NASA TechRise Student Challenge FAQs
Last Updated:
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ABOUT THE CHALLENGE:

What is the NASA TechRise Student Challenge?

- NASA is calling on middle and high school students to join the fifth NASA TechRise Student Challenge, which invites student teams of four or more to submit science and technology experiment ideas to fly on a commercial suborbital-spaceship or high-altitude balloon. Students in sixth to 12th grades attending a U.S. public, private, or charter school – including those in U.S. territories – are challenged to team up with their schoolmates to design an experiment under the guidance of an educator. Administered by Future Engineers, the challenge offers participants hands-on insight into the payload design and suborbital flight test process, with the goal of developing critical skills in engineering, computing, electronics, and more that will be required for America's technical workforce. The challenge opens on September 4, and teams should submit their experiment ideas by the challenge deadline on November 3, 2025.

  A total of 60 winning teams will be selected to build their proposed experiment. Each winning team will receive $1,500 to build their experiment, a starter kit that includes a flight box in which to build it, and an assigned spot to test their experiment on a NASA-sponsored suborbital-spaceship or high-altitude balloon flight. Winning teams will also receive technical support from Future Engineers advisors, who will help students learn the skills needed to turn their experiment idea into reality. No experience is necessary, and it is free to join the NASA TechRise Student Challenge!

  Details at: https://www.futureengineers.org/nasatechrise

What's the timeline for the NASA TechRise Student Challenge?

- Challenge Opens: September 4, 2025
- Student Virtual Field Trip: September 25, 2025
- Entries Close: November 3, 2025 at 11:59 p.m. PT
- Winners Announced & Experiment Build Starts: January 20, 2026
- Experiment Build Period: January 20–May 15, 2026
    - Experiment Build Period: Winning teams will be asked to join a virtual kick-off orientation meeting and then scheduled to meet virtually with the NASA TechRise Technical Advisory team on a weekly basis to begin the experiment planning and build process. Additionally, teams will be provided with a

NASA TechRise starter kit to help launch their design and build process. All experiments must be mailed to Future Engineers no later than May 16, 2026.

- Virtual Winner Experiment Showcase: May 15, 2026
- Experiments Ship to Future Engineers: May 16, 2026
- Experiments Launch: Summer 2026

What is the different between a "payload" and an "experiment"?

- A "payload" refers to the components (also called hardware) that are used to create an experiment. Hence, the words "payload" and "experiment" can often be used interchangeably.

What is an entry in the competition?

- An entry is a student-written proposal submitted by the educator affiliated with the team (Team Lead) and a team of four or more students from the same school. The proposal will explain the team's proposed experiment idea. Teams are not required to build anything or have any prior skills or knowledge to submit an entry. We provide all of the necessary educational materials to develop your proposal. If selected as a winner, the teams will then embark on their educational journey to work under the guidance of Future Engineers' technical advisory team to design, build, refine, and fly their experiment for testing on a NASA-sponsored commercial flight. Please use the NASA TechRise Proposal Example and Template to submit your proposal.

Is participation in the NASA TechRise Student Challenge free?

- Yes. Students in sixth to 12th grades attending a U.S. public, private, or charter school – including those in U.S. territories – are encouraged to team up with their schoolmates to design an experiment under the guidance of an educator.

PARTICIPATION & ELIGIBILITY:

Who is eligible for the competition?

- U.S. public, private, and charter schools incorporated in and maintaining a primary place of business in the United States that serve students in the range of sixth to 12th grades are eligible to assemble a team (or multiple teams) and enter. Eligible schools include schools in the fifty United States, District of Columbia, U.S. Territories or Possessions, and schools operated by the U.S. for the children of American personnel overseas. Unfortunately, Department of Defense Dependents Schools and other federal entity schools are not eligible to participate. You can find more information about this in the Challenge Rules.

Why are Department of Defense (DOD) schools excluded from this challenge?

