

# The Antikythera Mechanism:

An Ancient Computer and Underwater Archaeology

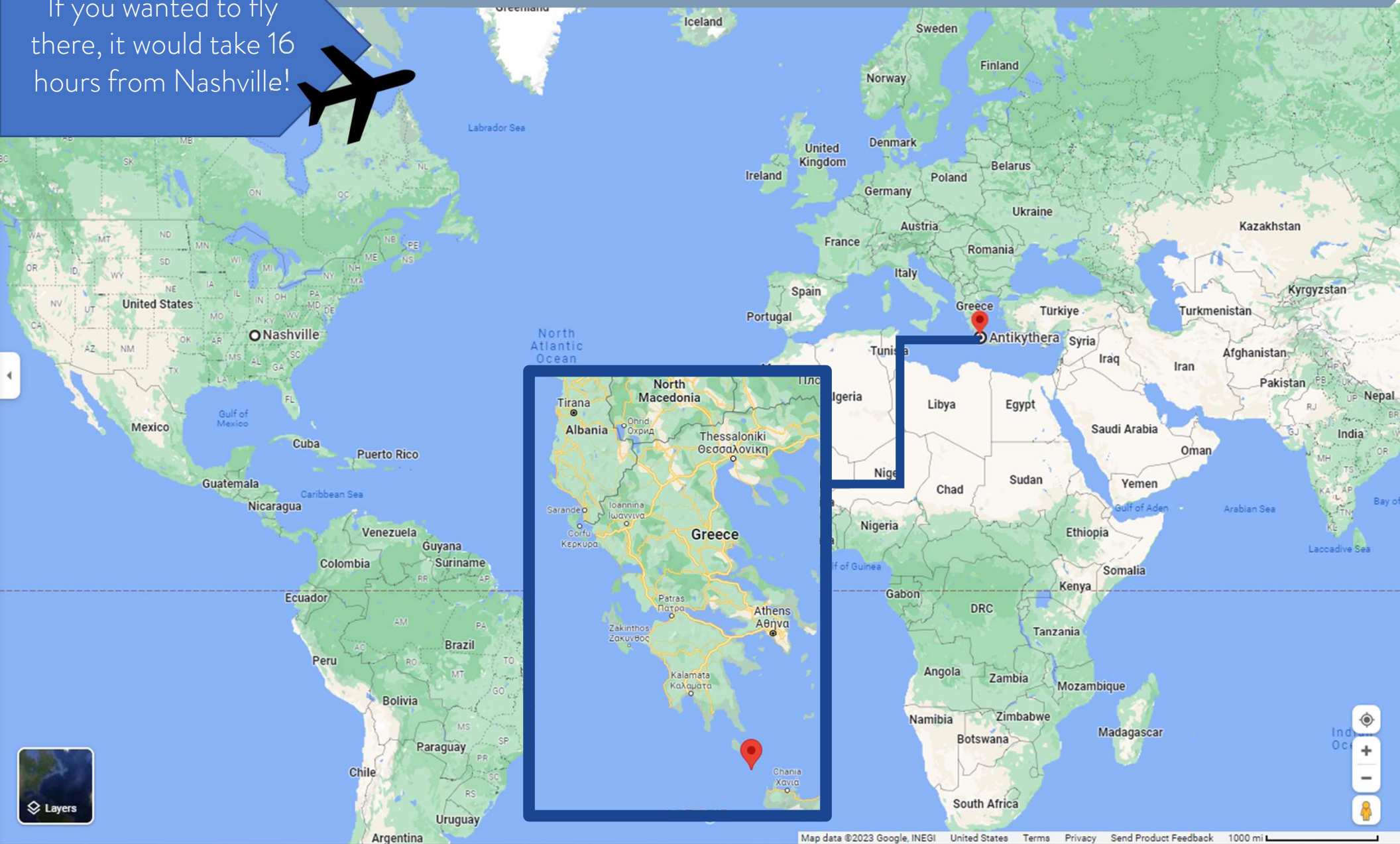
*Kaitly Hinson*

*Education & Curatorial Assistant, Nashville Parthenon*



# The island of Antikythera is located in the Mediterranean Sea off the coast of Greece. That is about 5,700 miles away from the Nashville Parthenon!

