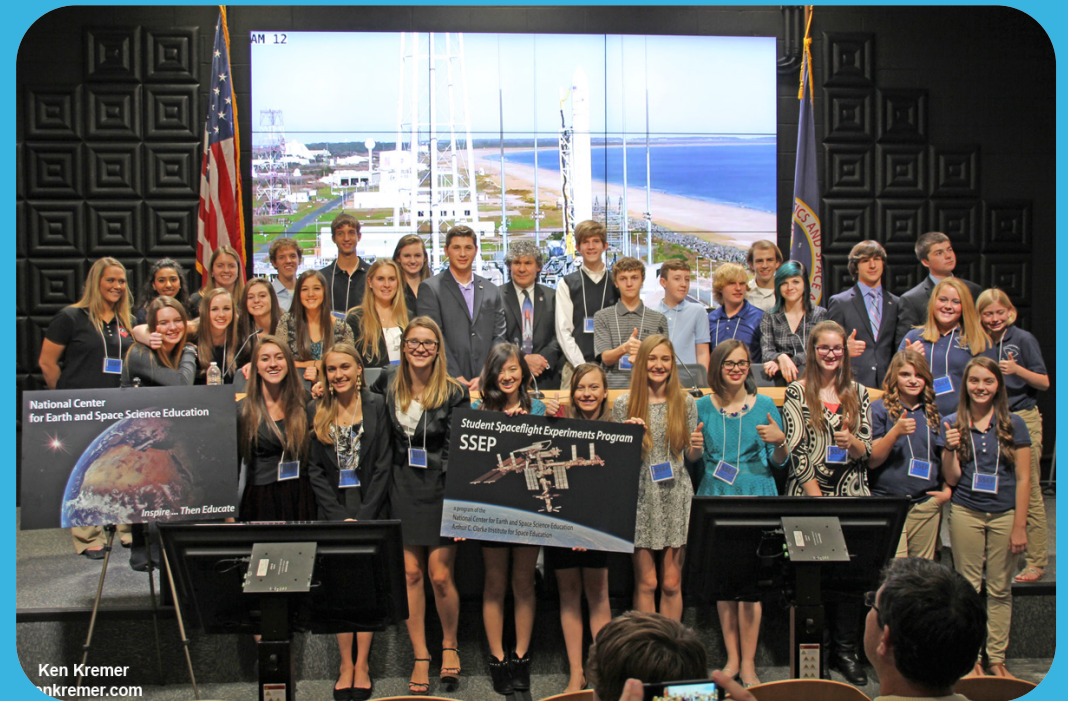


MIXSTIX

DREAMUP, PBC



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WHAT ARE MIXSTIX?



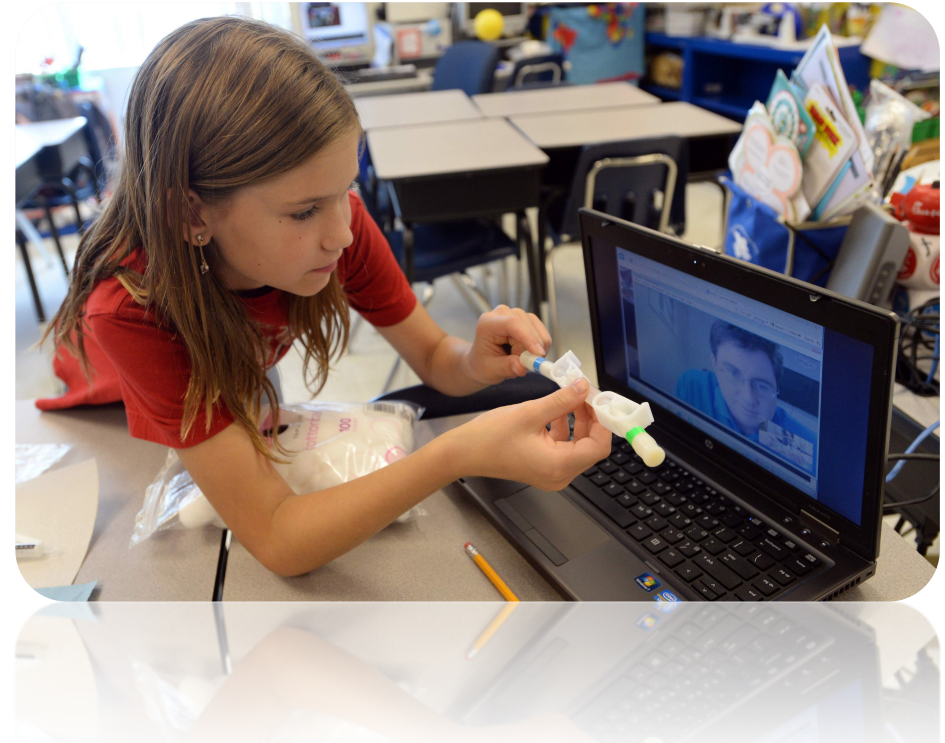
- MixStix are simply mixture enclosure tubes – keep fluids, materials, chemicals, biological materials separate, then see how they mix in space!
- Materials mix differently in microgravity – part of the mystery of the universe
- MixStix allow for single, double or triple experiment sample segments of adjustable sizes and the ability to open or close clamps at specified times
- Tubes can be shaken either gently or vigorously to facilitate mixing



