



A Sampling of the Questions Pursued by LaunchQuest Teams

Does microgravity affect battery life?

How do different materials affect alka-seltzer's ability to produce carbon dioxide after being exposed to radiation?

How do various protective coverings affect the viability of yeast?

What effect does space flight (acceleration/thrust heat, pressure, weightlessness, and reentry) have on developed and undeveloped film negatives?

How exposure to the different magnetic fields will affect the coding on an electronic train pass

Is there a difference in the amount of Neutron Radiation that is emitted in space compared to that on Earth?

How can relative forces of axial and angular momentum be utilized as a centrifuge and how do these contrast to the effects of microgravity in flight?

How will the flight path affect the music recorded on various media?

Will the radiation and heat in space make microwavable popcorn kernels pop?

Will exposure to launch environment affect the effective power output of a battery and will radiation or other factors experienced in flight affect the germination rates of seeds?

How radiation might affect 2 kinds of germinating seeds: basal seeds and flame grape seeds while up in microgravity for 5 minutes?

How does space affect the effectiveness of enzymes?

How does space effect the growth and resistance of bacteria?

How does space affect the integrity of a memory stick and the photos produced from that stick?

How does space effect the germination and growth of mustard seeds?

How will materials such as non-hardening clay and marshmallows respond to hypergravity created by forces during launch and flight and also in microgravity?

Are technologies available in radio controlled cars, for use on Earth, able to withstand the environment they are exposed to during a sounding rocket flight?

Will data (pics, sound, docs) change on 2 USB-sticks during the exposure of the launch and the weightless time in space? One USB-stick will be packed in aluminum foil. We will also send 1 photo negative along.

If a marble is put in a container partly filled with a fluid it sinks to the bottom. What happens in a microgravity environment, does it float, will the fluid concentrate around the marble or what else?

Will data be erased from music cds, dvds, and game cds as it ascends into space (due to sun spots, radiation, acceleration and zero gravity)?

How does the temperature, particulate, pictures of this payload flying on a rocket compare with data of payload from hi-alt balloon?

How will the effectiveness of fertilizer flown on the microgravity rocket mission compare with a ground-based identical sample?

Will the physical and chemical characteristics of malachite, powdered milk, and pepper change when exposed to microgravity?

Will the power or quality of contact lenses change after exposure to micro-gravity?

Will magnets lose their strength after being subjected to the stresses and conditions of launch and microgravity?

How will exposure to space affect the physical properties of a small amount of silicone plastic clay encased in a variety of different containers?

Will immiscible liquids mix in 0-g?

How are the properties of popcorn kernels affected by traveling in outer space?

Will toothpaste deform under the high "g" loads of launch and boost and whether residual atmospheric pressure in the tube will expel the paste?

What effect, if any, will the space environment have on the integrity of data storage media that must be taken along on long term space missions? Will aluminum foil or other reflective, metallic materials provide sufficient shielding for data storage media that are exposed to space environment that may include extreme cold, zero air pressure, electromagnetic radiation, etc?

Will extreme temperature, gravitational force, altitude, or exposure to an influx of charged particles from the earth's magnetic field affect the data retention of various common devices or the device's ability to further retain data?

How does launch, microgravity, reentry and landing affect the time on our watches?

How well do bolts and screws stay together under the rigors of a rocket launch?

How will lack of gravity affect the interaction between the liquid and its container? How will the meniscus be affected without gravity? Will the adhesive forces be stronger than the cohesive forces?

What is the effect on the cell phone SIM card (memory) in space? Will we receive a signal from the cell phone?

Will files on a flash drive be damaged in space due to radiation?

What will happen to the magnetic strip on a gift card up in space?

Can dehydrated Tardigrades (water bears) survive a trip to space on a Launch Quest rocket and after hydration reproduce at an equal rate to Tardigrades that were dehydrated but stayed on Earth?

What will be the effect of cosmic radiation (duration =5minutes) on the efficacy of a) Lactase enzyme and b) Amoxicillin antibiotic?

How will increased levels of radiation and microgravity affect the longevity of gram positive and gram negative bacterial strains?

How will G forces affect the integrity of watches when packed in packing peanuts, Styrofoam, and bubble wrap?