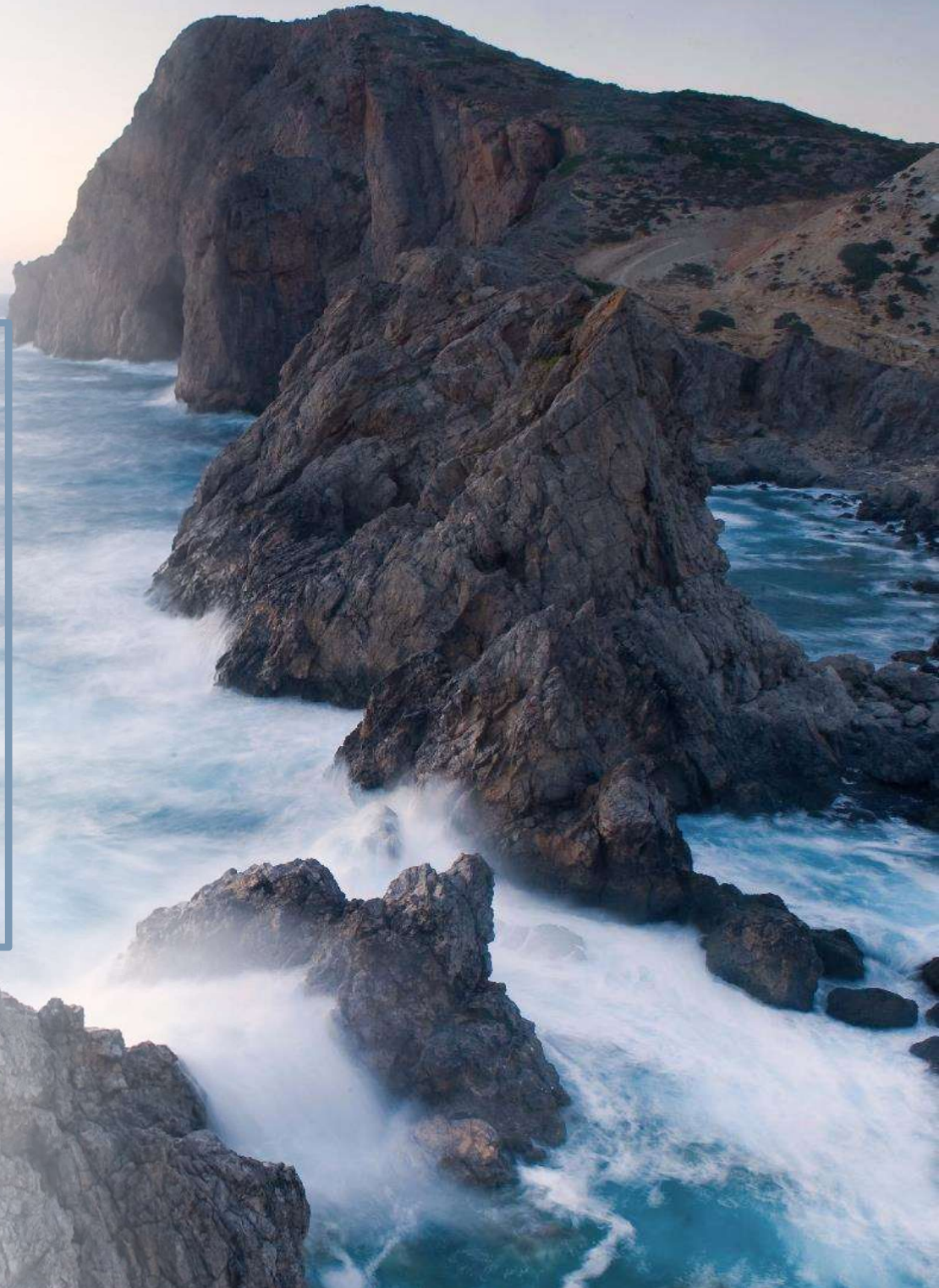
If you wanted to fly there, it would take 16 hours from Nashville!



