Barrett-Jackson
THE WORLD'S GREATEST COLLECTOR CAR AUCTIONS®

GEARING TOWARDS THE FUTURE

Presented By Honeywell

GEARING TOWARDS THE FUTURE

Science, Technology, Engineering and Math! Barrett-Jackson, The World's Greatest Collector Car Auctions, is partnering with Arizona SciTech Institute to bring you Gearing Towards The Future — a community, education and outreach initiative focused on STEM education.

Barrett-Jackson's Gearing Towards The Future aims to encourage and develop future automotive engineers and technicians through age-appropriate STEM challenges focused on teaching students how to solve problems and develop new skills using real-life scenarios related to automobiles.

SCITECH INSTITUTE

ARIZONA MILK PRODUCERS

https://stem.barrett-jackson.com

2024 CHALLENGES

Grades K-5

Create a Mars Rover That Can Navigate the Martian Terrain Presented by Arizona SciTech.

Grades 6-8

Design and Build an Advanced Air Mobility Vehicle Presented by Honeywell.

Grades 8-12

Life Cycle Analysis, Energy Engineering and STEM Careers in Dairy Production Presented by Arizona Milk Producers.

DESIGN AND BUILD AN ADVANCED AIR MOBILITY VEHICLE

Use the Engineering Design Process to design and build an advanced air mobility vehicle capable of transporting 4 passengers and 1 pilot at least 2 ft in the air and landing safely.

Related Standards:

6.P2U1.4: Develop and use a model to predict how forces act on objects at a distance.

7.P3U1.4: Use non-algebraic mathematics and computational thinking to explain Newton's laws of motion.

8.P4U1.3: Construct an explanation on how energy can be transferred from one energy store to another.

Engineering Design Thinking: Project must demonstrate the use of engineering design thinking. Submissions can utilize an engineering design process of your choosing, as long as it encompasses some form of the following steps:

1. Situating- show evidence of background research

2. Choice- show evidence of brainstorming, prototyping, and use of a decision matrix for design elements

3. Defending- show evidence of iteration and improvements

4. Communicating/Connecting- demonstrate product and how it aligns to the problem statement

Team Roles:

Project Engineer: The project manager is responsible for planning, executing, and closing the project. They coordinate team members, set goals, create schedules, and ensure that the project is completed within the budget and on time.

Design Engineer: A design engineer is someone who uses creative thinking and technical knowledge to solve problems, design projects, or create the prototype.

Test Engineer: A test engineer is a student who is responsible for evaluating and assessing the functionality, performance, or effectiveness of the project

Documentarian: The Documentarian is responsible for capturing and documenting the journey of your design, learning, and achievements.

Criteria:

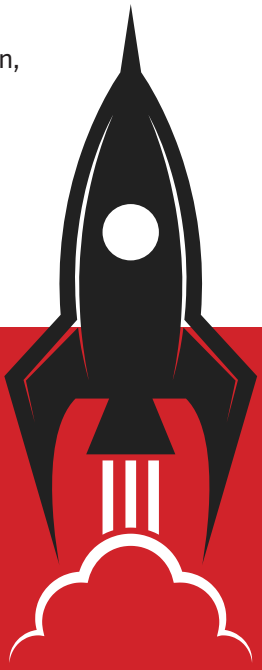
Must transport 4 paper clips (passengers) and 1 paper clip (pilot) Must achieve vertical take-of.

