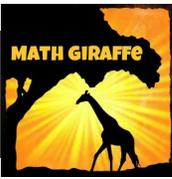
doodlenotes.org

the brain converts

BLENDS of visual information and linguistic information into long-term memory more easily.

Visual note-taking allows student brains to process and retain lesson material more effectively.

doodlenotes.org

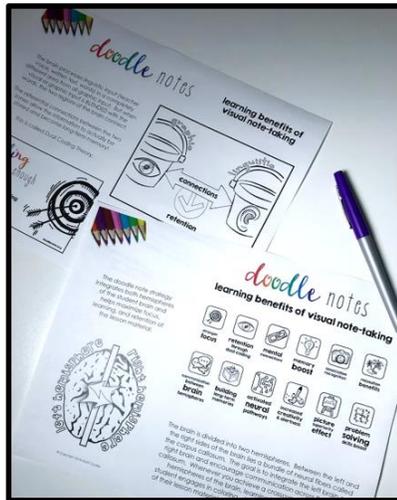


Free Support for Diving Deeper into Doodle Notes



Our “Quick Start” page at doodlenotes.org is another great place to gather some free downloads and information about teaching with visual notes.

1



Download your FREE informational presentation and handout.

This is great to share with parents, admin, and even students! It shows the brain processing and explains the learning benefits of visual note-taking.

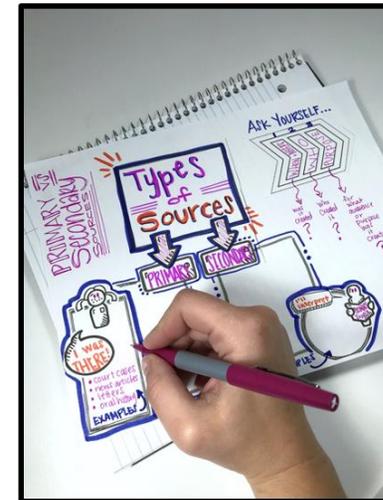
2



Download your FREE doodle note about visual note-taking.

Students can do this as their first doodle note set. They will learn how their brain processes graphic and linguistic information while they try it out themselves!

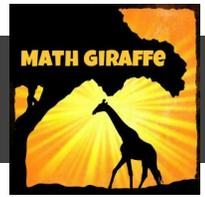
3



Read tips from teachers using visual notes in their classrooms.

Get started right away by downloading templates (or buying pre-made doodle note sets). Take advantage of the insights of teachers who have gone before you.

Terms of Use



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Clip Art & Font Credit



MATH *and* PHYSICS

A chain reaction is a process in which the _____ of one action sets off a _____ that moves the next object.

There must be initial to start it all off! (Identify what provides this for the domino setup shown below.)

Draw a net showing all the faces of a domino (using the same colors). Find the surface area of a domino with dimensions of 4.8 x 2.4 x 0.7 cm.

DRAW it

Color the faces of the prisms, using the same color for all congruent rectangles.

COLOR CODE it

PRISMS

FORCE

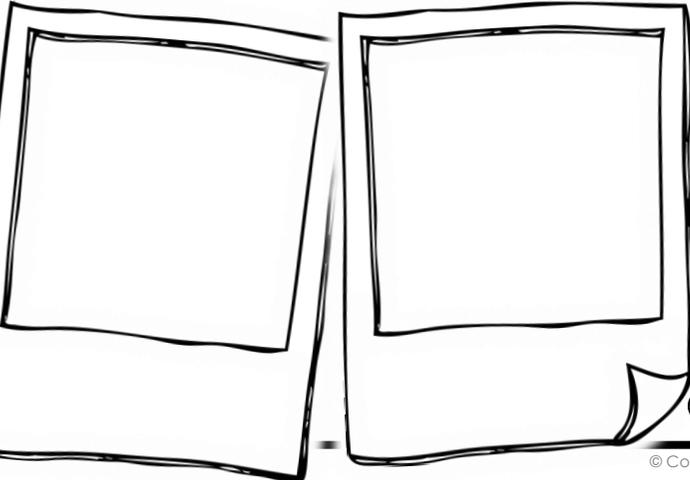
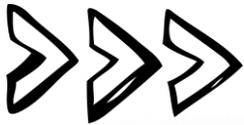
Write the equation for force, and identify each variable.

