NASA TECHRISE STUDENT CHALLENGE

2024-25 Challenge Overview

https://www.futureengineers.org/nasatechrise

The Challenge

NASA is calling on middle and high school students to join the fourth NASA TechRise Student Challenge, which invites students teams to submit experiment ideas to fly on a high-altitude balloon.

Students in sixth to 12th grades at a U.S. public, private, or charter school – including those in U.S. territories – you are challenged to team up with your schoolmates to design an experiment under the guidance of an educator.

The high-altitude balloon will offer approximately four - eight hours of flight time at approximately 70,000-95,000 feet and exposure to Earth's atmosphere, high-altitude radiation, and perspective views of our planet.

The NASA TechRise contest offers participants hands-on insight into the payload design and suborbital flight test process, with the goal of inspiring a deeper understanding of space exploration, Earth observation, coding, electronics, and the value of test data.

Prizes

60 winners will be selected to build their payload. The prize package consists of:

- $1,500 to build the experiment
- A flight box in which to build the experiment
- An assigned spot to test the experiment on a high-altitude balloon
- Technical support from Future Engineers advisors when building the experiment

Watch the Challenge Video!

NASA TECHRISE STUDENT CHALLENGE

Challenge Timeline

Educator Workshops Begin	Contest Opens	Student Virtual Field Trip	Educator Workshops End	Entries Due	Winners Begin Build	Experiments Launch
Jul 15 2024	Aug 1 2024	Sept 20 2024	Oct 11 2024	Nov 1 2024	Jan 21 2025	Jun/Jul 2025

Regions

- Teams will compete within their state or territory

Steps to Enter

- **STEP 1: FORM A TEAM**

Your team needs to have at least 4 students and one educator/teacher.

- **STEP 2: REVIEW PROPOSAL TEMPLATE AND GUIDE**

Your entry needs to be a written proposal that describes your experiment. It's important to review both the proposal template and guide to understand the requirements.

- **STEP 3: LEARN ABOUT BALLOONS**

Watch the NASA TechRise Student Challenge high-altitude balloon video and review the balloon brainstorming slide deck and design guidelines to learn about the conditions in Earth's atmosphere and the types of data that can be collected at approximately 70,000 - 95,000 feet.

- **STEP 4: PLAN YOUR EXPERIMENT**

Use the high-altitude balloon brainstorming and components design resources to explore experiment ideas and consider how to build your idea.

- **STEP 5: SUBMIT YOUR PROPOSAL**

Once your proposal is done, save it as a PDF so that the team leader (educator/teacher) can submit it online.

Proposal Template & Guide

Write up the experiment idea using the [Proposal Template & Guide]

NASA TechRise

PROPOSAL TEMPLATE & GUIDE

Your team's entry must be a proposal submitted as a PDF (max 20 MB). Please review the template and guide below to develop your proposal. DO NOT include personally identifiable information such as school names, team member first & last names, photos of people, or other identifiable information in your proposal. However, mentioning names of significant figures (i.e., an astronaut) is okay if it helps explain your entry. All other names will be redacted. Once written, the team lead (teacher or school employee) can submit the proposal on the challenge website. Per the NASA TechRise Challenge Rules, your team's proposal must be an original creation that has not been previously submitted for or selected as a winner in a promotion or competition of any type. Team leads can submit an unlimited number of proposals. All entries will be judged using the following criteria:

- 40 Points: Impact - To what extent does the submission demonstrate a positive impact on the team's education, providing an opportunity for the team to gain new STEM-related skills?
- 20 Points: Connection - How connected is the submission to NASA's mission to explore the unknown in air and space, innovate for the benefit of humanity, and inspire the world through discovery?
- 20 Points: Alignment- How well does the proposed design of the experiment support the team's hypothesis.
- 20 Points: Design - How well does the submission meet the design guidelines?
- 10 Bonus Points for Title 1 Schools

PROPOSAL TEMPLATE

To develop your NASA TechRise proposal, please use one of the following templates and follow the guide below.

