

GEOGRAPHICAL DISCOVERIES, ASTRONOMICAL CONQUESTS AND THE NEW REPRESENTATION OF THE WORLD



Preface

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Project: VAST: Values Across Space & Time

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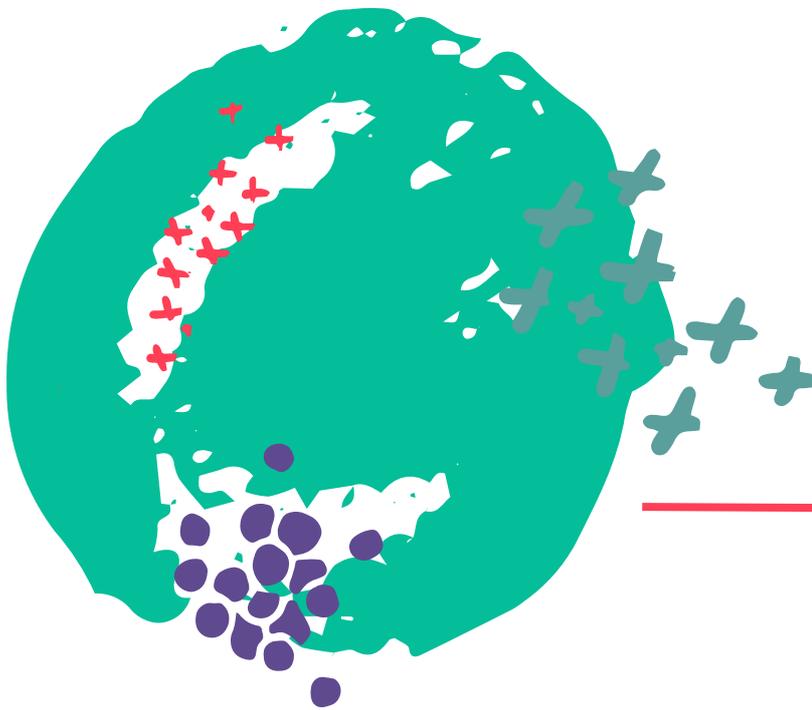
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The VAST project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **No 101004949**. This educational guide reflects only the view of the authors and the European Commission is not responsible for any use that may be made of the information it contains.

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overview

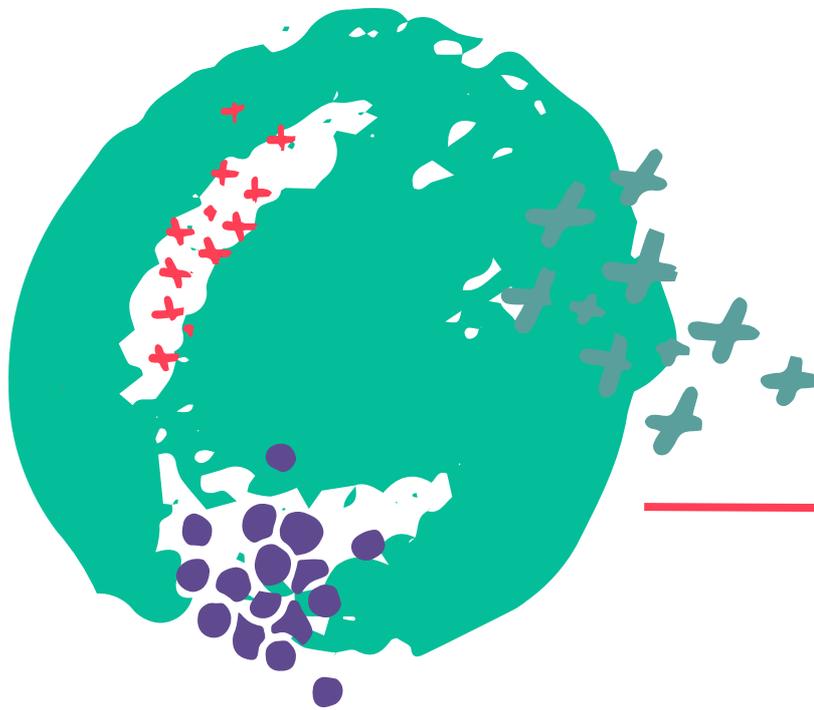
The H2020 European research project VAST- Values Across Space & Time is a collaboration among the National Center for Scientific Research 'Demokritos' (Greece), National and Kapodistrian University of Athens (Greece), the Athens & Epidaurus Festival (Greece), Università degli Studi di Milano (Italy), Fairytale Museum (Cyprus), Museo Galileo (Italy), Universidade NOVA de Lisboa – NOVA (Portugal) and Semantika (Slovenia).

The project envisions to study the dissemination of the European values (such as freedom, democracy, equality, tolerance, dialogue, human dignity, the rule of law) in space and time through the use of digitised materials and intangible cultural artefacts as well as to explore the communication, reception and perception of these values in the modern era. For the purposes of this research, three pilots have been described concerning: 1. the theatre/ancient drama, 2. the scientific texts of the 17th century, 3. the fairy tales.