WRITE it

His first law of motion states that:

MOTION

Who wrote the 3 laws of motion? Embellish his name below in creative lettering:



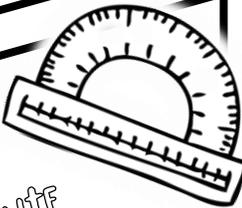
Draw two different examples of this law in action - one with a domino topple, and one with a situation of your choice.

SKETCH it

What angle between the two branches of a "split" do you think can be successful? Guess and test. Color the type(s) of angles that you think can work.

- Acute
- Obtuse
- Right

CHECK it



in DOMINO TOPPLES

How many dominos do you think the winning build in the show will end up needing to use? Tune-in to watch the action & find out!

DOMINO MASTERS

WEDNESDAYS 9/8c FOX



guess it



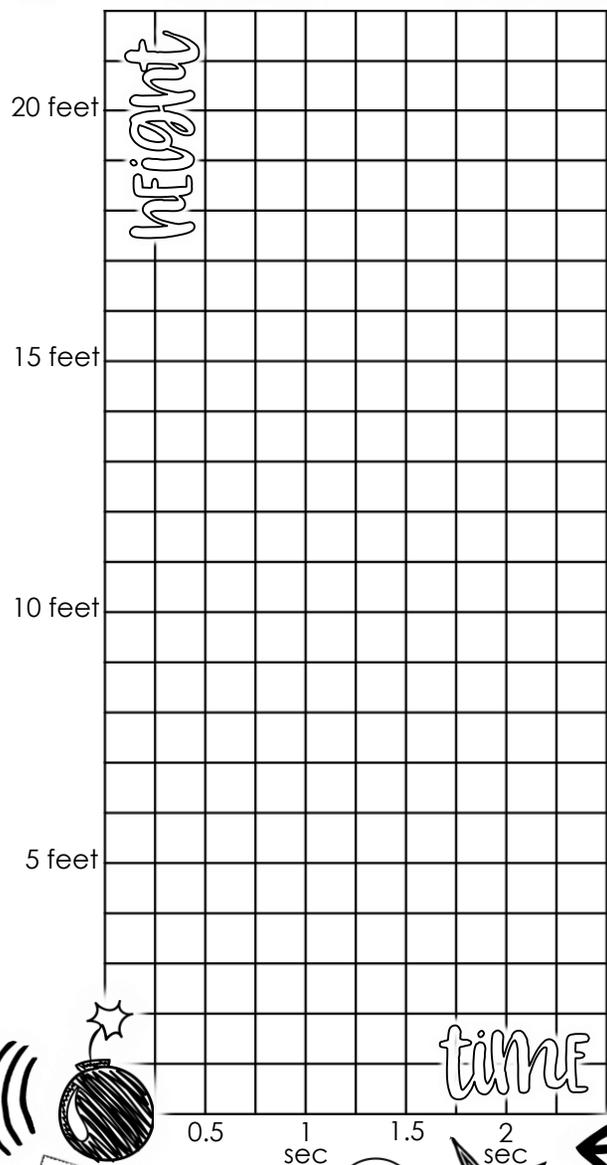
In some of the domino setups, a projectile is launched into the air. To calculate the height of the projectile, use a quadratic equation where x is the number of seconds of time, and y is the height of the projectile.

GRAPH IT

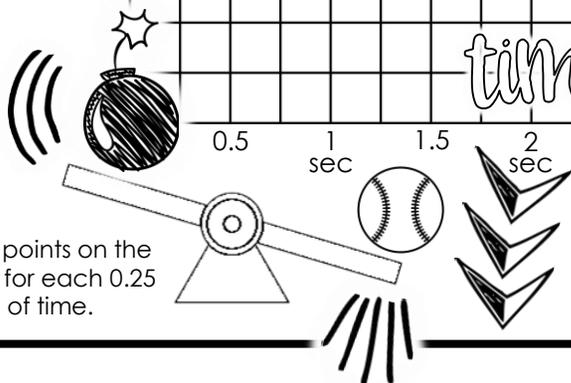
For the launch shown below, use:

QUADRATICS

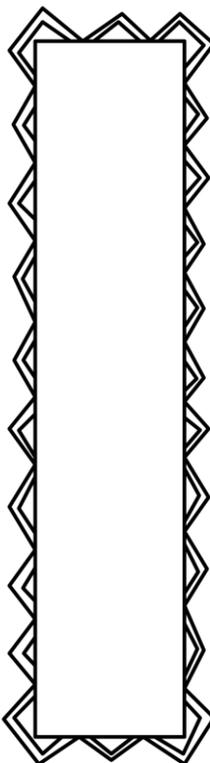
$$Y = -16X^2 + 35X$$



Plot points on the grid for each 0.25 sec. of time.