- NASA is conducting this public challenge under the authority of the America COMPETES Reauthorization Act, which directs prize funds to non-federal entities only. DOD schools are a federal entity and are, therefore, restricted from winning a prize. The COMPETES Act intends to stimulate innovation outside the federal sector.

Can homeschool students participate?

- At this time, participation in the NASA TechRise Student Challenge is limited to public, private, and charter schools. All prize money will be awarded to the school, and all experiment build activities will fall under the school's liability insurance policy. Homeschool students affiliated with a larger homeschool charter or umbrella school that carries the necessary liability insurance to operate a school may form a team with other students and an adult employee at their affiliated school.
- Independent home school students who are NOT affiliated with a public, private, or charter school are ineligible to participate at this time. These eligibility requirements are specific to the NASA TechRise Student Challenge. All other challenges on the Future Engineers site are open to homeschool students, and there are lots of exciting opportunities, so stay tuned!

Can afterschool clubs participate?

- Yes, if the club is part of school activities and a school employee can serve as a Team Lead for a team of four or more sixth - 12 grade students from the same school, the school club is eligible to participate.

Can offsite afterschool programs join the TechRise Challenge?

- At this time, NASA TechRise Student Challenge participation is limited to public, private, and charter schools. These eligibility requirements are specific to the NASA TechRise Student Challenge. All other challenges on the Future Engineers site are open to students affiliated with afterschool programs, and there are lots of exciting opportunities, so stay tuned!

What is the difference between the Entrant and the Team Lead?

- The Entrant is the eligible sixth to 12th grade student in a U.S. public, private, or charter school. The Team Lead is the teacher, educator, or other adult employee of the school that will lead the student group and assist them in submitting their proposal. This means that the school will be awarded the prize money, and the experiment build will be part of the school's insured activities. You can find more information about this in the Challenge Rules.

Do I need to get parent signatures for students to participate?

- Parent signatures are not required to enter the competition; however, if your team's proposal is selected as a winner, the Team Lead will be required to obtain consent from all team members' parents'/legal guardians regarding participation in the challenge and experiment build activities. When required, a consent form will be provided.

Can the "Team Lead" or teacher change throughout the challenge timeline?

- Yes, a substitute Team Lead can be appointed, provided the new Team Lead also works at the school and satisfies the eligibility requirements. You can find more information about this in the Challenge Rules.

Is this challenge open to international participants?

- No. This challenge is only open to schools in the United States and its territories. For details on eligibility, please visit the Challenge Rules.

FORMING A TEAM:

What is the minimum number of students allowed on a team?

- Your NASA TechRise team must include one Team Lead (an adult employee from your school) and at least four team members (students from your school).

What is the maximum number of students allowed on a team?

- There is no maximum number of students on the same team, but all student teammates must attend the same school.

Can students from multiple grade levels participate on a team?

- Yes. Students from different grade levels can be on one team. Team members just have to be in sixth to 12th grade.

Can students from different schools be on one team?

- No. At this time, participation is limited to students from the same school.

My class will change throughout the timeline of the proposal. Can I add students to my team?

- Yes, students may be added to the team so long as they attend the same school as the Team Lead. However, if selected as a winner, the Team Lead may be required to obtain parent/legal guardian consent for any student involved in the experiment build and therefore will have to do so if a new student is added during the experiment build period.

Can a student enter the challenge on two different teams?

- Yes. Teachers/schools may submit multiple entries, and students can participate on different teams at their school, but each entry should be unique. Prizes, however, are limited to one winner per school, regardless of how many proposals are submitted.

PROPOSAL SUBMISSION AND RULES:

Can one teacher/team/school submit multiple entries?

- Yes! Teachers/schools may submit multiple entries, but each entry should be unique. Prizes, however, are limited to one winner per school, regardless of how many proposals are submitted. If a school submits multiple proposals and one is selected as a winner, the school can add students from the other proposals to the winning team.

How and when do we submit our entry? Do we have to submit the proposal in a specific format?