A digital platform has been developed, as part of the project, with open access to citizens. In this platform, values-related scientific and educational materials and research evidence/results will be posted, as well as various tools for scientific and research study.

Do not miss visiting!

In this activity the discovery of new worlds are paralleled with the contemporary celestial discoveries of Galileo Galilei, offering the cue for discussion on the plurality of worlds and the multiplicity of perspectives leading to reflections on today's world, the importance of evidence versus tradition, absence of prejudice, dialogue between different cultures.



activity

Institution

Museo Galileo (Institute and Museum of the History of Science)



Audience

11 to 13 years old

Title

Geographical discoveries, Astronomical Conquests and the New Representation of the World.

Description

The activity focuses on the geographical and astronomical discoveries that shaped our understanding of the world. The program encompasses explanations of the astronomical and nautical instruments used during ocean voyages between 1500 and 1700, along with the evolution of maps related to the discovery of new worlds. These historical revelations are paralleled with the contemporary celestial discoveries of Galileo Galilei, offering a fertile ground for discussions on the plurality of worlds and the diversity of perspectives. Inspired by quotes from notable figures such as Francis Godwin, John Wilkins, Cyrano de Bergerac, and Fontenelle, the program will encourage students to reflect on modern-day society, focusing on important values such as the significance of evidence over tradition, the importance of avoiding prejudice, and the necessity of maintaining open dialogues between diverse cultures and viewpoints.

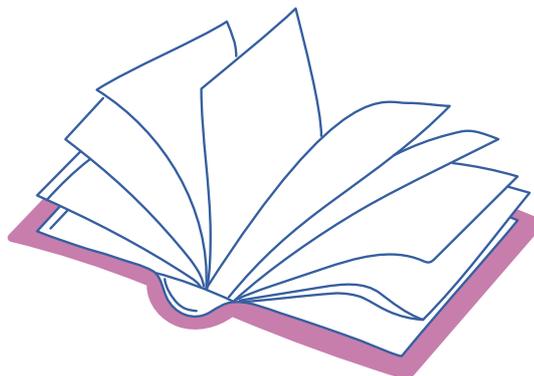


Educational Objectives



Through this activity the participants are expected to:

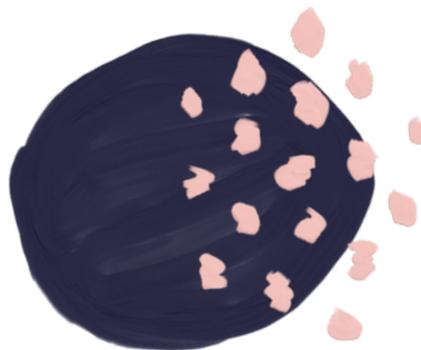
- 1 come into contact with ancient cartography and nautical instruments and by extension with the values of knowledge, dialogue, human dignity, hospitality, curiosity, progress, and equality
- 2 understand the evolution of cartography and the representation of the world
- 3 learn about the impact of past discoveries on the world today
- 4 exercise their critical thinking about the power dynamics involved in cultural encounters
- 5 understand concepts of the past related to cartographic representation, geography perception, and different interpretations of territories over time



Expected outcomes

After completing the activity, the participants:

- 1 will have understood the importance of cartography and its evolution over time
- 2 will have an overview of the history of geographical discoveries
- 3 will have understood the complexity of cultural encounters
- 4 will have constructed a deeper appreciation for the value of diversity and mutual understanding
- 5 have worked together to argue for the importance of dialogue and collaboration between cultures
- 6 will have realized that cultural encounters require respect, understanding, and equality among peoples and cultures



Structure



Duration

90' - 120'

Educational materials/tools

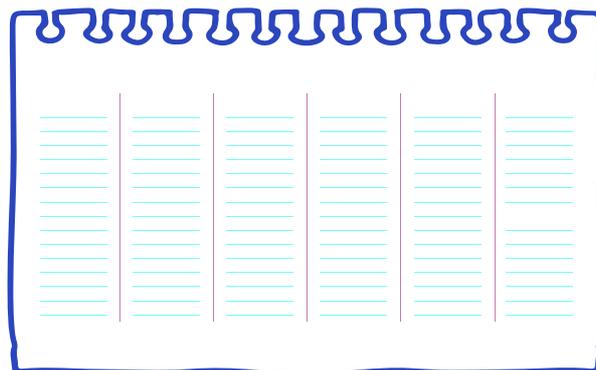
- Paper (or digital) pre-visit questionnaires for teachers
- Video teaser
- PPT projection with texts and images
- Various instruments: quadrant, nautical astrolabe, nocturnal, sundial, compass, wind rose, sounding lead, sun compass, and hourglass
- Learning through inquiry system and instruments replicas' manipulation
- Paper boats drawn on A5 & colored markers
- Panel and removable fastener for attaching boats
- Visit to the museum collection
- Paper (or digital) post-visit questionnaires for teachers