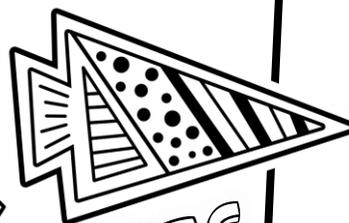
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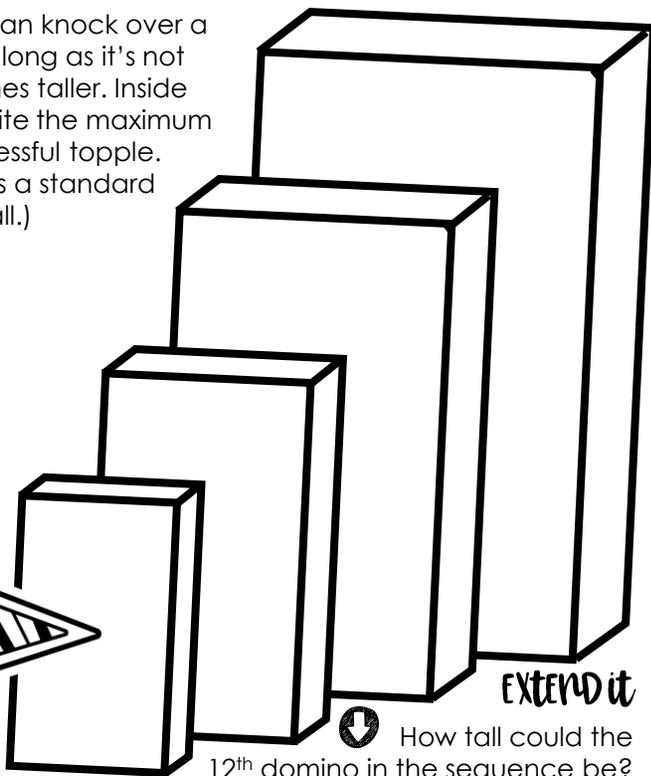
A small domino can knock over a larger domino as long as it's not more than 1.5 times taller. Inside each domino, write the maximum height for a successful topple. (Assume the first is a standard domino 4.8 cm tall.)

DEFINE IT

What type of sequence is this?



SEQUENCES



EXTEND IT

How tall could the 12th domino in the sequence be?

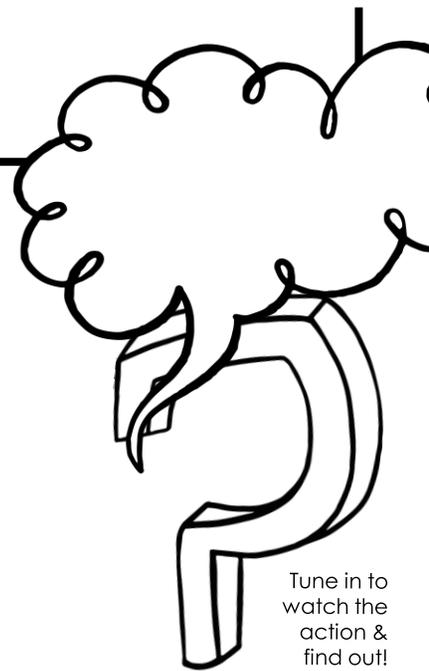
How else do you think **DOMINO MASTERS** contestants use math in the creation of their topples?



GRAVITY

The -16 in the quadratic equation is based on the pull of gravity! Gravity pulls the projectile

in a predictable way.



Tune in to watch the action & find out!



DOMINO MASTERS
WEDNESDAYS 9/8c FOX

Sample

MATH and

PHYSICS

A chain reaction is a process in which the energy of one action sets off a force that moves the next object.

There must be initial Momentum to start it all off! (Identify what provides this for the domino setup shown below.)

force = *mass* × *accel.*

FORCE

Write the equation for force, and identify each variable.