- Download the fillable PDF template HERE
- Download the MSWord template HERE
- Download the Google Docs template HERE

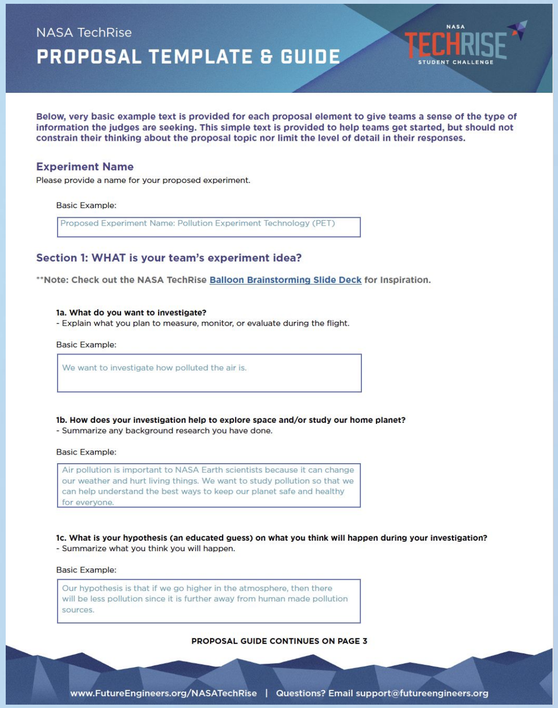
Note - You are welcome to recreate the template so long as your proposal includes all of the required sections and meets the required font and margin guidelines listed below.

PROPOSAL GUIDE

Proposal Narrative: Pages 1-3

The proposal narrative should be written by STUDENTS. The proposal may not exceed 3 pages and should be formatted using 11-point Times New Roman font, single-spaced, with 1-inch margins. The proposal narrative must include an experiment name and the three sections below. DO NOT include hyperlinks to additional proposal information, files, or websites you have developed. This is beyond the 3-page limit. All links will be removed prior to judging. Citations, however, are acceptable.

PROPOSAL GUIDE CONTINUES ON PAGE 2



NASA TechRise

PROPOSAL TEMPLATE & GUIDE

Below, very basic example text is provided for each proposal element to give teams a sense of the type of information the judges are seeking. This simple text is provided to help teams get started, but should not constrain their thinking about the proposal topic nor limit the level of detail in their responses.

Experiment Name

Please provide a name for your proposed experiment.

Basic Example:

Proposed Experiment Name: Pollution Experiment Technology (PET)

Section 1: WHAT is your team's experiment idea?

Note: Check out the NASA TechRise Balloon Brainstorming Slide Deck for inspiration.

1a. What do you want to investigate?
- Explain what you plan to measure, monitor, or evaluate during the flight.

Basic Example:

We want to investigate how polluted the air is.

1b. How does your investigation help to explore space and/or study our home planet?
- Summarize any background research you have done.

Basic Example:

Air pollution is important to NASA Earth scientists because it can change our weather and hurt living things. We want to study pollution so that we can help understand the best ways to keep our planet safe and healthy for everyone.

1c. What is your hypothesis (an educated guess) on what you think will happen during your investigation?
- Summarize what you think you will happen.

Basic Example:

Our hypothesis is that if we go higher in the atmosphere, then there will be less pollution since it is further away from human made pollution sources.

