

Build Like Benjamin Banneker



A 2017-2018 Global Cardboard Challenge Event

*Design and construct a **working model clock, telescope, garden container** or another original apparatus inspired by Benjamin Banneker using cardboard.*

The History of Benjamin Banneker's Clock

“Benjamin Banneker was born a free man in Maryland on November 9, 1731. A land-owning farmer of modest means, Banneker nevertheless lived a life of unusual achievement. In 1751, Banneker borrowed a pocket watch from a well-to-do neighbor; he took it apart and studied [its] workings. He made a drawing of each component, then reassembled the watch and returned it, fully functioning, to its owner. From his drawings Banneker then proceeded to carve, out of wood, enlarged replicas of each part.

Calculating the proper number of teeth for each gear and the necessary relationships between the gears, he completed construction of a working wooden clock in 1753 that kept accurate time and struck the hours for over 50 years until it was destroyed along with most of Banneker's other belongings in a mysterious house fire that took place on the day of Banneker's funeral. Benjamin Banneker has been credited for making the first clock to be built completely in America.”

- As published by Benjamin Banneker Watches and Clocks (<http://www.bannekerstore.com/benjamin-banneker/>)

This challenge is a cross-curricular activity addressing mathematics, science, history/social studies, language arts, reading, and the arts!

The Benjamin Baneker Association, Inc. is an advocacy organization which supports high-quality learning in mathematics by converging these three ideas:

Focus



Perseverance



Inspiration



We hope Benjamin Baneker’s amazing focus and perseverance will also inspire your ingenuity to exercise your creative talents through the “Build Like Benjamin Baneker” Cardboard Challenge.

Why the cardboard challenge?



Clock created by student at Knox Gifted Academy in Arizona
image taken from <https://www.flickr.com/photos/buistbunch/21114218824/>

- Cardboard, is a strong and lightweight material made up of the same resource Benjamin Baneker used over 250 years ago – wood! Corrugated cardboard (the type often used for packaging materials) is made of pine chips which have been manufactured as kraft paper. (Advameg, 2017).
- Building models with cardboard fosters creativity, ingenuity, resourcefulness, perseverance and teamwork; also provides an opportunity for younger children to engage in creative play (Cherry Creek Schools Foundation, 2014).
- Provides individuals with an opportunity to explore their interests and passions, and make things that have an impact on others.
- Bottom line - it is fun!



- Cardboard is being considered as a building material because it is “inexpensive, environmentally friendly, and cheap to manufacture” (Rose, 2012).
- For a more in-depth look at how cardboard can be used to for major constructions, check out this presentation on [Cardboard as a Building Material](#).

Instructions

1. After studying the life Benjamin Banneker, design a working clock, telescope, garden container or other structure that reflects his contributions to the world and provides a purpose for your community.
2. A design blueprint must be drawn on graph paper before cardboard construction begins.
3. Build your structure using cardboard and other approved building materials (see list below).
4. Take pictures of your completed structure, and make a video showing how it was constructed and / or how it works.



Images taken from <http://bit.ly>

Approved Building Materials

The following materials are approved building materials for this project:

- measuring tools (such as ruler, measuring tape, meter / yard sticks, protractor, or a compass)
- paper
- tape
- glue
- brads
- scissors
- pencils

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- re-used / empty containers (e.g. milk cartons, egg cartons, paper towel, toilet paper tubes, stuffed animals)
- clock movement kit / parts from a working clock (which can be purchased from Hobby Lobby, Michaels, Amazon, etc.)
- art supplies (e.g. markers, paint and confetti to decorate your structure)
- lenses (for telescope)

*For questions about approved building materials for a structure other than the clock, telescope, or gardening container, please email bratliff@bbamath.org.

Competition Guidelines

1. There will be **5 competition categories**:
 - Pre-school (ages 2 – 4);
 - Elementary (students in Kindergarten – Grade 5);
 - Middle (students in grades 6 – 8);
 - High School (students in grades 9 – 12); and
 - Adults (ages 18+)
2. You may work alone, with a partner, or in a group. Invite your friends, family, classmates, and community members to help!
3. **Elementary – Adult Categories**: You must provide a written project reflection to accompany your structure that explains the **personal, civic, scientific, and mathematical** significance of what you've built. For example:
 - How did Benjamin Banneker inspire your structure?
 - How does your structure help or impact your community, our country or the world?
 - What did you learn while creating this structure?
 - How did you persist in creating this structure?
4. Structures will be evaluated by the following criteria:
 - Creativity and originality of concept
 - Design and design plan
 - Structure stability
 - Use of cardboard as a primary material
 - Project reflection

Submission Information

- Your submission packet should be mailed to the Benjamin Banneker Association, Inc. and postmarked no later than **February 16, 2018**. The following materials should be included in your submission packet:
 - Project reflection
 - Registration Form (please submit one form per individual)
 - Copy of the design blueprint
 - Pictures of final structure
 - Link to video showing the structure in use
- Please do not mail your actual construction.

Awards

- The top participants in each category will be featured on the [Global Cardboard Challenge](#) website, and in national Benjamin Banneker publications, including our website, newsletter, academic journal.
- Prizes will be awarded to the 1st, 2nd, and 3rd place participants in each BBA region.

“Build Like Banneker” Registration Form

Name _____

City / State _____

Contact Information (email and mailing address) _____

Structure Title / Description _____

Category (circle one): Pre-school Elementary Middle High School Adult

I give my permission to allow my photograph to be used on the Global Cardboard Challenge website, and in Benjamin Banneker Association, Inc. publications

I give my permission be interviewed for Benjamin Banneker Association, Inc. publications.

Participant Signature

Parent Signature (for children under the age of 18)

I confirm this submission contains my / my child’s original design and work and I understand that all judges’ decisions are final.

Participant Signature

Parent Signature (for children under the age of 18)

Please send this form and all materials to:
The Benjamin Banneker Association, Inc.
P.O. Box 55864
Little Rock, AR 72215

References

- Advameg Incorporated. (2017). Corrugated Cardboard. Retrieved on October 30, 2017 from <http://www.madehow.com/Volume-1/Corrugated-Cardboard.html>
- Cherry Creek Schools Foundation (2014). “Out of the Box” Cardboard Challenge 2014. <http://foxbollow.cherrycreekschools.org/resources/Documents/Cardboard%20Challenge%20packet.pdf>
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- Morgan, L. (2015). The Global Cardboard Challenge – The STEAM World Clock Challenge. Retrieved on October 23, 2017 from <https://sites.google.com/a/bisdmail.net/louise-morgan/what-s-your-passion/the-global-cardboard-challenge>
- Rose, S. (2012). Are cardboard buildings the future? Retrieved on October 30, 2017 from <https://www.theguardian.com/artanddesign/shortcuts/2012/apr/20/cardboard-buildings-future>
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- Wills, B. (2017). Building a Homemade Telescope. Retrieved on October 30, 2017 from <https://www.savvyhomemade.com/building-a-homemade-telescope/>