Write it

MOTION

Who wrote the 3 laws of motion? Embellish his name below in creative lettering:

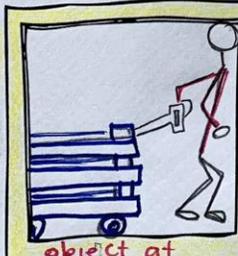
Newton >>>

An object remains either at rest or in straight, uniform motion unless acted on by a force.

His first law of motion states that:



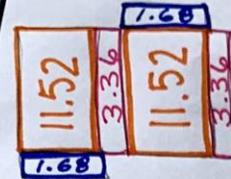
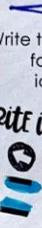
object in **MOTION** acted upon...



object at **REST** acted upon

Draw two different examples of this law in action - one with a domino topple, and one with a situation of your choice.

sketch it



Color the faces of the prisms, using the same color for all congruent rectangles.

COLOR CODE it

PRISMS

Draw a net showing all the faces of a domino (using the same colors). Find the surface area of a domino with dimensions of 4.8 x 2.4 x 0.7 cm.

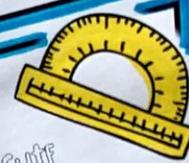
DRAW it
SURFACE area:
33.12 cm²

ANGLES

What angle between the two branches of a "split" do you think can be successful? Guess and test. Color the type(s) of angles that you think can work.

- Acute
- Obtuse
- Right

CHECK it



in DOMINO TOPPLES

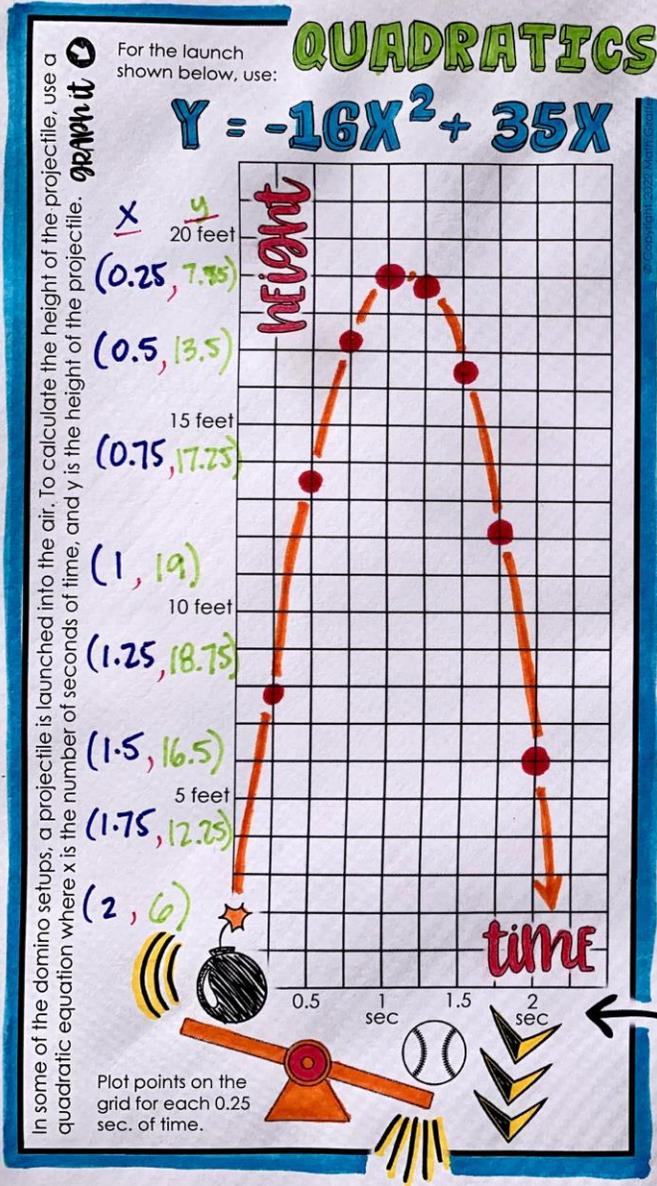
How many dominoes do you think the winning build in the show will end up needing to use? Tune-in to watch the action & find out!