Educator/facilitator

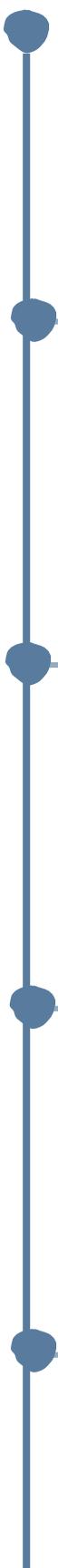
1 educator/facilitator for up to 25 students

Target group

Secondary school students (from 11 to 13 years old)



Modules/sections (design)



Pre-visit questionnaire	Described in pages:	11
Welcome	Duration:	10'
	Materials/tools:	Video
	Described in pages:	12
1st part of the activity	Duration:	20'
	Materials/tools:	Power point with texts and images
	Described in pages:	13-14
2nd part of the activity	Duration:	20'
	Materials/tools:	Power point with texts and images
	Described in pages:	15-16

3rd part of the activity

Duration: 20'

Materials/tools: Replicas of scientific instruments

Described in pages: 17

4th part of the activity

Duration: 20'

Materials/tools: Paper boats drawn on A5 & colored markers

Described in pages: 18

5th part of the activity

Duration: 30'

Materials/tools: -

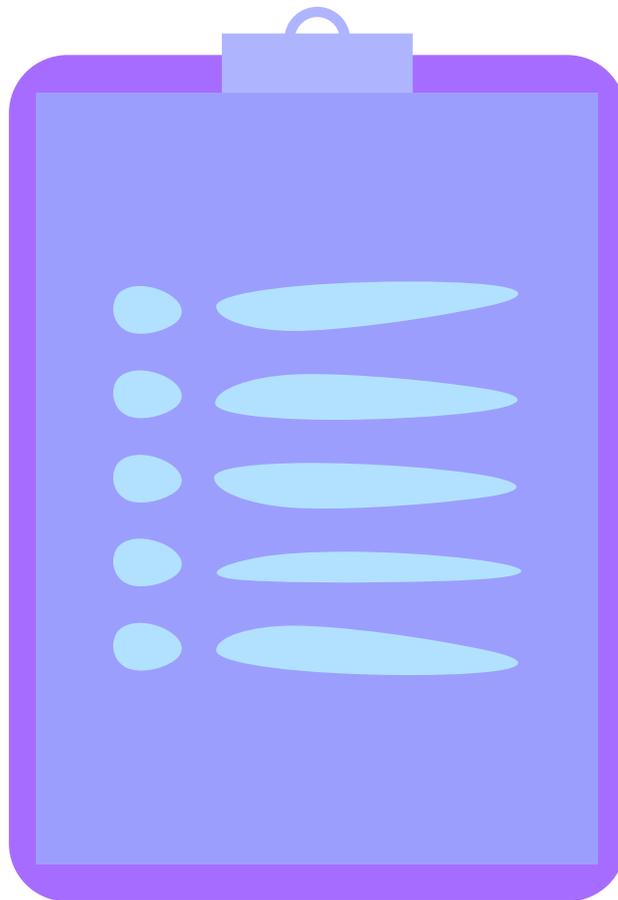
Described in pages: 19

Farewell - Activity evaluation

Described in pages: 20

Pre-visit questionnaire

Prior to the visit, teachers are provided with a brief questionnaire (Appendix I). This survey serves the purpose of gaining insight into the demographic and cultural context. This, in turn, contributes to a more accurate interpretation of the final evaluation stage of the activity.



A. Introduction (5')

Welcome to the participants.

B. Ice breaker activity (5')



Video teaser: introducing the values
(<https://youtu.be/HpCKDMjJz4k>)

We start with a short powerful introduction to the upcoming activity that will delve into the theme of challenging the unknown with the help of science. Using evocative music and imagery, the teaser invites students to embark on an exploratory journey, spanning from ancient boundaries to the revelation of new worlds and civilizations. From uncharted lands and diverse cultures to the identification of novel plant and animal species, the activity will showcase the revolutionary impact of these discoveries on our perception and comprehension of the world. The theme of challenging the unknown will continue, as we explore the latest frontiers of scientific inquiry, particularly those related to space exploration.

Note: The video can help students to contextualize their learning, providing a visual and emotional connection to the concepts and ideas being explored. It can also be a highly effective tool for engaging students, capturing their attention and imagination.

1st part of the activity: *The Evolution of Geographic Representation and Its Importance Today*

- In this part, the group will learn about the evolution of cartography.
-



Discussion

This part begins with a ppt slide showing the Earth surrounded by values such as knowledge, dialogue, human dignity, hospitality, curiosity, progress, and equality. These values highlight the significance of cartographic science and the crucial role of geographic representation. We discuss these values together, encouraging students to express their perception and give examples for each of them.