**This is the rocky coast off  
of the island Antikythera.**

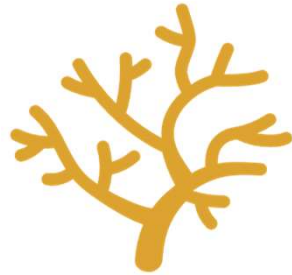
Around 65 BCE, a Greek cargo  
ship sailing towards Rome  
encountered a terrible storm  
here.

The ship was so heavy from the  
treasures that it sank less than  
one hundred meters off of the  
shore of this small island.





In 1900, 2 sponge divers were exploring the coast off of the island. They dove 60 meters below the surface and saw what looked like bodies of men, women and horses from a shipwreck.



The captain, Dimitrios Kontos decided to dive into the clear blue water to see for himself. Once he got close, he realized that what the other divers saw was a trove of marble and bronze statues!

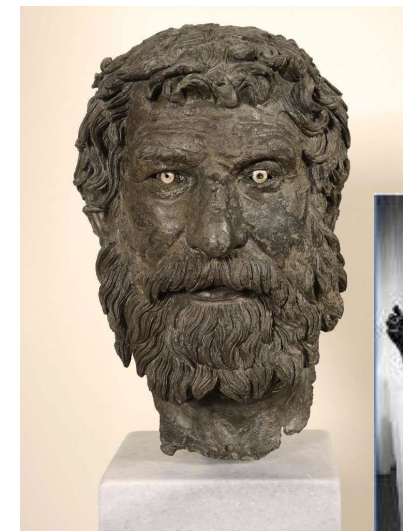


# What was on the ship?



Salvaged by the Antikythera Youth statue, from the exhibited at the Museum of Athens.

Reassembled from two-meter tall still considered the prize nicknamed The Antikythera Youth by Hermes, Apollo, head of the Medici.



Archaeologists found hundreds of artifacts from the shipwreck. Including coins, pottery, even bronzes named *The Antikythera Youth* and another nick-named *The Philosopher*.

# What happened to the objects in the water?

This statue of a boy is from the early first century BCE and was on the ship. One side of him was buried in the dirt of the ocean floor and the other half was not.

The side that was buried looks different because it was protected from the damage that sea creatures caused to the other side.



**This Side Was Buried**

**This Side Was Not**



**This was also found on the shipwreck.**

What is this?

What was it used for?



What is it made of?



# Fragment A

This set of corroded bronze gears became known as Fragment A. It was later named the Antikythera Mechanism.

There were also inscriptions written on some fragments in Ancient Greek. In 1903, the first study of this was published by a scholar named John Svoronos who was an expert in ancient languages. He found this to be part of an astrolabe- a tool that could track the sun and stars in the sky.





# Antikythera Mechanism

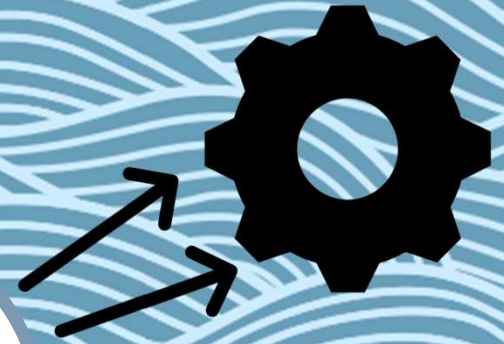


In the 1920s, Admiral Theofanidis started studying the Antikythera Mechanism and thought that it was used for sea navigation.

These notches are called teeth.

Depending on the size and number of teeth, gears can turn at different rates.

Scientists saw that it was made of up gears, like this one. Where have you seen gears before?





Dr. Derek Price studied the mechanism beginning in the 1950s.

