

Building the Best: Comparing Observatories

Grade Level: 3-5, 6-8, 9-12

Subject Areas: World History, Social Studies, Math, Geometry, Computer Science

Lesson Summary:

In this lesson, students will learn about the social function and construction techniques of observatories in the past and today. Through an analysis of Chichen Itza and Chankillo, students will embark on their own research and reconstruction project, concluding in a 3D computer model or physical model.

Common Core Standards:

Grades	3-5	6-8	9-12
Mathematics	3.OA.A-D, 3.NBT.A, 3.MD.A-D 4.OA.A-C, 4.NBT.A-B, 4.MD.A-B 5.OA.A-B, 5.NBT.A-B, 5.MD.A-C, 5.G.A-B	6.RP.A, 6.NS.A-C, 6.EE.A-C, 6.SP.A-B, 6.G.A 7.RP.A, 7.NS.A, 7.EE.A-B, 7.SP.A-C, 7.G.A-B 8.EE.A-C, 8.G.A-C, 8.G.A-C, 8.SP.A	HSN.Q.A HAS.CED.A HSG.MG.A HSG.GPE.A-B HSS.ID.A-C HSS.IC.A-B
English Language Arts	W.3.1-8, W.3.10, SL.3.1-6, L.3.1-3, L.3.6 W.4.1-10, SL.4.1-6, L.4.1-3, L.4.6 W.5.1-10, SL.5.1-6, L.5.1-6	W.6.1-10, SL.6.1-6, L.6.1-6 W.7.1-10, SL.7.1-6, L.7.1-6 W.8.1-10, SL.8.1-6, L.8.1-6 RH.6-8.1-10, RST.6-8.7-10	W.9-10.1-10, RH.9-10.1-10, SL.9-10.1-6, L.9-10.1-6, RST.9-10-7-10 W.11-12.1-10, RH.11-12.1-10, SL.11-12.1-6, L.11-12.1-6, RST.11-12.7-10

Learning Objectives:

After completing this lesson, the student will be able to:

- describe ancient techniques of construction and the tools required to build monuments around the world, with special focus given to Western Hemisphere observatories.
- explain how construction materials were sourced and how they were transported for use.
- explain the functionality of observatories historically.
- compare how observatories were used in the past and today, and investigate how the use and architecture of observatories have changed over time.
- identify where and how ceremony influences architecture.
- reconstruct a site or structure using like materials, taking into consideration size and scale.

Lesson Description:

An observatory is a place used for observing terrestrial or celestial events. In this lesson, students will utilize CyArk's 3D archive of heritage sites as a resource for investigating observatories around the world. Navigate the class to www.CyArk.org, and click on the Projects tab. Prompt students to explore CyArk's projects independently, eventually directing them to Chichen Itza's Caracol and Chankillo as sites that contain observatories as an example.

As the students explore the website, encourage the following questions:

- Where are observatories found?
- What purpose do observatories serve?
- Of CyArk's projects that include observatories, what materials are they made from?
 - Where would this material come from, and how would it be transported?
 - What other sites or structures have similar construction techniques?
- In what ways are functionality and spirituality linked at observatories?
 - How about observatories today, like the Los Angeles Griffith Observatory or Oakland's Chabot Space & Science Center?

After initial research and inquiry is complete, divide students into groups to begin the student project.

Student Project:

In groups, students will experiment with different construction materials to build a representative model of a historical observatory. Before beginning their models, each group should draw a sketch of their model with dimensions, either by hand or using a Computer Aided Drawing (CAD) program, such as AutoCAD. Additionally, each group should test various materials to determine what they would like to utilize in constructing their models.

Each group may present their sketches and material choices to the class before beginning their construction project.

Possible materials to use are soap, foam, or soapstone if a sculpture class. This process would replicate the carving of stone. In lieu of physical reconstruction, a lesson in SketchUp would support 3D modeling of their project.

Each group may complete an essay providing context for their models. Information to consider includes, but is not limited to:

- Where would this observatory be found?
- How was it used, and by whom?
- How are observatories built today?
- What does this construction technology say about the society and its available resources?

Resources:

CyArk website: www.CyArk.org

Wikipedia: <http://en.wikipedia.org/wiki/Observatory>