- Teams should write a proposal that explains their experiment idea and its impact using the NASA TechRise Proposal Example & Template. The final proposal must be saved/exported as a PDF file and submitted to the NASA TechRise Student Challenge page on or before or 11:59 p.m. Pacific Time on November 3, 2025.

Can Future Engineers help us with our entry?

- Future Engineers cannot mentor teams or provide advice on any experiment ideas during the entry phase.
    - However, Future Engineers can answer any logistical questions your team has regarding completing or submitting your proposal. They will also be available to clarify the Challenge Rules, and the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon) or answer any other questions you might have along the way.
    - Additionally, after the entry period is closed, and if your team's proposal is selected as a winner, Future Engineers will provide weekly technical assistance and office hours throughout the experiment build period to help prepare your experiment for flight.

      Please reach out to support@futureengineers.org for assistance.

Can a student team get help from someone other than a teacher or other employee at our school?

- Yes, you can. Teams are welcome to reach out to anyone not associated with NASA that they think can assist them with brainstorming their idea for the challenge. However, students are expected to write their team proposal and, if selected as a winner, build their team experiment.

Do we have to use the proposal template?

- You do not have to use the provided proposal template. However, you do have to adhere to the parameters of the Proposal Example & Template.

JUDGING AND WINNER SELECTION:

Will the winners get the payloads back after the flights?

- The flight providers will do their best to retrieve and mail the payloads back so that students can analyze their experiment data and results. (In other words, YES, but we have to give full disclosure that there is always a small chance that an experiment can't be retrieved or will be damaged during flight).

How are the entries judged?

- All entries will be judged against other entries submitted in their state/territory. In their reasonable technical opinion, the judges will determine how well each entry addresses the Judging Criteria to select the winners in each per the rules. For more detailed information on the Judging Criteria and the judging process, please see the Challenge Rules.

How many winners will be selected?

- A total of 60 winners will be selected across the U.S. states and territories. Please refer to the Challenge Rules for additional details.

What support will I receive to build my payload if my team is selected as a winner?

- Future Engineers will provide weekly virtual technical assistance meetings and office hours throughout the experiment build period to help winning teams prepare their experiment for flight.
- Future Engineers will provide a NASA TechRise starter kit and tutorial videos to help teams get started with the build process.

Is $1,500 the maximum our team can spend on our experiment?

- When developing your proposal build plan, keep in mind that all purchased components to build your proposed experiment should not exceed $1,500. The judges are not requesting a budget, nor will any team be disqualified based on cost, but proposals that require additional funding or outside sponsorship beyond the $1,500 prize value will score lower.

EXPERIMENT GUIDELINES AND FLIGHT VEHICLES:

Can you perform multiple tests within one experiment?

- Yes. You can perform multiple tests as long as the experiment idea(s) fits within the size and weight limit allowed. See the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon).

Will experiments be exposed to the outside environment at altitude?

- **High-Altitude Balloon Experiments:** Yes, the experiments will be mounted on a gondola frame that hangs from the balloon and rises to 70,000–95,000 feet.
- **Suborbital-Spaceship Experiments:** No, the suborbital-spaceship flight experiments will be mounted within a payload locker pressurized similarly to an airplane cabin with no line of sight to the exterior of the vehicle.

Is previous experience with microcontrollers/electronics needed to participate?

- No. If selected as a winner, your team will receive technical support from Future Engineers mentors. They will help guide you through the process of refining your concept design, building, and coding your experiment.

Will the experiments have coastline views?

- **High-Altitude Balloon Experiments:** No. The high-altitude balloon will be launched at an inland location. However, there may be views of vegetation (natural or agricultural) and/or bodies of water (e.g., rivers, reservoirs, lakes).
- **Suborbital-Spaceship Experiments:** No. The experiments don't have views outside of the payload locker or the exterior of the vehicle.

Will the experiments have line of sight to the exterior of the flight vehicle?

- **High-Altitude Balloon Experiments:** On the balloon flight, the experiment will have a line of sight in two directions during flight – down to the Earth (nadir) and out to the horizon (horizontal).
- **Suborbital-Spaceship Experiments:** No. The suborbital-spaceship flight experiments will be mounted within a payload locker with no exterior exposure.