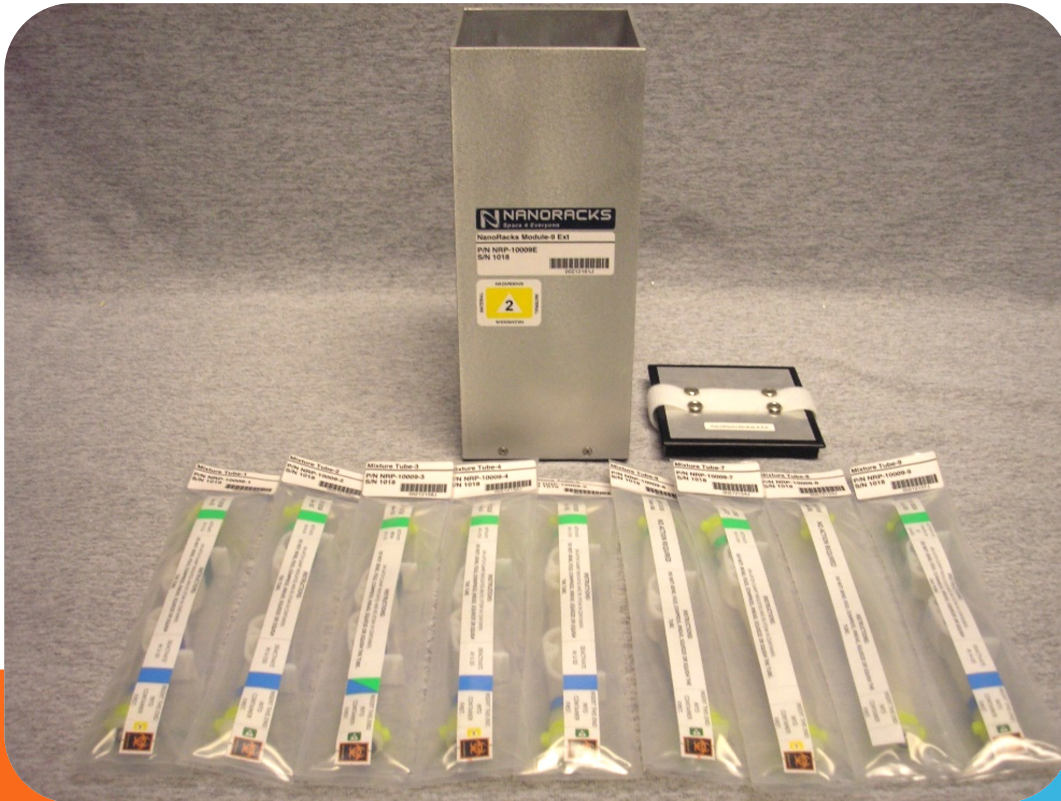
WHY MIXSTIX?

- Affordable microgravity research that gets returned to you
- Highly versatile—have been used by elementary schoolers and professional researchers alike and for all scientific disciplines
- Easy to assemble—a member of our team holds a video conference with your group to walk you through the loading process before you ship it to Nanoracks (our launch services provider)
- Keep a control experiment on Earth
- An astronaut will be directly interacting with your experiment!