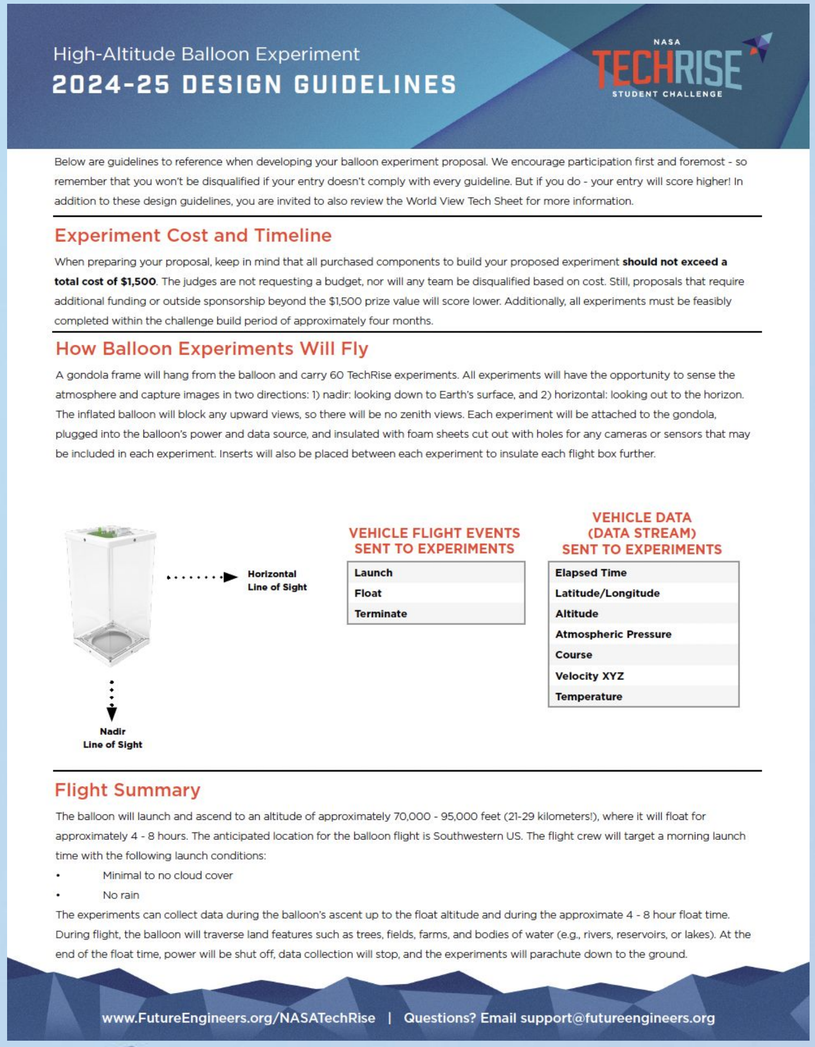
PROPOSAL GUIDE CONTINUES ON PAGE 3

Design Guidelines

Review the Balloon Design Guidelines before submitting your proposal. A few examples include…

- Your experiment idea must be realistic so that it can be built within ~4 months
- Your experiment must fit in a 4 inches x 4 inches x 8 inches box.

- Balloon experiments, including the flight box, screws, electronics, and all components inside, can weigh no more than 1 kilogram (2.2 pounds).



High-Altitude Balloon Experiment

2024-25 DESIGN GUIDELINES

Below are guidelines to reference when developing your balloon experiment proposal. We encourage participation first and foremost - so remember that you won't be disqualified if your entry doesn't comply with every guideline. But if you do - your entry will score higher! In addition to these design guidelines, you are invited to also review the World View Tech Sheet for more information.

Experiment Cost and Timeline

When preparing your proposal, keep in mind that all purchased components to build your proposed experiment **should not exceed a total cost of $1,500**. The judges are not requesting a budget, nor will any team be disqualified based on cost. Still, proposals that require additional funding or outside sponsorship beyond the $1,500 prize value will score lower. Additionally, all experiments must be feasibly completed within the challenge build period of approximately four months.

How Balloon Experiments Will Fly

A gondola frame will hang from the balloon and carry 60 TechRise experiments. All experiments will have the opportunity to sense the atmosphere and capture images in two directions: 1) nadir: looking down to Earth's surface, and 2) horizontal: looking out to the horizon. The inflated balloon will block any upward views, so there will be no zenith views. Each experiment will be attached to the gondola, plugged into the balloon's power and data source, and insulated with foam sheets cut out with holes for any cameras or sensors that may be included in each experiment. Inserts will also be placed between each experiment to insulate each flight box further.

VEHICLE FLIGHT EVENTS SENT TO EXPERIMENTS
Launch
Float
Terminate

VEHICLE DATA (DATA STREAM) SENT TO EXPERIMENTS
Elapsed Time
Latitude/Longitude
Altitude
Atmospheric Pressure
Course
Velocity XYZ
Temperature

Flight Summary

The balloon will launch and ascend to an altitude of approximately 70,000 - 95,000 feet (21-29 kilometers!), where it will float for approximately 4 - 8 hours. The anticipated location for the balloon flight is Southwestern US. The flight crew will target a morning launch time with the following launch conditions:

- Minimal to no cloud cover
- No rain

The experiments can collect data during the balloon's ascent up to the float altitude and during the approximate 4 - 8 hour float time. During flight, the balloon will traverse land features such as trees, fields, farms, and bodies of water (e.g., rivers, reservoirs, or lakes). At the end of the float time, power will be shut off, data collection will stop, and the experiments will parachute down to the ground.

www.FutureEngineers.org/NASATechRise | Questions? Email support@futureengineers.org

Entries Due by Nov. 1, 2024, 11:59 PM PT

- A proposal needs to be written by students and submitted by a teacher/educator. All proposals must include the following sections:

- **WHAT** is your team's experiment idea? What do you want to investigate? How does your investigation help to explore space and or our home planet?

- **HOW** do you imagine your experiment would work? What components and or technologies might you need to make it run?

- **WHY** do you want to propose this experiment idea? What impact will building and testing your experiment have on your school team? What new knowledge or skills would your team gain by doing this project? How is your experiment connected to NASA's mission?