The presentation then proceeds with glimpses of cartographic development over time, illustrating how this science has evolved throughout the centuries. Maps of imaginary and unknown lands were placed alongside familiar and well-described lands by cartographers. The maps presented include the Babylonian Map of the Earth, Ptolemy's Representation of the Map of the Ecumene, Fra' Mauro's World Map, Mercator's Projection, and Arno Peters' Map.

The ensuing discussion focuses on the importance of cartographic representation and how it has changed over time through new geographic discoveries made by explorers such as Columbus, Vespucci, Cabot, Verrazzano, Magellan, and Cook. We also highlight the use of geographic maps related to ocean travels and the importance of constant cartographic updates.

We engage in a thoughtful discussion with students, emphasizing the substantial expressive value of geographical maps, as they enable us to expand our understanding of the environment we inhabit, encompassing both geographical and political aspects. Additionally, geographical maps serve as indispensable tools for orientation, also enhancing our awareness of others' presence on Earth. By utilizing these maps, we can easily locate significant landmarks like cities, historical monuments, and natural parks, fostering a deeper comprehension and appreciation for diverse cultures and traditions.



2nd part of the activity: *The diversity of perspectives on maps*

- In this part, the group will reflect on how different cultures prioritize and view territories differently.



Discussion

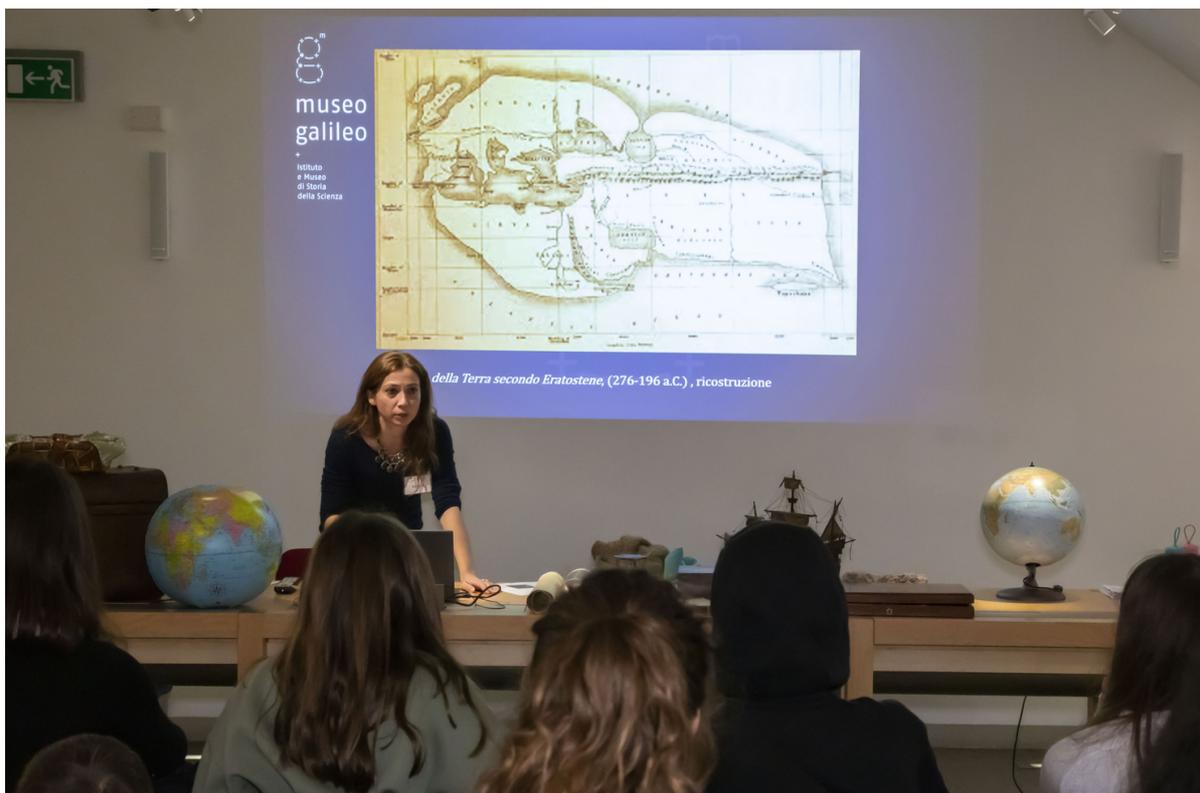
We show one or more maps from the past belonging to different cultures and ask what they represent. A brief description of the Aztec, Chinese, and European maps before the discovery of the New World is given to provide context. The discussion emphasizes the significance of representing the world through maps, which has been a crucial aspect of cartographic science. Maps provide new perspectives and routes, giving us new certainties, making updating them crucial. Despite the advances in digital cartography, many of the challenges that cartographers face today are the same ones that have been encountered for thousands of years, such as deciding what to include on a map, what to exclude.