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TECHNICAL DETAILS



- Designed for Fluid and Biological research onboard the ISS
- 10 ml Parylene Coated Silicon Tubes
- Provides the ability to keep materials separate until on-orbit
- Can be stowed frozen (-20C), cold (+4C), or ambient on launch, berth, pre & post operations, and on return.

IMPROVE LIFE IN SPACE



- **Testing how bacterial biofilms form on contact lenses in microgravity**
 - (The Effect of Microgravity on Bacterial Biofilm Formation on Soft Contact Lenses - New Explorations into Science, Technology and Math, Grade 5, New York City, NY)
- **Studying a potential factor in rapid skin aging, impaired wound healing, and bone loss experienced by astronauts**
 - (Effect of Matrix Metalloproteinase-1 on Collagen Integrity in Microgravity - Treasure Valley Mathematics and Science Center, Grade 7, Boise, ID)
- **Determining whether ASM contributes to muscle atrophy in spaceflight**
 - (Levels of Sphingomyelinase (ASM-2) in Caenorhabditis Elegans in Microgravity - University of Toronto Schools, Grades 8 and 12, Toronto, Ontario, Canada)



BIOLOGY EXAMPLES



Plant growth (often seeds, water, and a growth substrate)

- Sunflower seeds
- Red clover
- Algae reproduction

Animals (often eggs/larvae, an agar or food substance, and formaldehyde for preservation)

- Tardigrades
- Ladybugs
- Drosophila

Bacteria (often a strain sample and antibiotic)

- Staphylococcus epidermis
- E. coli
- Lactobacillus



CHEMISTRY EXAMPLES

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Paper chromatography

Formation of tin whiskers on solder

Breakdown of hydrogen peroxide

Rust formation



WHY DREAMUP?



myLAUNCH

- DreamUp will host you at your payload's launch!
- Providing you a full VIP experience – with tours, events, special viewing, and more

Alumni Program

- Think your school's alumni would like to help sponsor a research experiment? We've got materials ready to help get them involved

Access to DreamUp Network

- We've launched over 400 experiments to the ISS, so we've got a big network!
- Over 70,000 students engaged
- We are building a community of students and alumni who want to push STEM education to new boundaries, and create exciting opportunities for every student

AUTOMATED MIXSTIX



- **Automated MixStix are autonomous, so they operated without the need of human interaction.**
 - This is ideal for more precise science needs that can't allow for human fluctuations
 - We get get shaking/movement of the stick down to an exact time
- **Reusable**
 - Even in space, we are trying to be more eco-friendly!
- **Wider flow channel for better mixing - allows you to use different fluids and materials in the tubes**

FLIGHT OPPORTUNITIES: NORTHROP GRUMMAN & SPACEX



To the International Space Station

- ~30 day mission duration is standard, but can be extended
- Flights approximately every quarter from each provider
- Rockets launch from Wallops Island, Virginia and Cape Canaveral, Florida
- NASA Safety Process – Three Phases
- Payloads can be returned on SpaceX's Dragon capsule
- MixStix operated via Nanoracks, who books time with the astronauts





DARE TO DREAM WITH DREAMUP!

www.dreamup.org

Thanks! We look forward to bringing your students' dreams to space.

Contact: info@dreamup.org



NANORACKS OPERATIONS

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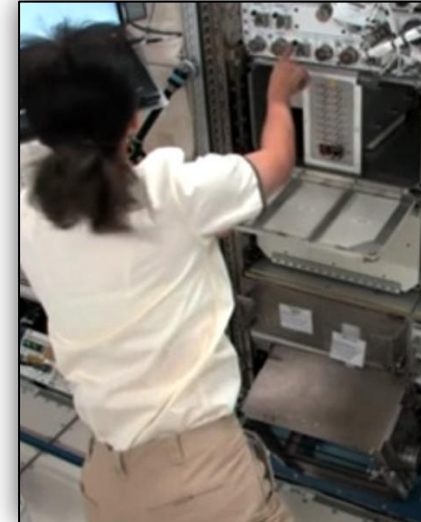
Safety
Review



Launch



Delivery



On-Orbit
Operations



Return



Landing



Retrieval



Receive At
Nanoracks