What sensors can my team use?

- You are more than welcome to use any sensor that would be appropriate for your experiment. While we have provided a Hardware Components Worksheet (Suborbital-Spaceship, High-Altitude Balloon), this is by no means a required component list. We realize that there are many components out there that will work in a flight experiment. Teams are free to choose other sensors; however, we do advise you to choose sensors that align with the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon).
- For fairness, Future Engineers is not able to advise on what specific components should be included in your team's proposal. However, if your team wins, a Future

Engineers expert will review your hardware components to ensure compliance with the vehicle requirements and suggest alternative components if needed.

What microcontrollers can my team use? For example, can we use a Raspberry Pi?

- TechRise winners will be provided a microcontroller such as the Metro M4 as part of their introductory learning kit. This microcontroller can be programmed in Circuit Python or Arduino IDE (Integrated Development Environment). This will be the primary microcontroller for the experiment. However, teams may be allowed to add additional microcontrollers as long as they adhere to flight requirements and, if selected as a winner, are approved by a NASA TechRise mentor.
- Something to note is that there are voltage and amperage limitations listed in the Design Guidelines (High-Altitude Balloon, Suborbital-Spaceship). Some microcontrollers do not work as well with such restrictions, so if you are interested in using a Raspberry Pi, we would advise you to look at the voltage and amperage Design Guidelines and then look at the different types of Raspberry Pi microcontrollers that will work successfully with the limitations. Another consideration is that we have a few flight simulator support materials on the NASA TechRise Student Challenge page that are focused on the CircuitPython language. If you want to leverage those resources, you may want to use a microcontroller with CircuitPython.
- If selected as a winner, Future Engineers mentors will help you with ensuring your microcontroller is best suited for your experiment. So, just do your best on the proposal.

How will the microcontroller and various other electronics be powered?

- Your experiment will receive power and data from the flight vehicle. See the Design Guidelines (High-Altitude Balloon, Suborbital-Spaceship).

What is the experiment flight vehicle interface?

- A DB9 cable on the flight vehicle will connect to the payloads through a circuit board called the payload interface board (PIB). If selected as a winner, this component will be provided in the NASA TechRise prize box starter kit. That circuit board has the DB9 plug on the exterior. On the interior, the payload interface has connectors on standard JST-XH pin headers that provide connections to 9V, 5V, 3V, and ground.
- Depending on what electronics you need to power, you can use any of the power supplies referenced above. For a Metro M4 Express, for example, you can power it directly from the 5V and ground pins. The interface also converts the flight data, so you can connect the UART RX pin on any compatible microcontroller to the TX pin on the payload interface to receive flight data from the vehicle.
- Please see the Design Guidelines (High-Altitude Balloon, Suborbital-Spaceship) for more details.
    - **Note:** If selected as a winner, Future Engineers mentors will help you with ensuring your experiment is compliant. So just do your best on the proposal.

Can we use DNA or viruses in our proposal idea?

- **High-Altitude Balloon Experiments:** Viruses are NOT allowed. DNA that is within a sterile solution can be used. It is important to note that the experiments may sit in the dark for several months as they await launch day. Therefore, we advise that teams ensure their solution has a long shelf life and can withstand environmental conditions listed in the Design Guidelines (High-Altitude Balloon)
- **Suborbital-Spaceship Experiments:** Viruses are NOT allowed. Additionally, liquids are NOT allowed. However, dehydrated samples containing DNA are allowed. See Design Guidelines (Suborbital-Spaceship).

If using liquid in our experiment, do we need to double case our entire experiment, or only the liquid?

- **High-Altitude Balloon Experiments:** The Future Engineers technical advisory team will work with winning teams to handle double containment needs.
- **Suborbital-Spaceship Experiments:** For suborbital-spaceship experiments, liquids are NOT allowed.

Can we use blood in our experiment?