DOMINO MASTERS

WEDNESDAYS 9/8c FOX

guess it 8,000

Sample



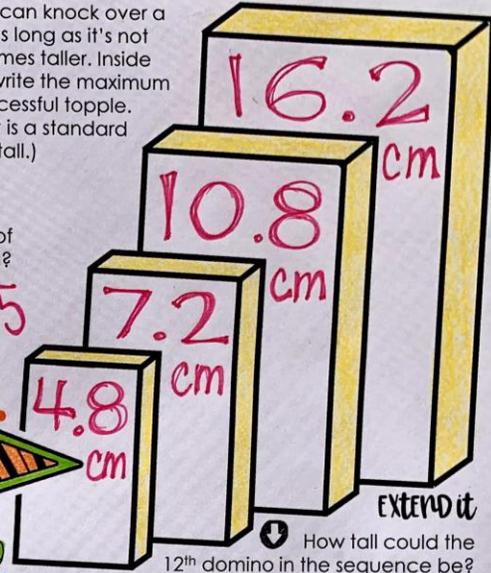
geometric

A small domino can knock over a larger domino as long as it's not more than 1.5 times taller. Inside each domino, write the maximum height for a successful topple. (Assume the first is a standard domino 4.8 cm tall.)

Define it

What type of sequence is this?

$\rightarrow \times 1.5$



Extend it

How tall could the 12th domino in the sequence be?

SEQUENCES

$$a_n = a_1 \cdot r^{n-1} \quad \parallel \quad a_{12} = 4.8(1.5^{11}) \approx 415.2 \text{ cm}$$

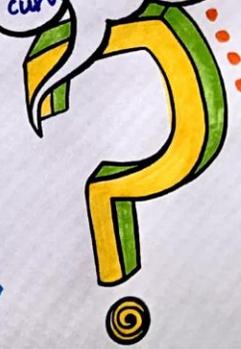
How else do you think **DOMINO MASTERS** contestants use math in the creation of their topples?

Estimating for # of dominoes, geometry for curves + angles

GRAVITY

The -16 in the quadratic equation is based on the pull of gravity! Gravity pulls the projectile back to earth in a predictable way.

DOWN $16t^2$ feet in t sec.



MATH and PHYSICS

A chain reaction is a process in which the energy of one action sets off a force that moves the next object.

$$F = M \cdot A$$

Force = mass · acceleration

FORCE

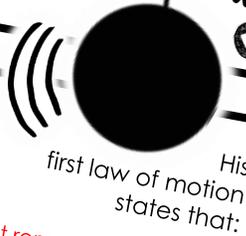


*Note: Point out that in this image, the swinging ball provides the initial momentum.

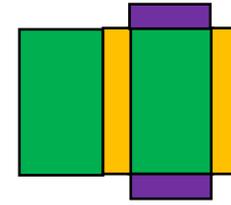
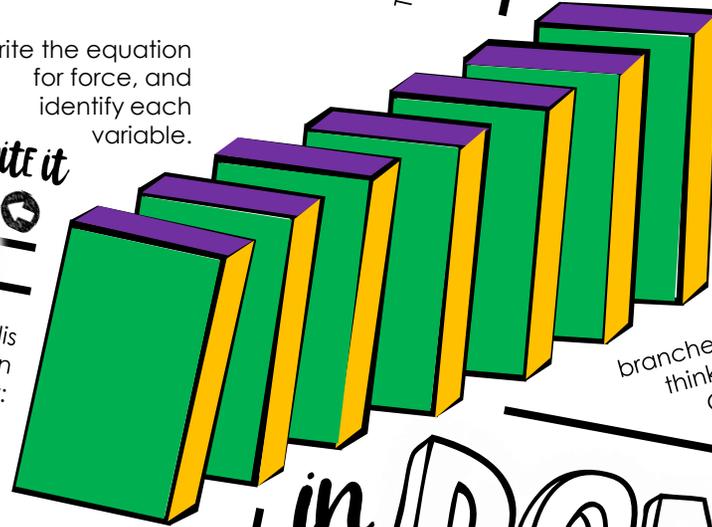
There must be initial momentum to start it all off! (Identify what provides this for the domino setup shown below.)

Write the equation for force, and identify each variable.

WRITE it



An object remains either at rest or in straight, uniform motion unless acted on by a force.



Draw a net showing all the faces of a domino (using the same colors). Find the surface area of a domino with dimensions of 4.8 x 2.4 x 0.7 cm.

