



## *The Adventures of the Open Dream Ensemble: Pythagoras Study Guide*

by Rebecca Nussbaum

*Open Dream Ensemble is a project of the Thomas S. Kenan Institute for the Arts, whose mission is to incubate projects that sustain artists at every point in their creative development through strategic partnerships that capitalize on visionary thinking in the arts.*



Dear Educator,

This study guide provides suggestions for classroom activities and lessons that connect to the second season of our original web series, *The Adventures of the Open Dream Ensemble: Pythagoras*. It includes biographical information about Pythagoras, fun ways to explore basic geometry, and more! It is our hope that the web series and study guide can be a useful supplement to classroom instruction.

Open Dream Ensemble is comprised of professional actors, dancers, and musicians trained at the University of North Carolina School of the Arts. Together we create and perform original musical theater productions for youth and carry out arts-integrated residencies that connect to the standard curriculum.

For more information about Open Dream Ensemble and the work we do, please visit our website: <http://opendreamensemble.com/index.html>

We hope this guide is helpful for you and that you enjoy our web series!

Rebecca Nussbaum  
General Manager, Open Dream Ensemble

### List of Characters

**Professor Poople** – a scientist and the mission leader of the Open Dream Ensemble.

**Dr. Disrupto** – an evil scientist who wants to control all knowledge and thereby take over the world.

**Pythagoras** – one of the greatest and most influential thinkers of ancient Greece.

**Julianne, Adrian, Danielle, Marissa, William, Ulung, and Guy** – members of Open Dream Ensemble whose mission it is to make sure the great discoveries in math and science happen!

### Episode Index

Episode 1 – Introduction to characters and setting, exploring different types of triangles.

Episode 2 – Pythagoras as a philosopher (or “lover of wisdom”), travel to Croton Island and shape song outlining triangles through octagons.

Episode 3 – A deeper look at quadrilaterals.

Episode 4 – Time machine “clangulators” are used to discover how pitch, size, and sound waves are related. It is uncovered that Adrian is working for Dr. Disrupto and the cast is stuck on Croton island.

Episode 5 – Pythagoras travels to Dr. Disrupto in a dream and takes him on a trip to his childhood to see how important shapes are to learning and the world. “*Hey, Hey, What Do I Know*” shape song.

Episode 6 – Pythagorean Theorem, the importance of friendship and the need to keep pursuing wisdom and knowledge.

## Pythagoras Biography

While most of what is known about Pythagoras was written centuries after his death, it is widely believed that he was born around 569 B.C. in Samos, Greece and died around 475 B.C. He was well educated in reading, geometry, ethics, music, and the natural sciences. He played the lyre, a harp-like string instrument popular throughout ancient Greece. He traveled to Italy, Egypt, Babylon (now Iraq), and Crete. Mostly, he was known as a skilled mathematician, religious leader, and philosopher. Around 520 BC, Pythagoras founded a school in Croton. This school included instruction in mathematics, astronomy and religion.

Many of Pythagoras's observations and realizations were important. He is acknowledged as a leading mathematician and astronomer of his day, and is often credited with comprehending that musical pitches are related through ratios. And while the Pythagorean theorem was recognized before Pythagoras's lifetime, it is possible that Pythagoras was the first person to prove the theorem.

Given that Pythagoras lived 2500 years ago and very little information about him remains, is impossible to know him well. However, we do know that Pythagoras called himself a "lover of wisdom" (a philosopher), was a teacher, and founded a religion called Pythagoreanism. Some of his religious beliefs can be found in *The Golden Verses of Pythagoras*. These verses include the need for good behavior, self-respect, respect for others, importance of friendship and patience, and the need to avoid greed, laziness, and meanness.

There were a number of rumors about Pythagoras that circulated during his lifetime, including that Apollo was his father, that he had a thigh of gold, that he could be in multiple places at the same time, that he had magical powers, and that he could talk with plants and animals.

Although we may not know a lot about Pythagoras, it is clear that he was an important figure in Ancient Greece. His thoughts and discoveries helped shape other great thinkers and have influenced the way we think and live today.