The discussion prompts students to contemplate the profound impact of historical geographical discoveries on shaping our modern world. It encourages them to reflect on how these explorations fostered significant interactions between diverse cultures. Emphasizing the importance of dialogue among different societies today, it serves as a means to promote understanding and respect for alternative ways of life. This emphasis stands in stark contrast to the past, where encounters between different cultures were often fraught with tension and conflict. Such historical interactions were frequently characterized by power imbalances, with one culture seeking to dominate another. In today's context, an increasing number of individuals recognize the immense value of diversity and the necessity for mutual respect and comprehension. The focal point of this discussion lies in promoting equality among individuals and acknowledging equal dignity of different cultures, appreciating their unique perspectives and contributions, while encouraging dialogue and collaboration.



Discussion

The importance of the diversity of perspectives on maps is highlighted, as different cultures prioritize and view territories differently. This is illustrated by the work of Arno Peters and Buckminster Fuller, who proposed new cartographic projections that rejected traditional Eurocentric and environmentalist views. We reflect on how maps of different periods in history have seen varying interpretations of territories and their constituent elements. “In the sixteenth century, maps emphasized cultural elements and resembled artistic depictions, providing a more realistic representation of the world, even if they were not very geographically accurate. In contrast, modern Euclidean geography offers a more generalized and simplified view of the world, which may be more accurate, but also differs more from our perception of reality. Through maps, we can mentally place ourselves in places we do not physically occupy, allowing us to understand their arrangement without actually experiencing them.” (Casti 1998)



3rd part of the activity: *Exploring the Tools of Discovery*

- In this part, the group will use various navigation instruments
- in a hands-on way.



Activity

In this part, students have the opportunity to use various instruments such as the quadrant, nautical astrolabe, nocturnal, sundial, compass, wind rose, lead line, sun compass, and hourglass in a hands-on way. By experimenting with these tools, the educator seeks to help students understand how the evolution of observation and navigation instruments has influenced the discovery of new worlds and gain a deeper appreciation of their importance in enabling explorers to discover uncharted territories.



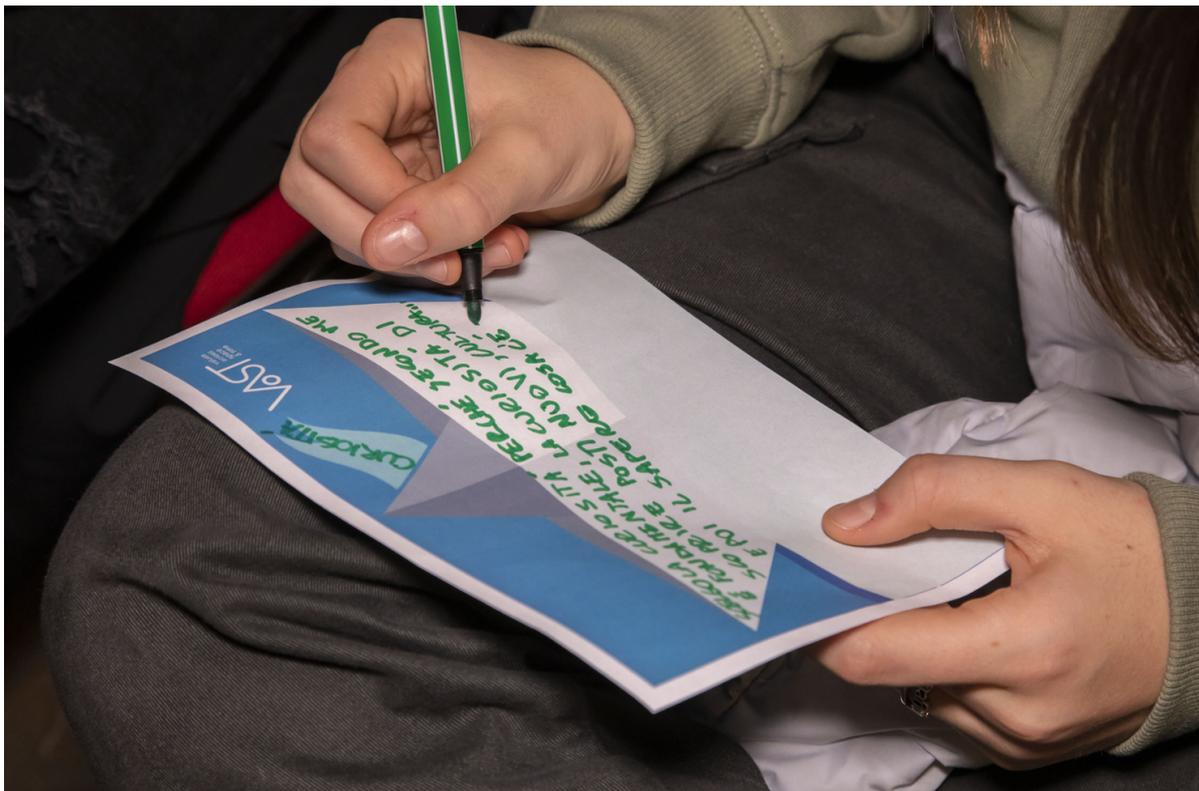
4th part of the activity: *Setting Sail with our Values*

In this part, students reflect on their personal values.