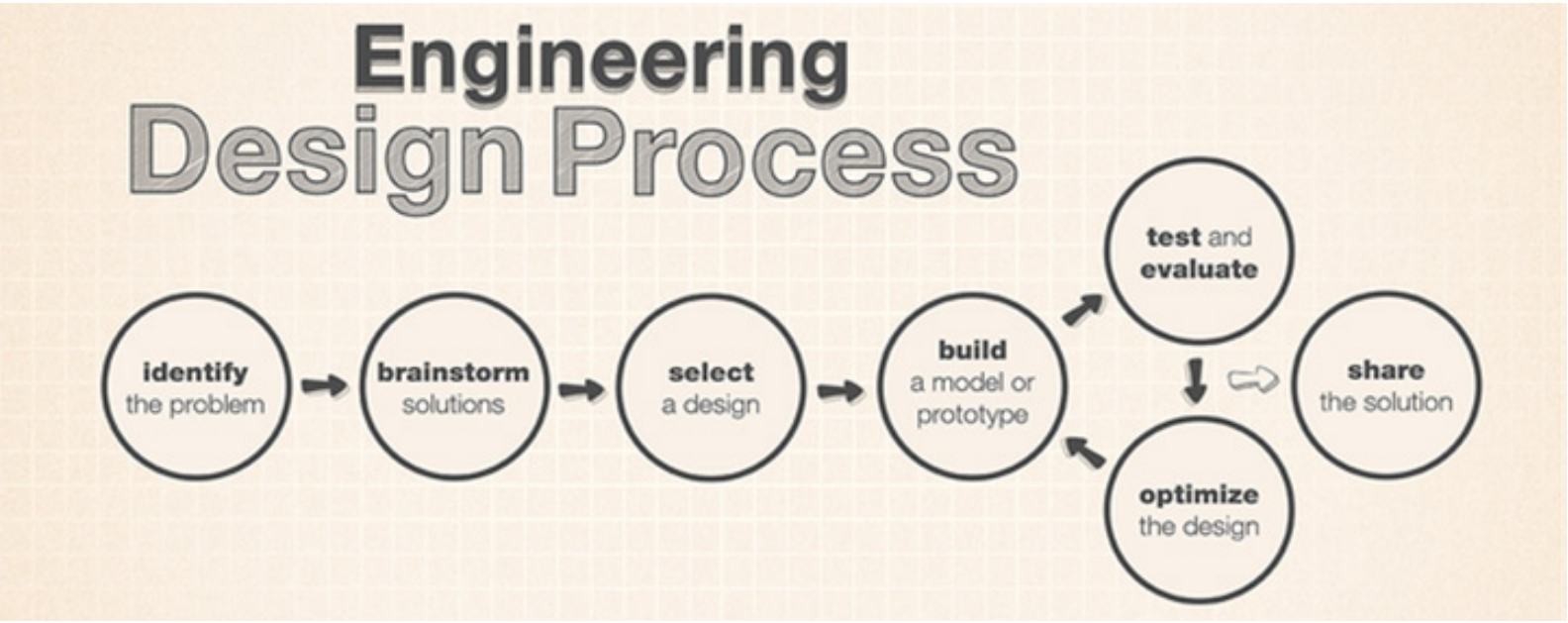
The passengers and pilot must still be in the vehicle when it lands.

Constraints:

Weight- cannot exceed 5.5 oz (about the weight of a banana).

*Materials posted online.





Materials that May Be Used:

- 1 cup or container (no larger than 20 fluid oz)
- Cardboard
- Construction paper
- Aluminum foil
- Popsicle sticks
- Drinking straws
- Writing utensils of your choice
- Paper clips
- Plastic utensils/ cutlery
- Rubber bands
- Balloons
- Tape (any)
- String (any)
- Glue

Table 1: Calculate Total Supply Cost

Supplies	Quantity Used	Cost Per Item (points)	Total Cost (points)
1 cup or container (no larger than 20 fluid oz)	1	free	0
Cardboard		free	0
Construction paper (1 sheet)		2	
Aluminum foil (1 square foot sheet)		5	
Popsicle stick		5	
Drinking straw		2	
Writing utensil		2	
Paper clip		2	
Plastic spoon		2	
Rubber band		10	
Balloon		10	
Tape (1 ft)		5	
String (1 ft)		5	
Glue		Free	0
Total Supply Cost			

Table 2: Calculate Final Score

Criteria	Excellent (30)	Good (20)	Fair (10)	Poor (0)	Score
Vehicle Max Height Achieved	Greater than 3 feet	2-3 feet	1-2 feet	Less than 1 foot	
Pilot Landing	Vehicle landed with pilot still inside			Vehicle landed without the pilot still inside	
Passenger Landing	Vehicle landed with all four passengers still inside			Vehicle lost passengers	
Engineering Design Process	All steps of the engineering design process are documented on paper or a digital document, describing each step and at least one sketch	All steps of the engineering design process are documented and at least one sketch	Only some steps of the engineering design process are recorded, and/or there is not a sketch included	Documentation of the engineering design process is not included in the submission	Multiply by 2:
Visual Design	The vehicle includes cohesive and creative physical and visual design elements	The vehicle includes physical and visual design elements, but they are not cohesive and/or creative	The vehicle includes only physical or only visual design elements	The vehicle does not include any physical or visual design elements	
Video Submission	Video is submitted showing flight and outcome of passengers and pilot	Video is submitted showing some flight and/or does not show the outcome of all passengers and pilot	Video is submitted that does not show the flight and/or does not show any passenger/pilot outcomes	A video is not submitted	
Subtract Tallied Supply Cost					
TOTAL SCORE					