VOL. 64, PT. 7, 1974]

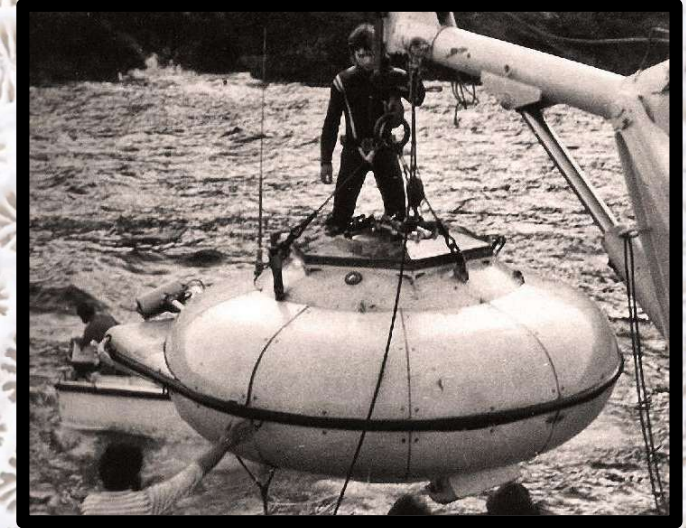
# Studying the Antikythera Mechanism

In 1971, he was able to work with a radiologist to get the first x-rays of the mechanism. He was able to see 27 gears. The x-ray also allowed him to start counting the number of teeth on the gears. Knowing how many teeth on the gears helped him know what math formulas the mechanism was using in its “computing”.



# Underwater Archaeology

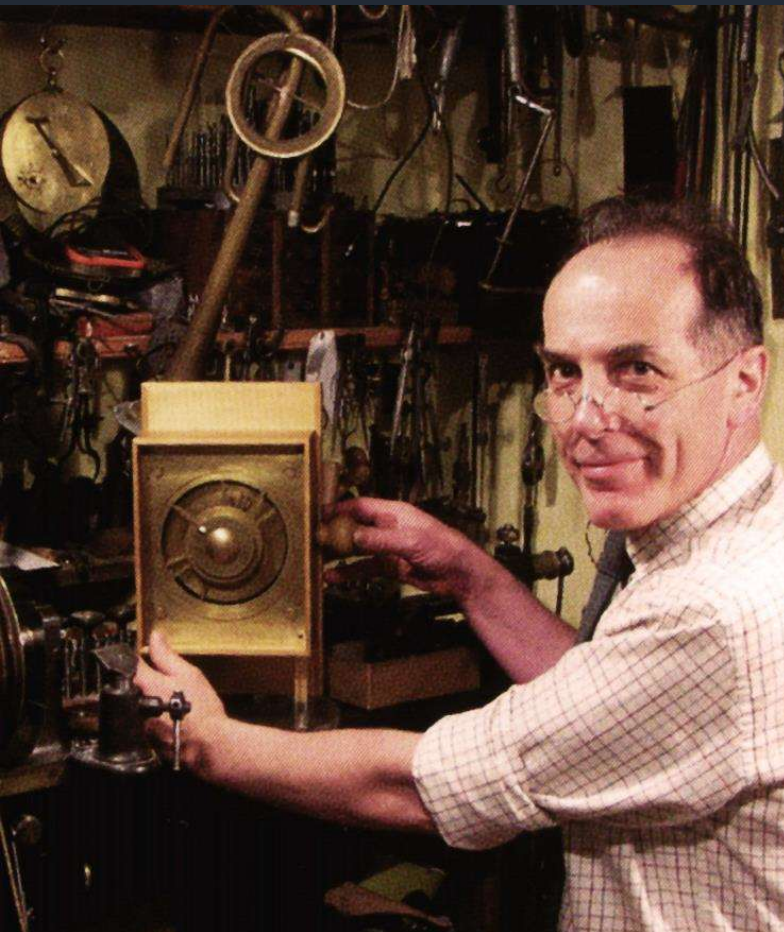
Underwater archaeologists dive underwater in special diving suits. They can dive for certain amounts of time before they need to come back up to the surface to refill their oxygen tanks. Diving underwater can also only be done at certain times of the years and at certain parts of the day because of water temperatures, tides, and light levels.