Activity

At the end, students are invited to reflect on their personal values by writing them on boat-shaped notes and explaining their choice. These boats are then displayed on a large panel that depicts a ship sailing across the ocean waters. This exercise encourages students to think about what values they would bring with them on an imaginary journey to distant lands, and to consider how these values would shape their experiences and interactions with other cultures. Through this reflective exercise, students can gain a deeper understanding of their own values and the importance of respecting the values of others.



—● 5th part of the activity: *Visit to the museum collection*



In this unit, the group visits the museum collection.



Activity

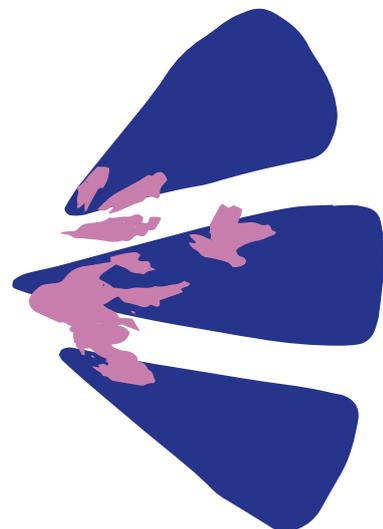
As a continuation of the earlier activities, the group will participate in a guided tour through the museum galleries, where they will have the opportunity to see the actual objects that were previously discussed, particularly focusing on orientation and nautical instruments along with ancient globes and planisheres. During the tour, intriguing stories and anecdotes about some famous transoceanic voyages will be shared, adding a fascinating dimension to the experience. These stories will shed light on the significance of exploration and discovery throughout history, strengthening the connection between the values and concepts explored during the activities and the museum's historical collections.

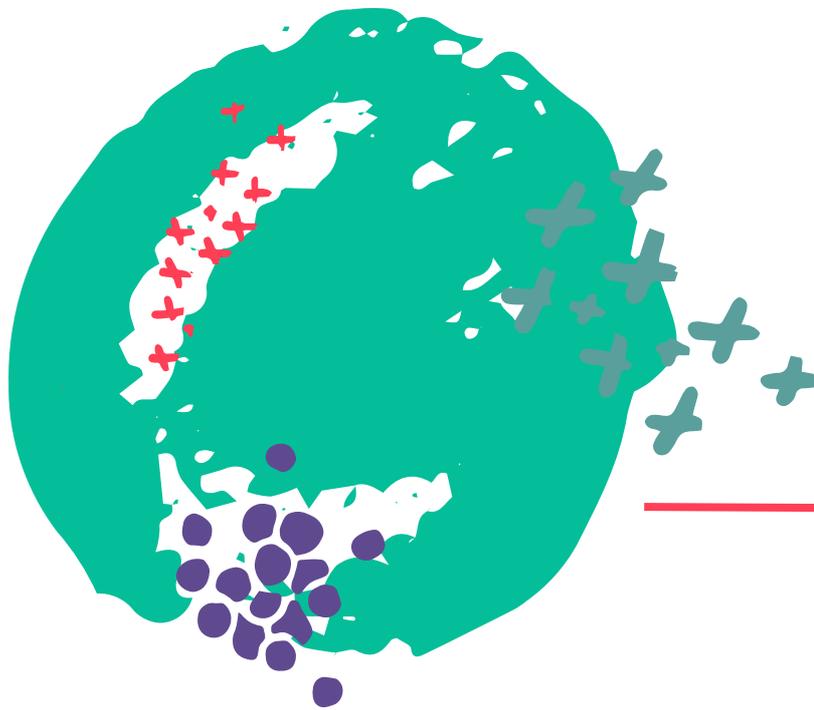
Farewell - Activity evaluation

-  We summarize the most important points with students and ask the teachers to fill a post-visit questionnaire (Appendix II).
- 

The purpose of this questionnaire is to understand:

- Whether the activity succeeded in stimulating a discussion on values among the students
- Whether it provided a broader perspective on scientific instruments
- Whether teachers believe that museums, as cultural institutions, can be a place for discussing the transformation of values in different eras
- If they believe that the digitization of experiences within the VAST Project can contribute to the study of values and their emergence in modern society
- Satisfaction with the experience