*Note: Point out that there are two of each side, even if in the image we can only see one of each colored side with each dimensions. Model it with a rectangular prism in the room.

Color the faces of the prisms, using the same color for all congruent rectangles.

COLOR CODE it

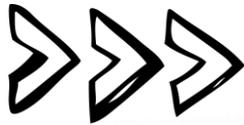
Surface Area: 33.12 cm²

PRISMS

MOTION

Who wrote the 3 laws of motion? Embellish his name below in creative lettering:

NEWTON



(Sketches will vary. Discuss how an object in motion can be stopped by a force, or change direction by a force, and how an object at rest can be moved by a force.)

(Sketches will vary. Discuss how an object in motion can be stopped by a force, or change direction by a force, and how an object at rest can be moved by a force.)

Draw two different examples of this law in action - one with a domino topple, and one with a situation of your choice.

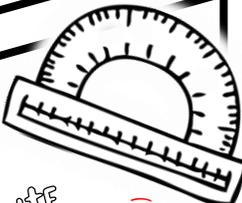
SKETCH it

What angle between the two branches of a "split" do you think can be successful? Guess and test. Color the type(s) of angles that you think can work.

- Acute
- Obtuse
- Right

(Guesses will vary.)

CHECK it



in DOMINO TOPPLES

How many dominoes do you think the winning build in the show will end up needing to use? Tune-in to watch the action & find out!



WEDNESDAYS 9/8c FOX



guess it

(Guesses will vary.)



In some of the domino setups, a projectile is launched into the air. To calculate the height of the projectile, use a quadratic equation where x is the number of seconds of time, and y is the height of the projectile.

GRAPH IT

For the launch shown below, use:

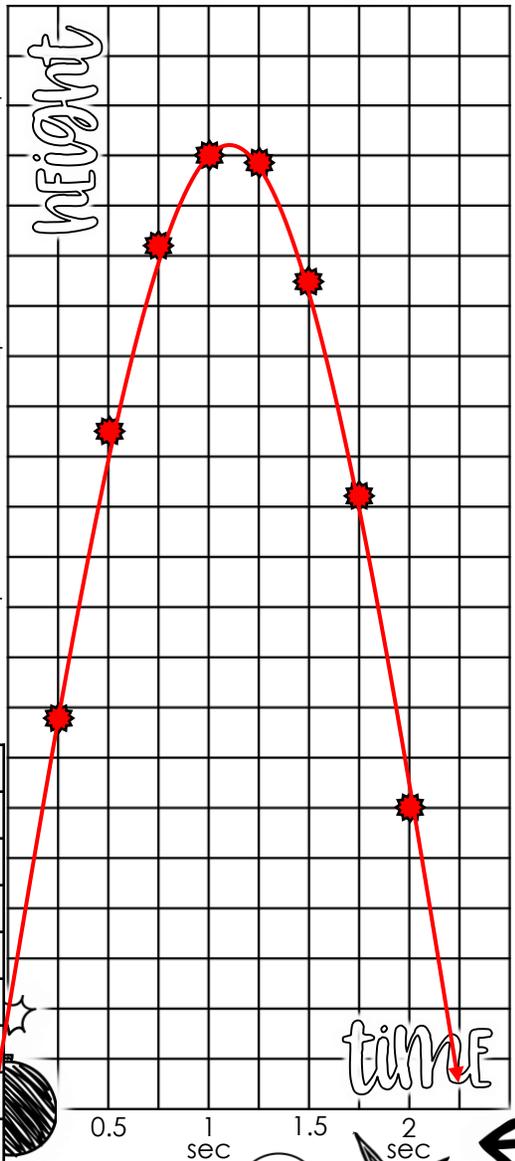
QUADRATICS

$$Y = -16X^2 + 35X$$

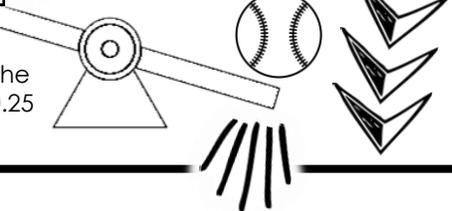
*Note: If students are not yet comfortable with quadratics, that's ok. Show how to replace "x" with each x value along the x-axis. Simplify using order of operations, then plot each (x, y) point on the grid. 10 feet

They can create a table like this:

x	y
0.25	7.75
0.5	13.5
0.75	17.25
1	19
1.25	18.75
1.5	16.5
1.75	12.25
2	6



Plot points on the grid for each 0.25 sec. of time.