- **High-Altitude Balloon Experiments:** For the high-altitude balloon, real blood is not permitted. Artificial blood is allowed as long as it complies with the liquid requirements listed in the Design Guidelines (linked below). It is important to note that the experiments may sit in the dark for several months as they await launch day. Therefore, we advise that teams ensure their solution has a long shelf life and can withstand environmental conditions listed in the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon).
- **Suborbital-Spaceship Experiments:** For the suborbital-spaceship, liquids are NOT allowed.

Can yeast be used in an experiment?

- **High-Altitude Balloon Experiments:** Yes. Substances such as yeast that are dormant until activated may be used as long as they are not activated until the experiment is in flight. Keep in mind that activation will have to be automated as experiments could sit for several months prior to flight and activation of the experiment.
- **Suborbital-Spaceship Experiments:** Liquids are NOT allowed. Therefore, dormant substances such as yeast can be flown but CANNOT be activated with liquids.

Would it be permissible to use a slightly radioactive substance such as americium-241, which is found in smoke detector batteries, in an experiment payload?

- No, we have determined that this would be unallowable. It would require extra layers of safety approvals for handling, shipping, and flight provider acceptance which

would be out of scope for the NASA TechRise Student Challenge. However, low-level radiation sources are permitted for classroom use in order to test radiation sensors.

Can we collect air samples during the flight?

- **High-Altitude Balloon Experiments:** Yes, the payload will have environmental access, meaning you can directly sample the surrounding air with whatever air sampling device you design. Keep in mind that activation will have to be automated as experiments could sit for several months prior to and after flight.

- **Suborbital-Spaceship Experiments:** You may collect an air sample from within the vehicle (similar to airplane cabins) but remember that your experiment will not have access to external environmental conditions outside of the suborbital-spaceship.

Can we have a controlled fire on our experiment?

- No, fire is not allowed.

Will the high-altitude balloon be facing the sun during the experiment?

- The balloon will likely face the sun at some point, but we cannot guarantee any side of the balloon will face the sun as the orientation entirely depends on the air currents.

Will the high-altitude balloon rotate or remain stable during the flight?

- The high-altitude balloon will rotate around the vertical axis, normally at a slow rotation rate, however, it is dependent entirely on the environmental conditions so abnormal wind currents can increase those rates.

Is there a limit to how many sensors we can use?

- There is no limit to how many sensors you can include in your proposal as long as your entire experiment meets the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon). However, if your team wins, a Future Engineers expert will review your hardware components to ensure compliance with the vehicle requirements.

Is the suborbital-spaceship a rocket? / How is the suborbital-spaceship different from a rocket?

- A traditional rocket is a flight vehicle that uses rocket motors that ignite from the ground to get to its highest point of the flight (apogee). A suborbital-spaceship, on the other hand, is flight vehicle that is carried to 45,000 feet by another vehicle (the launch vehicle) and is then released and ignites to boost itself to apogee. Rocket motors ignite from the ground and suborbital-spaceship motors ignite mid-air.

BUILD PHASE AND FLIGHTS:

What is the box our experiment will go into made of?

- The box is made of polycarbonate and the panels are designed to allow components to be mounted. See the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon) for more details.

Do we have to use the flight box or can we make our own?

- Your team has to use the flight box provided if selected as a winner. You can see an image of that flight box on the Design Guidelines (Suborbital-Spaceship, High-Altitude Balloon). You can drill holes through the side walls of the flight box to mount your components. However, your entire experiment has to fit inside the flight box and meet all Design Guidelines.

Will the winning teams be able to watch the launch?

- Given the remote location of the launch and safety considerations, teams are not authorized to attend the launch in person. However, they are invited to attend a special virtual viewing of the launch.

Are there any actual holes pre-made in the flight box so that the contents of the box are exposed?

- The payload flight box has vehicle-mounting points and a large hole in the bottom. The four vertical walls are designed so that teams can easily drill through or cut holes in the plastic for custom-mounting or environmental access.