sources

- Lazzati L. (2021), *Navigatori e stelle, I grandi viaggi della storia e l'orientamento con gli astri*, Novara: Libreria Geografica
- Brooke Hitching E. (2018), *L'atlante immaginario*, Milano: Mondadori
- Brotton J. (2018), *La storia del mondo in dodici mappe*, Milano: Feltrinelli,
- Sobel D. (2017,) *Longitudine*, Milano: Rizzoli
- Colombo C. (1992), *Giornale di bordo del primo viaggio e della scoperta delle Indie*, Milano: Rizzoli
- Pigafetta A. (1989), *Il primo viaggio intorno al mondo*, Edizioni associate
- Harley J.B., Woodward, D., a cura di (1987), *The history of cartography*, Chicago, University of Chicago Press
- Cavendish M. (1666), *The Blazing World and Other Writings*, New York: Penguin Classics, Reprint (1994)
- Bernard le Bovier de Fontenelle (1686), *Entretiens sur la pluralité des mondes*, Paris: Flammarion, 1998
- Cyrano de Bergerac (1655), *L'Autre Monde: ou les États et Empires de la Lune*, Paris: Flammarion, c1970
- Godwin F. (1638), *The man in the moone, or A discourse of a voyage thither by Domingo Gonsales, thy [i.e. the] speedy messenger*, Little Logaston: Logaston press, c1996
- J. Wilkins (1638), *The discovery of a world in the moone, or, A discovrse tending to prove that 'tis probable there may be another habitable world in that planet*, London: Printed by E.G. for M. Sparke and E. Forrest

Online sources

- [CASTI, Emanuela \(1998\), L'ordine del mondo e la sua rappresentazione. Milano: Unicopli, p.228](https://www.ub.edu/geocrit/b3w-185.htm) (<https://www.ub.edu/geocrit/b3w-185.htm>)
- <https://mostre.museogalileo.it/framauro/it>
- <https://mostre.museogalileo.it/waldseemuller/indice.html>

APPENDIX - I

Pre-Visit Questionnaire for Teachers

Dear Teacher,

Thank you for the time you are dedicating to completing this survey. The questionnaire is anonymous, and your participation is entirely voluntary. The survey results will be evaluated and used for research purposes, and to enhance the educational offerings of the Museum. Should you have any questions regarding the survey, you can contact us.

Your contribution is greatly appreciated!

UNIQUE CODE*	
---------------------	--

** Choose a unique code (word or number) and remember it to use in the post-visit questionnaire.*

Section 1 – Personal Information

1. Age

- 22-30
- 31-40
- 41-50
- 51-60
- > 60

2. Gender

- M
- F
- Other
- I prefer not to answer

3. Where do you live?

- Large City/Capital (>100.000)
- Suburb near a large city
- Small City (<100.000)
- Town or Rural Area (<30.000)

4. Educational qualification
- Bachelor's Degree
 - Master's Degree
 - Ph.D.
 - Other

5. Years of work experience in the educational field
- < 5 years
 - 5-10
 - 11-20
 - 21-30
 - > 30

6. What type of school are you currently teaching at?
.....

7. What is the age of your students?
.....

8. What subject do you teach?
.....

Section 2 - Museum Experience

9. Which museums have you already taken your students to?
- Art Museums
 - Science and Technology Museums
 - Natural History Museums
 - Ethnographic, Anthropological, and Regional Museums
 - Archaeological Museums or Archaeological Parks
 - Historical Museums
 - House Museums
 - Military or War Museums
 - Maritime or Oceanographic Museums
 - Botanical Gardens
 - Outdoor Museums (e.g. caves and mining parks)
 - Fashion Museums
 - Sports Museums
 - Virtual Museums
 - Other

10. Do you recall a museum that left a particular impression on you? Could you explain why?

.....
.....

11. Is this the first time you are accompanying your students to our museum?

- Yes
- No

Section 3 - Museums and Values Communication

12. Have you ever participated with your students in an educational activity centered on values?

- Yes
- No

If yes, which ones?

.....

13. Do you believe that a museum can serve as a medium for promoting certain values and consequently contribute to societal change and the expression of values?

- Yes
- No
- I'm not sure

If you wish, please explain why

.....

14. If your answer is positive, on which values would you like a museum to focus its attention?

.....
.....

15. Considering the current socio-political reality, do you think museums should contribute to reflecting on these events?

- Yes
- No
- I'm not sure

If you wish, please explain why

.....

Section 4 - Activities at the Museum

16. What benefits do you expect for your students from this activity?

- Consolidation of knowledge
- Enrichment of cultural background
- Stimulating experience
- Sharing and exchanging opinions
- Development of critical thinking
- Other

17. Do you think an activity focused on the dissemination of the history of science is suitable for stimulating a discussion on values?

- Yes
 - Somewhat
 - No
- Why?
-

18. Do you believe there are inherent risks in this operation?

- Yes
 - No
 - I'm not sure
- If yes, what are they?.....
-

APPENDIX - II

Post-Visit Questionnaire for Teachers

UNIQUE CODE*	
---------------------	--

** Please, provide the unique code you used to complete the pre-visit questionnaire.*

1. How would you rate the activity?

- It was a pleasant surprise
- It was as I expected
- It was not very effective

If you wish, please explain why

.....

.....

2. Do you believe the activity successfully stimulated a discussion on values?

- Yes
- Somewhat
- No

If you wish, please explain why

.....

.....

