Astronaut Challenge
Space Mailbox Engineering Competition

Sponsored By

General Rules and Regulations
Student Astronaut Challenge
Space Mailbox Engineering Design Competition

<u>**INTRODUCTION**</u>:

Blue Origin **Club for the Future** currently sponsors the "**Postcard into Space Program**". Any student can write or draw their vision on a postcard for what they think the future of life in space will look like or any other message they would like to send to space. Postcards are sent to **Club for the Future**, that will support its launch it to space and back on a New Shepard rocket, and return stamped with "Flown to Space." Students can send them as many postcards as they like and Blue Origin will fly them all. **https://clubforfuture.org/missions/**

In this challenge, students will design and construct a portable mailbox for their school to receive the postcards so they can be gathered and sent to **Club for the Future**. Please note that the Mailbox is **NOT** going into space, just the mail!

<u>**ENTRY GUIDELINES**</u>

Student must design and build a mailbox according to given specifications provided for the competition and the design must incorporate the given theme and supporting organizations.

<u>**THEME**</u>
  A. This year the visual appearance of the mailbox must encompass the subject **"Exploring the Red Planet - Mars"**. Students may select whatever artistic expression they feel bests demonstrates this concept.

<u>**Mailbox Design**</u>
  A. Each team must construct a **functioning life size** mailbox and present the **actual mailbox** for judges review at the competition.

  B. Since the mailbox must be transported by the teams to the event, the mailbox **MUST** be designed to be portable and fairly easy to assemble and disassemble (the amount of time to assemble the mailbox will not be timed but should be reasonable).

  C. Teams will be **required** to demonstrate the assembly as part of their presentation.

  D. The mailbox must be easy to use, and constructed of **sturdy material** such as wood, plastic, fiberboard, etc.so that it can withstand both being assembled and disassembled as well as withstand use in the school setting. The security of the postcards within must also be considered and the ease of mailing and mail retrieval. Teams that present mailboxes made of flimsy material or that are not constructed to meet the required dimensions and specifications may be disqualified from the event.

  E. The mailbox must be designed to closely approximate the following specifications 15"W x 15"D x 40"H within the limitations of the artistic design chosen. Floor base plates needed for stability are not included in these dimensions and are up to the discretion of the design team. The area

that receives the postcards may **not be less** than 50% of the overall mailbox dimensional volume. The mailbox must also incorporate in its design the following two logos:

    a. The participating School's emblem or logo
    b. Blue Origin and/or Club for the Future logo

DESIGN PLAN

A comprehensive written design plans must be provided that could be used to replicate the mailbox. This includes specific design components to scale, dimensions, and various colored pictures or perspective drawings as necessary. Five hard copies of the design plan will be needed to be provide to judges for their review. Assembly instructions should be included.

PRESENTATION

The student presentation will be 30 minutes in duration and consist of three parts:
1. A narrated demonstration of the assembly of the mailbox.
2. A Microsoft Power Point presentation of the development and construction process used to make the mailbox and a comprehensive review of the design plan to include the artistic components of the design.
3. A question-and-answer period

Note: Internet service may be limited so students should bring a copy of their presentation on a flash drive. All team members must actively participate in the presentation.

PROTOTYPE RESTRICTIONS
A. Chemicals and any liquids (including household cleaning products and outdoor/pool chemicals), soils, food, gases, bleach, batteries, open flames, and explosives may not be used.
B. Controlled or illegal substances, including over the counter drugs, prescription drugs, alcohol, or tobacco, may not be part of the prototype.
C. Knives, syringes, or any sharp objects are not to be used.
D. Any item that can be easily pulled off and swallowed cannot be used.

Postcards into Space Rubric

School Name: _____   Final score: _____   Reviewer:_____

Engineering Design	Excellent 8 pts	Good 6 pts	Fair 4 pts	Poor 1 pts
Design Elements	The design elements are clearly stated, and all constraints are clearly listed	The design elements and constraints can be found but are not clearly stated at the beginning	Either the design elements or the constraints are missing	Both the design elements and constraints are absent
Brainstorming	Clear examples of brainstorming and research on design are shown.	Some examples of brainstorming and research are at least present in the presentation.	Examples of Brainstorming or research is limited.	Brainstorming and research are not clearly shown.
Approach to design	The design solution is well developed and thoroughly based on the group's consideration of construction criteria and constraints.	The design solution is well developed and is mostly based on the group's consideration of construction criteria and constraints.	The design solution is acceptable and is mostly based on the group's consideration of construction criteria and constraints.	The design solution is not and the group did not address the construction criteria and constraints.
Build process design plan	Documentation of the build process is present as well as changes or rationale in design are thoroughly noted	Documentation of the build process is present. Changes in design or rationale are noted but not necessarily complete.	Documentation of the build process is weak but present. Changes in the design process or rationale are not clearly noted.	The build process is not documented. Changes in design or rationale are not notated.
Engineering Design Innovation	The project design uses an innovative or creative approach to meeting the design elements.	The project design has innovative or creative aspects in the approach to meeting the design elements.	The project design has minimal innovative or creative aspects in the approach to meeting the design elements.	The project design has no innovative or creative aspects in the approach to meeting the design elements.
Overall Design	Final product is exactly like the original design presented and meets portability requirements.	Final Product is very close to original design. Final product resembles drawing and meets portability requirements.	The design is not clear or does not resemble the final product. Portability requirements are nearly met.	The final product has no resemblance to the original design. Project is not portable or only barely meets portability requirements.