## Activities

1. **A. Quilt squares** – have students cut equilateral triangles out of multiple colors of construction paper (or provide students with already cut triangles if necessary). These should be about three inches long / tall / wide. Give the students a 9 or 12-inch square sheet of paper and let them explore how the triangles fit together and what other shapes can be made of these triangles. When they create a pattern they like, have them glue the triangles on the large square of paper. Hang the artwork and lead students in an observation of what they see and how the triangles interact with other triangles on the paper. This project can be modified for other types of triangles and all shapes.
2. **B. Quilt Squares** – give students an option of a few standard quilt patterns such as tumbling blocks, log cabin, snow crystals, railroad and maple leaf. Have them figure out what shapes are used and how. Then have them draw and cut out the shapes from construction paper (or have the pieces already cut out for the students to piece together). They can then create the quilt pattern by gluing the pieces on a piece of paper.
3. **Web Weaving** – divide students into groups of 5 – 8. Give each group a ball of yarn. Working as a team, the students need to weave a web (one student could be a “spider” and the others points that the web connects to). Have each group make a web with the yarn that includes triangles, quadrilaterals, pentagons, hexagons, heptagons, and octagons. Challenge them to see how many shapes they can create.
4. **Outdoor Exploration** – have each student bring pencil and paper to a location out of doors. Have them look around and spot various shapes. They should list and / or draw the shapes. Share out. Discuss how shapes are present everywhere.
5. **Art Shapes** – Pass out copies of artworks such as: Piet Mondrian’s *Broadway Boogie*, Pablo Picasso’s *Three Musicians* and *Jacqueline Seated*, Georges Braque’s *Houses at L’Estaque*, Edward Hopper’s *The Circle Theater*, Lee Krasner’s *Painting No. 19*, and Joan Miro’s *Dutch Interiors I*. Have students work alone or in small groups and outline shapes they see in the artwork. Share out discoveries.
6. **Disappearing Shapes** – Dr. Disrupto is making shapes disappear one by one. How would our world change if this really happened? Have students work in small groups and discuss what would happen if triangles, quadrilaterals and circles disappeared. Have them create a short skit and share.
7. **Time Travel** – Working in groups, have students research a scientific discovery. In addition to finding out about the discovery, make sure they discuss when, why and how this discovery happened? What would it be like to be present when it happened? What would the world be like without it? Have them create and perform a skit about time traveling and seeing some great minds at work.
8. **Sound and Size** – Working in groups or individually, have students explore how things sound when struck, tapped, shaken, rubbed. etc. This exploration can happen with found objects, nature objects, or classroom objects. Have students record their observations and share. See if they can make a connection between the size of the objects and the sound waves produced.

## Word Find

Find the following list of words in the letter jumble below.

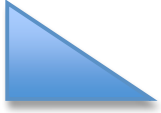
SQUARE      ANGLE      HEXAGON      HEPTAGON      OBTUSE

ACUTE      THEOREM      SHAPE      RIGHT      POOPLE

DISRUPTO      PHILOSOPHER      PYTHAGORAS

A	B	S	J	P	E	G	H	X	T
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T	B	U	R	O	A	O	P	E	R
P	M	A	Y	P	R	T	L	P	E
U	S	R	Y	L	S	I	O	T	H
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S	A	R	O	G	A	H	T	Y	P

## NAME the SHAPE



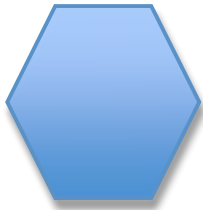
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2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_



5. \_\_\_\_\_



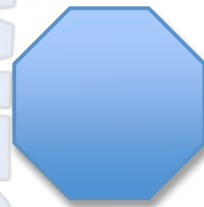
6. \_\_\_\_\_



7. \_\_\_\_\_



8. \_\_\_\_\_



9. \_\_\_\_\_

Octagon – an eight-sided shape.

Hexagon – a six-sided shape.

Scalene triangle – a triangle with all three sides are of differing length.

Trapezoid – a quadrilateral with one pair of parallel sides

Parallelogram – quadrilateral with both pairs of opposite sides parallel.

Pentagon – a five-sided shape.

Parallel lines – a set of lines that are an equal distance apart at all times.

Isosceles triangle – a triangle with two sides of the same length.

Circle – a curve that is always the same distance from the center.

## Bibliography

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