Jacques Cousteau, a famous ocean explorer and videographer, revisited the Antikythera site in the 1950s and 1970s. With his team, they discovered more artifacts for the National Museum of Archaeology in Athens.

By using the CT and x-ray models, scientists can make model of what the mechanism might have looked like.

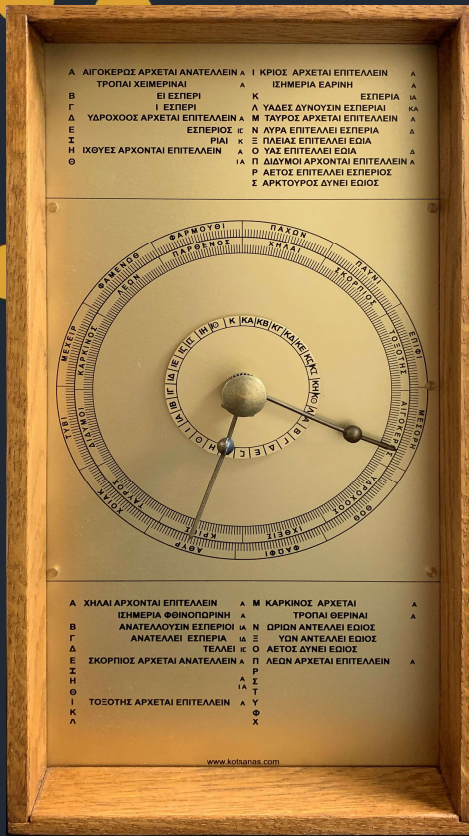
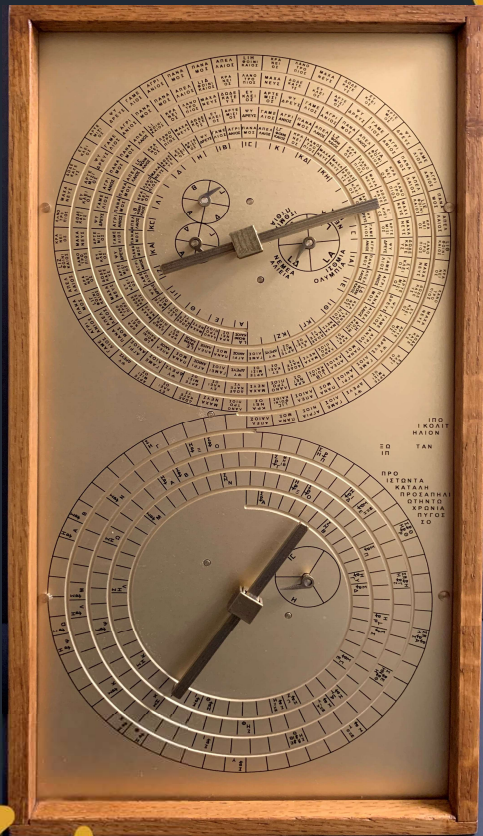
This is a picture from a CT scan of the Antikythera Mechanism



## X-ray vs CT scans

Michael Wright made the first 3-D x-ray model of the Antikythera Mechanism. With new images, he was able to build off of Price's model. He corrected gear teeth counts and was able to connect those numbers to lunar and other planetary numbers. Later scientists were able to use CT scans to see even more details.

# New Model



This model was made by Kostas Kotsanas. He was able to use CT scans to work off of. A model is on display at the Nashville Parthenon!

# Underwater Archaeology Activity



This activity walks students through the process that underwater archaeologists go through to grid and catalog what they find. The gridding process helps them know where objects were found and make a map of the artifacts they find.



Name: \_\_\_\_\_

## Map It Out

Work together to search for underwater artifacts and record their location below.