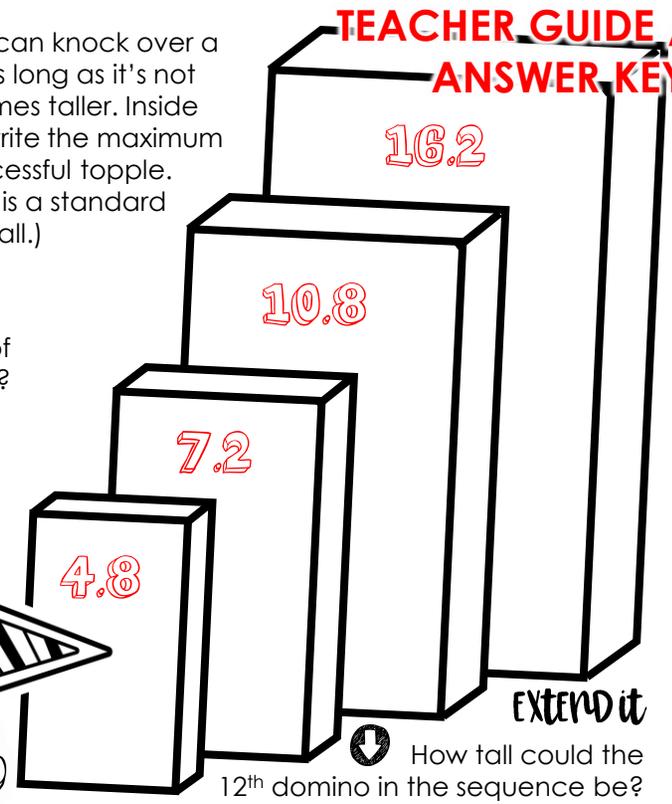
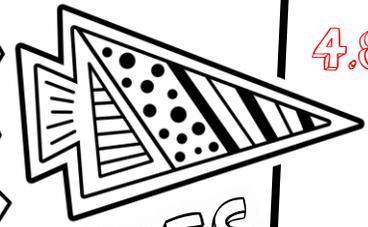
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GEOMETRIC

A small domino can knock over a larger domino as long as it's not more than 1.5 times taller. Inside each domino, write the maximum height for a successful topple. (Assume the first is a standard domino 4.8 cm tall.)

Define it

What type of sequence is this?



Extend it

How tall could the 12th domino in the sequence be?

SEQUENCES

~415.2 CM

*Note: This is a great introduction to geometric sequences if your students are not yet familiar with how sequences work. Start investigating further if you have time!

How else do you think **DOMINO MASTERS** contestants use math in the creation of their topples?

(Student answers will vary. Discuss.)

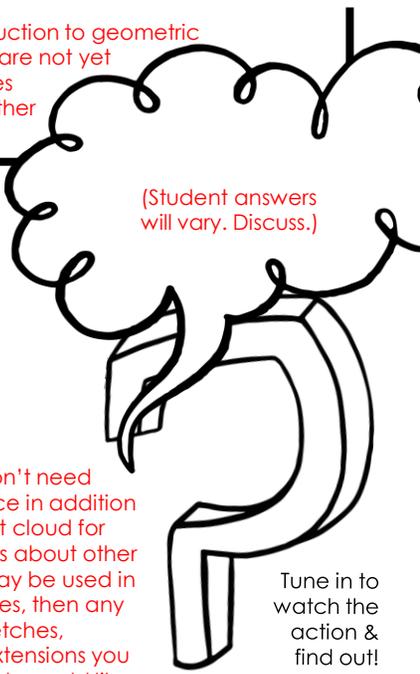


GRAVITY



The -16 in the quadratic equation is based on the pull of gravity! Gravity pulls the projectile **back to earth** in a predictable way.

(If students don't need this extra space in addition to the thought cloud for more thoughts about other ways math may be used in domino topples, then any additional sketches, doodles, or extensions you or your students would like to include can go here.)



Tune in to watch the action & find out!



More Creative Math

If you enjoy this creative approach, be sure to visit mathgiraffe.com for tons of ideas and printables, as well as a free toolkit for teaching math more creatively!