Can liquids known to be immiscible be mixed in a 0-g environment?

Will exposure to the conditions of space (vacuum, microgravity, and radiation) cause seeds of flowers and vegetables to grow differently when they return to Earth? Can radiation badges offer insight in the amount of radiation these organisms have been exposed to during their stay in space?

Will exposure to the conditions of space (vacuum, microgravity and radiation) cause popcorn kernels to somehow pop differently after they returned to Earth?

Will crystals exposed to microgravity grow the same as control crystals on Earth?

Will the internal air of a marshmallow escape when exposed to the lack of pressure in space or is there a coating to prevent this?

Will a marshmallow change shape, color and size as a result of exposure to g-forces, radiation, and pressure compared to a marshmallow that stays on Earth?

Will a group of 50 pea seeds that are exposed to radiation and the vacuum of space germinate and grow at the same percentage and rate as 25 pea seeds left on Earth compared also to a collection of 25 pea seeds which are exposed to radiation on Earth?

Will a ping-pong ball that is sent up to space and subjected to 0.01 atmospheric pressure and the forces of liftoff and landing look and bounce the same as a ping-pong ball which stays on Earth?

Will a Game Cube small CD which is launched into space and subjected to the forces of liftoff, radiation in the space environment, and then landing, be damaged and/or play differently compared to an identical game left on the Earth?

Will dehydrated Tardigrades or also known as Water Bears that fly into the environment of space (microgravity, radiation, vacuum) re-hydrate and become motile again at the same percentage as Water Bears that stay on Earth and how will they compare microscopically?

Do water bears survive better dry (in a state of cryptobiosis) or submerged in water? We will also test euglena (a protist) to see if it has similar survival techniques.

Which material will best protect against the higher radiation above the atmosphere: orange astronaut "jumpsuit" material, clay, aluminum foil, asphalt shingle, or rubber (from a balloon)?

When a full memory card and an empty memory card goes into space, will their memory be affected because of radiation?

Will the bread mold that we sent to space grow faster than the one on Earth? We also want to know if it can go without air or water.

Does space affect the work speed of a gear powered watch? I.e., how will a watch react to a gravity change and will it show the same time as an identical watch on Earth?

What is the effect of different magnetic fields on the function of credit cards?

What effect does space travel have on sound, particularly: 1. white noise, 2. frequency sweep from 20 Hz to 20 kHz, 3. sine waves at various frequencies, 4. sawtooth waves at various frequencies, and 5. square waves at various frequencies.

How does microgravity affect the volume and density of marshmallows?

How does microgravity affect the strength of magnets?

How does the amount of time in microgravity affect seed germination of basil (measured by plant height of basil seeds that flew aboard the space shuttle, that flew aboard the sounding rocket, and that remain in our classroom)?

Will the fabric and glue material of the small flags exposed to a space environment change when exposed to space and spaceflight?

Can Tardigrades be re-hydrated after exposure to the environmental factors such as radiation during spaceflight?

What will happen to blood cells in different salinity solutions after going into space?

How will exposure to fluctuations in temperature, pressure, acceleration/vibration, and radiation affect the comparative survival rates of spore-forming versus non-spore-forming bacteria (Bacillus vs. Streptococcus)?

Will exposure to the vacuum of space affect bacterial survival?

What will happen to the nail polish when it is launched into space?

What will happen to digital camcorder when it's launched into space? Which part of the launch/flight will put the most force on the camera (there will be marked gradients inside of the T_{sat}, so that we can make a good comparison of launch, flight upward in the sky, flight through the atmosphere, flight in space, flight down through the atmosphere, flight down through the sky, and landing)? Will the digital camcorder still record the as well in space? Will it work the same when it returns home?

How will the rigors of space flight effect different types of animal blood?

Will exposure to conditions of space change the doubling time or morphology of bacteria?

Will exposure to conditions of space change the effect of harmful bacteria on plants?

How will space flight affect the physical properties of: 1. Contact lenses – in case, with solution. 2. Tempurpedic foam mattress material. 3. liquid caplet (medication)?

Do weightlessness and radiation have an effect on the quartz inside of a clock? Does gravity help the wind-up clock keep time, what will happen in weightlessness? Will the clocks run faster or slower?