	A	B	C	D	
1					1
2					2
3					3
4					4
	A	B	C	D	



Try it at home

# At Home Underwater Archaeology

- Use 9 or 16 cups to make a grid (you can also use bowls)
- Hide small artifacts in some cups or all!
  - You can use coins, rocks, or anything that fits in cup
- Fill the cups with paper scraps (blue if possible)
- Use Map-it-Out printable page to keep track of where objects are found



Artifacts!



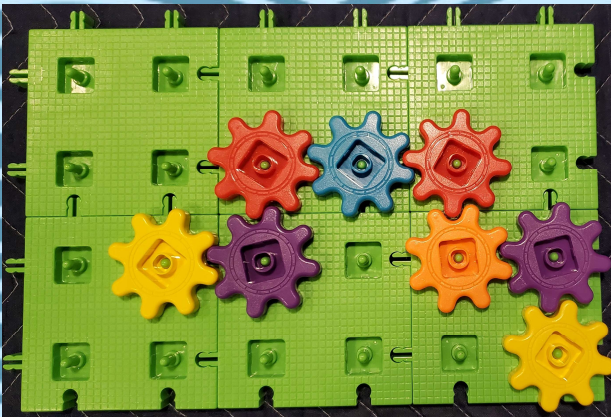
# Programming: Gear Activity

This program walks students through the basics of how gears work. Through this, they can picture the Antikythera Mechanism's inner workings. They can use gears to create their own "computers"!

**Gear challenge- Easy:**  
Make a horizontal path of gears that spin.

**Gear Challenge-  
Medium:**  
Make a vertical path of gears that spin.

**Gear Challenge-  
Hard:**  
Make a combination of vertical and horizontal gears that spin.

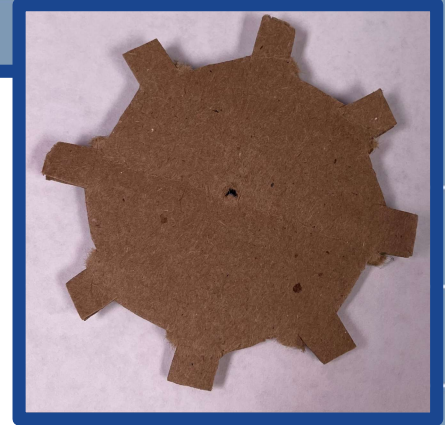




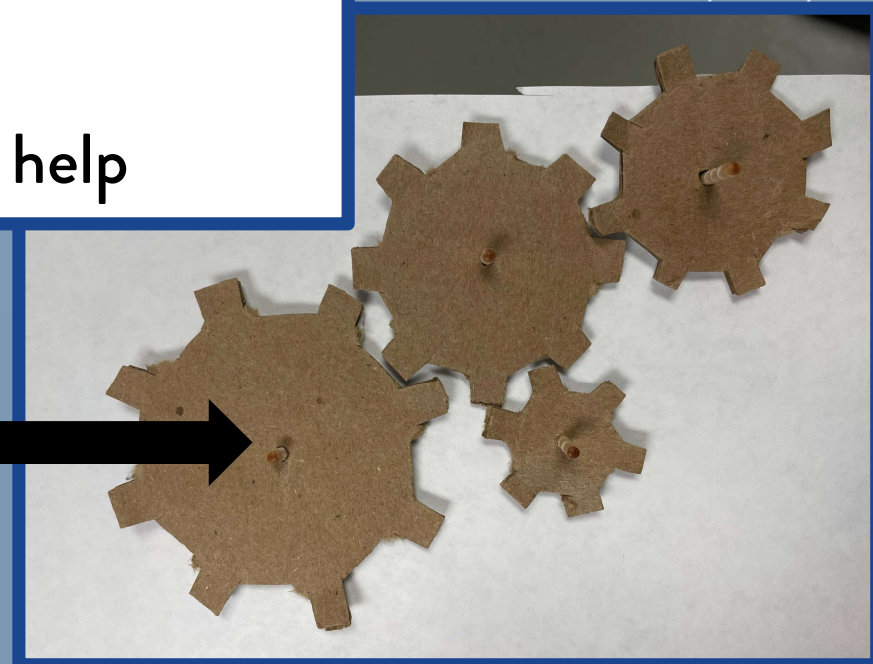
# At-Home Gear Activity

## Make-Your-Own-Gears

- Use cardboard circles or sheets of foam
- Cut gear “teeth” into circles (try to make them evenly spaced)
- Pin gears to a box or a piece of cardboard with toothpicks
- Make gears connect
- Make sure to have a parent or teacher help