3. Do you think the activity highlighted the connection between the displayed scientific instruments and the expressed values?

- Yes
- No
- Other

.....

4. Do you believe the activity managed to provide a broader perspective on scientific instruments to your students?

- Yes
- No
- I'm not sure

Do you have any comments on this?

.....

.....

.....

5. What did you like the most about the visit?

.....

.....

.....

6. Which part of the laboratory activity do you think most stimulated your students?

.....

.....

.....

7. The foundations upon which a value originates and develops lie within the social, cultural, and institutional context, as well as within the personality of individuals who are part of that context.

Considering the activity conducted, do you believe that a museum, as a cultural institution, can be a place of interaction, where discussions about the transformation of values across different eras can take place?

- Yes
- No
- Other

.....

8. Values form the foundation of our intangible cultural heritage. Do you think that the digitalization of experiences carried out within the scope of the VAST Project could contribute to the study of values and their emergence in modern society?

- Yes
- No
- I'm not sure

If you wish, please explain why

.....

.....

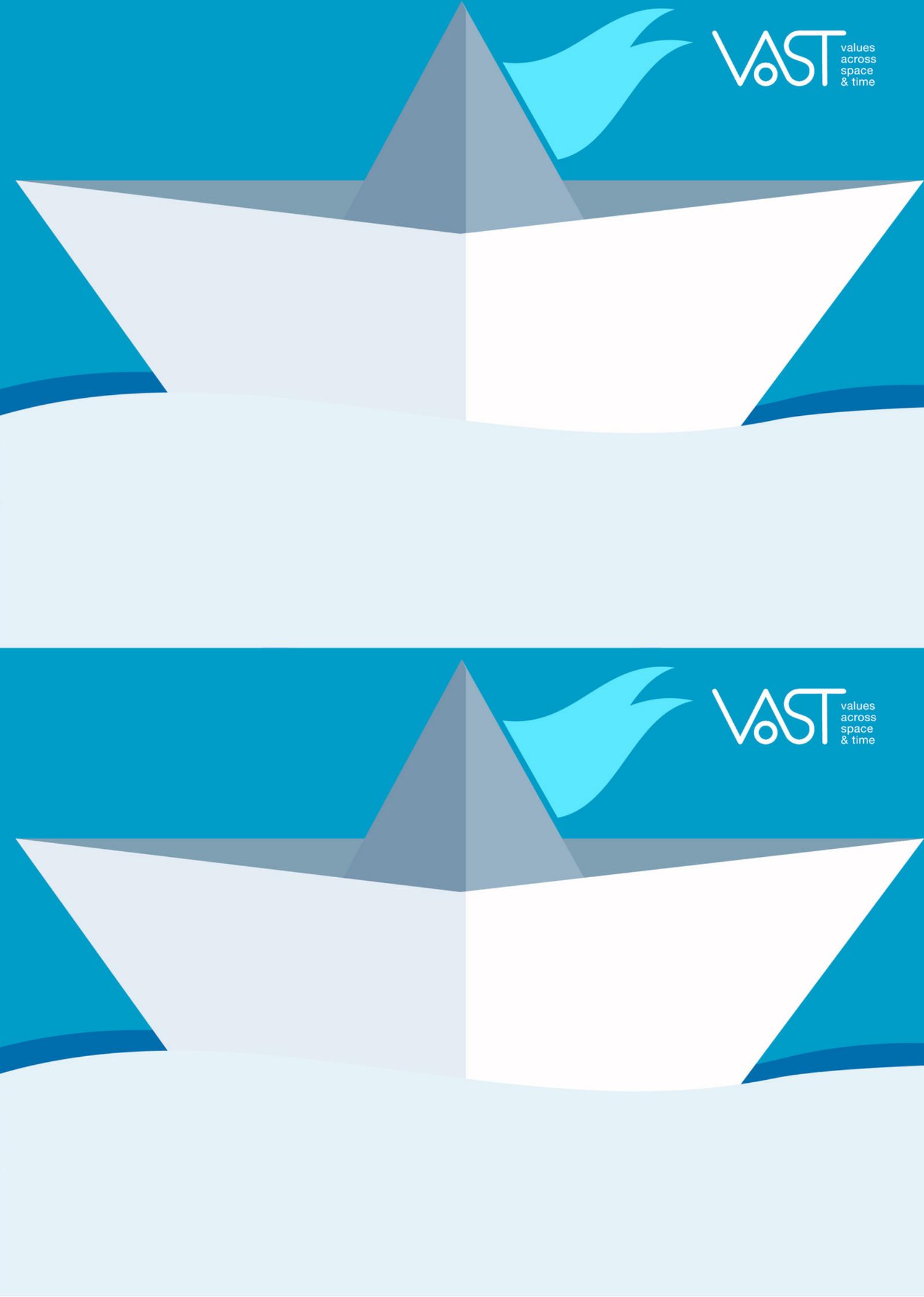
9. Additional comments

.....

.....

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APPENDIX - III





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