Artistic Representation	Excellent 8 pts	Good 6 pts	Fair 4 pts	Poor 1 pts
Theme	A definite theme is apparent in the design. An efficient and/or sophisticated means is employed to present the project theme.	A definite theme is apparent in the design.	The theme is not readily. apparent and requires explanation or thought and observation to discern.	Only minimal understanding of theme is demonstrated by the designers, or the theme is not present in the design.
Variety of materials	Thought has been given as to what materials, how many materials were used in the design. Intentional choices and decision making was used in the final design.	Different types of materials were used in the design, the designers provided only some information on the choices they made and why.	Different types of materials were utilized but the designers provided no information on the choices they made and why.	Only one type of material was used.
Contrast and Emphasis	The design catches the viewer's attention using both emphasis and contrast well. **Emphasis:** The designer makes one area stand out by contrasting it with another area. The area is different in size, color, texture, shape, etc. ... **Contrast:** The designer uses contrast in the arrangement. Opposite elements such as light vs dark, rough vs smooth, large vs small are seen in the design.	The design catches the viewer's attention using either emphasis or contrast in a limited fashion. **Emphasis**: The designer makes one area stand out by contrasting it with another area. The area is different in size, color, texture, shape, etc. ... **Contrast:** The designer uses contrast in the arrangement. Opposite elements such as light vs dark, rough vs smooth, large vs small are seen in the design.	The design catches the viewer's attention using either emphasis or contrast only. **Emphasis:** The designer makes one area stand out by contrasting it with another area. The area is different in size, color, texture, shape, etc. ... **Contrast:** The designer uses contrast in the arrangement. Opposite elements such as light vs dark, rough vs small are seen in the design.	The designer does not catch the viewers' attention. Both emphasis and contrast are missing.

Variety in design	The designer is extremely successful at placing different visual elements next to one another to provide variety. Straight lines next to curvy lines; non-geometric shapes among geometric shapes; bright colors next to dull colors.	The designer includes different visual elements next to one another to provide variety. Straight lines next to curvy lines; non-geometric shapes among geometric shapes; bright colors next to dull colors.	There is some attempt at placing visual elements next to one another to provide variety. Straight lines next to curvy lines; non-geometric shapes among geometric shapes; bright colors next to dull colors.	There is no attempt at placing visual elements next to one another to provide variety. Straight lines next to curvy lines; non-geometric shapes among geometric shapes; bright colors next to dull colors.
Construction	This piece is very well constructed and sturdy. Any adhesives used do not show or are incorporated in the final design. The adhesive methods are suitable for materials employed	This piece is well constructed and sturdy. Some adhesive does show and/or is only partially incorporated in the final design. The adhesive methods are acceptable for materials employed.	For the most part the piece is well-constructed. However, there is some concern that it will withstand display and/or the manner of adhesion is messy or distracting. There are some areas that may need reinforcement.	Little attempt has been made to create a sturdy piece and/or manner of construction is extremely messy and haphazard.
Logos	The Logo's used clearly represents the school and all the various programs related to the competition. The design and/or reproduction of the logos is clear and of a high quality.	The Logo's used adequately represents the school and all the various programs related to the competition. The design and/or reproduction of the logos is clear.	The Logo's used represents the school and a most of the various programs related to the competition. The design and/or reproduction of the logos is unclear or poorly displayed.	The Logos are absent or do not represent the school and all various programs related to the competition. The design and/or reproduction of the logos is poorly done.

Power Point Representation	Excellent 8 pts	Good 6 pts	Fair 4 pts	Poor 1 pts
Presentation Organization	The presentation content has been organized using an appropriate method.	The presentation content has been mostly organized using a logical sequence, but some flaws exist.	The presentation content has been organized using a somewhat logical sequence. The presentation is sometimes confusing.	The report content is disorganized. The required information is difficult to locate within the presentation.
Group Delivery	The group effectively and creatively delivers the information while staying on topic and considering the audience. Excellent use of voice, posture, eye contact, gestures, and pace by group. Presentation is interesting and vivid to hear.	The group does a good delivery of information while staying on topic and considering the audience. Speakers are clear and confident although may not demand attention or inspire interest.	The group adequately delivers the information while staying on topic. Some of the members lack confidence, appears nervous and fidgety. Marginal use of posture, eye contact, gestures, pace. Poor voice volume and intonation.	The group delivers the information but does not stay on topic. Little consideration of audience. Uses incomplete sentences. Speaker appears anxious. Difficult to hear.
Power Point Quality	Effective use of templates or designs which make the slides visually appealing. Excellent use of high-quality photographs, graphs, images, etc. that support and enhance the presentation.	Effective use of templates. The slides were somewhat appealing. Good use of photographs, graphs, and images, etc. that help to enhance the presentation.	The slides were somewhat appealing but were not consistent. Some photographs, graphs, and images but may not enhance the presentation or support the content.	Ineffective use of templates. Few photographs, graphs, or images, or images are unrelated to content.
Power Point Readability	All words and text are large, bold, and easy to read. Statements are brief and concise. No misspellings. Excellent grammar.	Most of the words and text are large, bold, and easy to read. Statements are brief and concise. One or two misspellings. Good grammar.	Some of the words and text are difficult to read. Statements are too long or are missing important elements. A few misspellings or grammatical mistakes.	Most of the words and text are difficult to read. Statements are too long. Presentation lacks detail. Several misspellings or poor grammar.
Timing	Presentation lasted 25-30 minutes	Lasted 20 to 25 minutes	Presentation lasted 15 to 20 minutes	Presentation lasted less than 15 minutes