The NASA TechRise Student challenge invites student teams to develop experiment ideas for either a suborbital rocket or a high-altitude balloon. Due to the uniqueness of this challenge, there are suborbital rocket guidelines and high-altitude balloon guidelines. Please select the vehicle type to below to view the guidelines applicable to your entry type.

### Design Guidelines

**Experiment Cost**
When developing your experiment, it is important that all purchased components to build your proposal be no more than $500. The budget is not requiring a detailed budget nor will any team be disqualified based on cost, but proposals that require additional funding or outside sponsorship beyond the $500 price will score lower.

**How Balloon Experiments Will Fly**
Below is an example mounting configuration with 20 balloon experiments aboard one HotAirTechRise balloon flight. A gondola frame will hang from the balloon and there will be four “droppers” with 5 experiments each. All experiments will be secured to the top of the balloon. The droppers will release up to 100 feet apart, allowing for the experiment to capture the atmosphere and deploy its own experiment. Each dropper will have a camera, GPS, and a temperature sensor. All experiments will be dropped in quick succession to ensure they all hit the same conditions. The bottom and upper limit of the experiment will be fully exposed to the environment and there will be no views of the surrounding area.

**Flight Summary**
For high-altitude balloon experiments, the balloon will launch and ascend to an altitude of approximately 75,000 feet, where it will float for at least four hours. The balloon will then begin the descent toward Earth and will travel about 200 miles in the wind before it hits the ground. The experiment will take a series of images using a high-resolution camera. The experiment will be programmed to take pictures at regular intervals during the flight. The power to the experiment will be shut off at the beginning of the flight, and the experiment will be activated before the balloon hits the ground.

**Suborbital Rocket Experiments**
When developing your proposal for a suborbital rocket, it is important that all purchased components be no more than $500. The budget is not requiring a detailed budget nor will any team be disqualified based on cost, but proposals that require additional funding or outside sponsorship beyond the $500 price will score lower.

**Do we need to choose between Blue Origin and UP Aerospace rockets?**
No, teams do not need to or get to choose which rocket they will fly with. There are two rockets, with two sets of unique requirements, but all proposals should be developed using these guidelines. Both rockets can be used to launch the experiment.

**Generalized Suborbital Rocket Flight Summary**
When a rocket goes up and comes back down without going around the Earth, it is called a suborbital rocket. The NASA TechRise suborbital rocket will be an 18-minute flight to an altitude of 100,000 feet above sea level, where it will float for at least four hours. The experiment will be programmed to take pictures at regular intervals during the flight. The power to the experiment will be shut off at the beginning of the flight, and the experiment will be activated before the balloon hits the ground. The experiment will be activated in a transparent container inside the rocket, and all suborbital rocket experiment ideas should focus on what’s going on inside the flight experiment box during the flight. The experiment will not leave the Earth. On the other hand, the experiments will be launched into space. The experiments will undergo very strong vibrations throughout the flight, and depending on the payload, they may experience accelerations of up to 8g (measured to a helmet), temperatures between -150 to 150 degrees C, and ambient pressures that could range between 2 to 0.1 bar. Depending on the rocket, your experiment could undergo long periods of dark or excessive maneuvering prior to reaching microgravity conditions. During this time, the experiments will experience shock waves when the spacecraft is deployed prior to touchdown. Please refer to the suborbital rocket experiment design guidelines below to plan your experiment.

Please click to view the
NASA TechRise High-Altitude Balloon Guidelines

Please click to view the
NASA TechRise Suborbital Rocket Guidelines