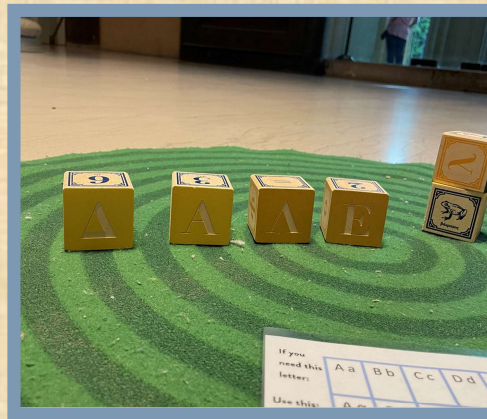


Toothpicks



# Antikythera Translation at the Parthenon

Museum Programing includes using blocks to spell your name in Greek to a Word Find that includes words from the Antikythera Mechanism.



This allows visitors and students to try out translating from one language to another, just like some scientists did with the inscriptions on the Antikythera Mechanism.



NASHVILLE PARTHENON  
Translation Time: Inscription and Key

Name: \_\_\_\_\_

This is the surviving text from an ancient artifact called the Antikythera Mechanism. Experts have identified important words. Imagine doing a Word Search puzzle, but in a different language? That is your challenge today! Find and circle the Key words hidden in the text.

## TEXT FROM THE BACK DOOR OF THE MECHANISM

```

1 ΤΑΥΤΗΝΔ
2 ΔΙΔΥΠΟΛΛ
3 ΥΠΟΔΕΤΟΝΤ
4 ΑΤ
5 Ε
6
7 Ο
8 ΙΡΜΟΣ
9 ΑΚΡΟΥΔ
10 ΜΕΝΟ
11 Μ
12 ΟΛΝ
13 ΥΠΟΛΛ
14 ΟΥΔ ΣΦΑΙΡΙΟΝΦΕΡΕ
15 ΠΡΟΕΧΟΝΑΥΤΟΥΓΝΩΜΟΝΙΟΝΣ
16 ΦΕΡΕΙΟΝΗΜΕΧΟΜΕΝ
17 ΤΟΣΤΟΔΕΔΙΑΥΤΟΥΦΕΡΟΜΕΝ
18 ΤΗΣΑΦΡΟΔΙΤΗ ΕΡΟΥ
19 ΤΟΥΣΦΟΡΟΥΙΕ ΕΡΕΤΑΝ
20 ΓΝΩΜΩ ΚΕΙΤΑΙΧΡΥΣΟΥΝΣΦΑΙΡΙΟΝ
21 ΗΛΙΑΚΤΙΝ ΥΠΕΡΑΕΤΟΝΗΛΙΟΝΕΣΤΙΝΚΥ
22 ΥΑΡΕΣΑΥΡΟΕΝΤΟΤΟΔΕΔΙΑΠΟΡΕ
23 ΕΘΟΝΟΣΤΟΔΕΔΙΑΠΟΡΕΥΟΜΕΝΟΥ
24 ΙΝΟΝΟΥΚΚΛΟΣΤΟΔΕΣΦΑΙΡΙΟΝΦ
25 ΜΕ ΤΟΥΚΟΣΜΟΥΚΕΙΤΑΙΣΦ
26 ΜΕΝ ΣΤΟΙΧΕΙΑΠΑΡΑΚΑΝ
27 ΑΥΤΑΤΑΙΣΣΠΙΔ
28 Α ΟΤΩΝΔΙΔΟ ΣΤΩΝΜΕΝ
29 ΝΟΜΗΤΗΕΛΙΚΙΤΗΜΜΑΤΑΣΛΕ
30 ΤΑΙΣΚΑΙΕΣΑΙΡΕΣΙΜΟΙΗΜΕΡΑΙΚ
31 ΧΟΝΣΤΗΜΑΤΙΑΔΥΟΠΕΡΙΤΥΜΠΑΝ
32 ΠΡΟΕΤΡΗΜΕΝΑΣΤΗΜΑΤΙΑΤΗΜ
33 ΑΤΩΝΤΡΗΜΑΤΩΝΔΙΕΛΚΕΣΘΑΙ
34 ΟΜΟΙΩΣΤΟΙΣ
35 ΦΥΕΣΠΟΙΗ
36 ΚΑΙΣΥΜΦΥ
37 Τ ΠΑ
38
39 Ε ΟΥ
40 ΕΝΛΧΠΑΝ Ε
41 ΜΗΝΘΕΝΕΞΗΑ
42 ΤΗΣΠΡΩΤΗΣΧΡΑΣ
43 ΜΟΝΙΑΔΥΟ ΩΝ ΤΑΑΧΡΑΦΕ
44 ΤΕΣΣΑΡΑΔΗΛΟΙΔΟΜΕΝΤ
45 ΣΑΙΝΤΗΣ ΟCΛΙΟΛΤΟΥ
46 ΟΣΕΙ ΕΙΣΑ ΣΚΓ ΣΥΝΤΕΣ
47 ΙΟΝΤ ΟΣΔΙΑΙΡΕΦΗ Η ΟΛΗ
48 ΔΟΙΕ ΕΓΓΕΙΠΤΙΚΟΙΣ
49 ΙΟΜΟ ΤΟΙΣ ΕΠΙΤΗΣΕ
50 ΧΡΟΝΦΕΡΕ ΤΑ
51 ΠΙΝΕΝΤ
    
```

