Challenge Resource & Pacing Guide

Use this pacing guide to help you plan out how to participate in the TechRise challenge.

Challenge Overview:
The NASA TechRise Student Challenge invites teams of sixth to 12th-grade students to design, build, and launch experiments on NASA-supported test flights. Guided by an educator, student teams affiliated with U.S. public, private, and charter schools can submit ideas for experiments to test on either a suborbital rocket with about three minutes of microgravity (i.e., weightlessness) or a high-altitude balloon with exposure to Earth's atmosphere and views of our planet. A panel of judges will review the submitted experiment ideas and select 57 winning entries. Each winning team will receive $1,500 to build their experiment and an assigned spot to test it on a NASA-sponsored suborbital flight operated by one of the following flight providers – Blue Origin, UP Aerospace, or Raven Aerostar.

CHALLENGE EXPLAINER VIDEO: https://www.youtube.com/watch?v=4x3_b_OvJeA

CHALLENGE WEBSITE: https://www.futureengineers.org/nasatechrise

KEY DATES:

- Entries due: November 3, 2021
- Winners Announced & Experiment Build Begins: January 21, 2022
- Experiment Build Complete: Target June 2022
- Experiments Launch: Early 2023

WHO CAN ENTER: This is a challenge for SCHOOLS in the United States. US public, private, or charter schools that serve 6th to 12th grade students can assemble a team (or multiple teams) and enter. Minimum 4 students per team. No Maximum number of students per team. Proposals must be submitted by a team lead that is a teacher or employee of the school.

NGSS STANDARDS ALIGNMENT
Middle School: MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4
High School: HS-ETS1-1, HS-ETS1-2, HS-ETS1-3, HS-ETS1-4

GETTING STARTED:

Resource Type	Title	Description	Duration
Slide Deck	Challenge Overview Slide Deck	Get to know NASA's TechRise Student Challenge. Explore the challenge page, learn the four steps to participate in the challenge, and get an introduction the proposal template.	10-15 min
Slide Deck	Pick a Vehicle: Balloon or Rocket	Use this slide deck to help pick your flight vehicle. Will your team choose a rocket or a balloon? Learn all about the suborbital rockets and high-altitude balloons and the environments they will provide your payloads. Then dive into what kinds of payload experiments can be done on these types of vehicles.	20 min

IF YOUR TEAM CHOSE THE ROCKET:

Resource Type	Title	Description	Duration
PDF	Rocket Design Guidelines	Review the Rocket Design Guidelines prior to planning your experiment.	5-10 min
Slide Deck	Rocket Brainstorm	Rocket Teams: Use this slide deck to brainstorm possible rocket experiments.	30-45 min
Worksheet	Rocket Brainstorm	Rocket Teams: Use this worksheet with the slide deck to help brainstorm possible rocket experiments.	
Slide Deck	Plan Your Experiment Design	Use this slide deck to start planning your experiment. First, learn about microcontrollers and how they can be used in your payload design. Next, learn the different types of hardware and components that can be used to plan out your experiment.	45-90 min
PDF Worksheet	Explore Components Design	Use this worksheet with the slide deck to plan a rocket or balloon experiment design.	
PDF	Proposal Template & Guide	Use this guide and template to create your NASA TechRise Proposal to enter the competition. Then submit your ENTRY!	Varies
PDF Lesson Plan	*Optional Getting Started with Microcontrollers	Learn how to program an Adafruit Circuit Playground Express microcontroller, download free coding software, use EduBlocks (a block coding software), and write basic code to light up your microcontroller. Be prepared for a taste of the amazing world of microcontrollers and start building your coding and electronic skills!	45-90 min
PDF Lesson Plan	* Optional: Use Sample Flight Data Trigger Your Microcontroller: Blue Origin, Up Aerospace	Learn how to use the TechRise Flight Simulator data to trigger a microcontroller to do something. Whether you are a beginner or an expert in coding and microcontrollers, this lesson plan will help you learn how to use the Flight Simulator as a part of your TechRise experiment plan.	30-45 min

IF YOUR TEAM CHOSE THE BALLOON:

Resource Type	Title	Description	Duration
PDF	Balloon Design Guidelines	Review the Balloon Design Guidelines prior to planning your experiment.	5-10 min
Slide Deck	Balloon Brainstorm	Balloon Teams: Use this slide deck to brainstorm possible balloon experiments.	30-45 min
PDF Worksheet	Balloon Brainstorm	Balloon Teams: Use this worksheet with the slide deck to help brainstorm possible balloon experiments.	
Slide Deck	Plan Your Experiment Design	Use this slide deck to start planning your experiment. First, learn about microcontrollers and how they can be used in your payload design. Next, learn the different types of hardware and components that can be used to plan out your experiment.	45-90 min
PDF Worksheet	Explore Components Design	Use this worksheet with the slide deck to plan a rocket or balloon experiment design.	
PDF	Proposal Template & Guide	Use this guide and template to create your NASA TechRise Proposal to enter the competition. Then submit your ENTRY!	Varies
PDF Lesson Plan	*Optional Getting Started with Microcontrollers	Learn how to program an Adafruit Circuit Playground Express microcontroller, download free coding software, use EduBlocks (a block coding software), and write basic code to light up your microcontroller. Be prepared for a taste of the amazing world of microcontrollers and start building your coding and electronic skills!	45-90 min
PDF Lesson Plan	* Optional: Use Sample Flight Data Trigger Your Microcontroller: Raven Aerostar	Learn how to use the TechRise Flight Simulator data to trigger a microcontroller to do something. Whether you are a beginner or an expert in coding and microcontrollers, this lesson plan will help you learn how to use the Flight Simulator as a part of your TechRise experiment plan.	30-45 min