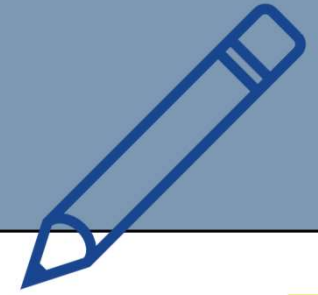
## KEY

- ΣΦΑΙΡΙΟΝ = little sphere
- ΑΦΡΟΔΙΤΗ = Aphrodite = Venus
- ΤΟΝ ΗΛΙΟΝ = the Sun
- ΑΡΕΣ = Ares = Mars
- ΕΘΟΝΟΣ = Jupiter
- ΚΥΚΛΟΣ = the orbit (of the planet)
- ΤΟΥ ΚΟΣΜΟΥ = of the cosmos
- ΤΥΜΠΑΝ = gear
- ΕΓΓΕΙΠΤΙΚΟΙΣ = the eclipse event

*What do you notice about the types of Greek words?*  
*What themes/subjects are these ancient instructions about?*

# Translate Your Name

Print off this worksheet and translate your name into Greek at home!



## Spell your name in Greek!



Find each English letter to discover the letter it matches in Greek.  
Combine Greek letters to spell your name.

A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	B	K or Σ	Δ	E or H	Φ	Γ	Χ	Ι	ΤΖ	Κ	Λ	Μ	Ν

O	P	Q	R	S	T	U	V	W	X	Y	Z
O or Ω	Π * PS = Ψ	Κ	Ρ	Σ	Τ * TH = Θ	Υ	Β	ΟΥ	Ξ	Ι or Υ or Η	Ζ

English Name:

---



---

Greek Name:

---



---

# Connect with us



@NashvilleParthenon



@NashvilleParthenon



@NashParthenon



@NashvilleParthenon

# Image Credits

- Slide 4
  - American Philosophical Society
  - Windmill Books
- Slide 5
  - Dancers- courtesy of Marcus Cyron (CC)
- Slide 9
  - X. Moussas
- Slide 11
  - by Unknown Author is licensed under [CC BY](#)
- Slide 12
  - Image Courtesy of Antikythera Mechanism Research Project
  - Image courtesy of Windmill Books