

MISSION X: TRAIN LIKE AN ASTRONAUT >>>>>



About Mission X

Mission X is an international educational programme designed by NASA and led in the UK by the UK Space Agency. It aims to inspire interest in science, nutrition and fitness in young people aged 8 – 12 years old by using astronauts as role models. It uses astronaut training to teach how good diet and exercise play an important role in human performance in space and on Earth.

Like Scouts, astronauts have to be extremely fit and healthy. They also need to be agile, dexterous and possess advanced communication skills. The Train like an Astronaut programme provides some fantastic resources that show how fit and healthy you need to be to be an astronaut. More information can be found at: www.trainlikeanastronaut.org

The following is an activity taken from the Train Like an Astronaut programme and shows the mental challenges astronauts face in space.

CREW ASSEMBLY

The timing of this physical activity can vary, but will average 15-30 minutes per group. The Scout group should be split into smaller groups or “crews” of two people.

LOCATION

This activity will be best conducted indoors on a flat surface such as on a table or on the floor.

EQUIPMENT

- Gloves – ideally gardening or cleaning gloves
- Puzzle or construction toy such as lego.
- Four jars
- Spoon
- Sand
- Paper and pen
- Paper for origami
- Stopwatch

ACTIVITY STEPS

- ① Divide into teams (“crews”) and select a challenge e.g. puzzle or construction pieces.
- ② Appoint a timekeeper per crew who will look after the stopwatch.
- ③ The timekeeper should time their crew to complete challenges, be it assembling the puzzle, constructing the toy, doing origami, spooning sand into jars or writing, e.g. their name with their left hand, as quickly and as accurately as they can. They should record the timings on the record sheet.
- ④ The crew should then repeat the challenge while wearing the gloves.
- ⑤ Repeat the challenge several times to see if timings improve with practice. Each member of the group should take a turn as ‘timekeeper’.
- ⑥ Get another crew to judge how well the task was completed by giving marks out of 10, 1 for not very well, 10 for excellent.

SCOUTS 

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UK SPACE
AGENCY

| Task | Time completed barehanded (first attempt) | Time taken with gloves (first attempt) | Time taken with gloves (second attempt) | Time taken with gloves (third attempt) | Time taken with gloves (fourth attempt) |
|---|---|--|---|--|---|
| Eg Spoon equal amounts of sand into four jars | 10 secs | 20 secs | 17 secs | 15 secs | 14 secs |
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Think about the following:

- ① How did timings compare between wearing gloves and not wearing gloves?
- ② Was a task easier when working as a crew or as an individual?
- ③ How did completion times improve over time with practice?
- ④ What ways could the crew improve on their timings for the challenges?
- ⑤ How well did the crew communicate and how could they improve that communication?
- ⑥ What challenges would an astronaut face trying to assemble an object in space?



BE FIT IN SPACE

Astronauts must go through rigorous training to get in shape for being in space. It takes many NASA team members working together to help train astronauts for the challenges of space. Teamwork is essential and all NASA team members, whether in space or on Earth, work together to make sure each mission is successful. Astronauts are required to put many objects and devices together as part of their missions. Sometimes large objects in space, such as satellites or the Hubble Space Telescope, are already assembled but require repairs. There are also small objects that astronauts must manipulate during the assembly of the International Space Station (ISS). Sometimes astronauts have to do space walks, or ExtraVehicular Activities (EVAs), to accomplish these tasks.

When assembling or maintaining objects in space, astronauts must have good dexterity and hand-eye coordination and work as a team. They must also be able to manipulate tools and objects while wearing a pressurized spacesuit that includes gloves over their hands. These gloves, worn to protect astronauts from the space environment, can be thick and bulky. They are made so astronauts on an EVA can move their fingers as easily as possible. A piece called a bearing connects the glove to the sleeve, allowing the wrist to turn. They must learn to work with their gloves on to handle both large and small objects. To help prepare astronauts for working in a spacesuit and manipulating objects during an EVA, they train in the Neutral Buoyancy Lab (NBL). The NBL is a large pool containing equipment and mock-ups similar to what an astronaut would experience in space. The NBL is 40 feet deep, 202 feet long, 102 feet wide, and contains 6.2 million gallons of water. It is primarily used to train astronauts for EVAs by simulating microgravity conditions.

Astronauts work with certified divers who are instructors at the NBL. These NBL instructors train suited astronauts how to open hatches, use tools, and move in a simulated weightless environment.

Dexterity and hand-eye coordination play a major role in performing the training tasks effectively. During NBL training the EVA astronaut wears a training version of the EVA spacesuit designed to be worn underwater. Astronauts only have 6-7 hours of life support during an EVA, so timing, efficiency and teamwork is very important while working in space.

As astronauts practice manipulating tools quickly and accurately in their spacesuits they are improving their dexterity and hand-eye coordination for a space mission. One of the selection tasks for Japanese Astronauts is to create thousands of origami cranes to check their patience, attention to detail, and dexterity.



LIFE ON BOARD A SPACECRAFT

Being in orbit is a special sort of freefall - so you and everything around you is weightless. But there are also many other things you may not be aware of that astronauts have to consider before they take off.

- Nearly every astronaut will experience space sickness, which could mean headaches, nausea and confusion.
- Weightlessness means there's less pressure on the spine, and every astronaut will grow about two inches. The design of the spacesuit actually takes this into account.
- Snorers on Earth sleep quietly in space, it's been found – but less well. The International Space Station takes 90 minutes to orbit the Earth. This means astronauts experience 16 sunsets and sunrises every 24 hours.
- If an astronaut suddenly finds himself without a spacesuit on, they won't explode, which is what most people think – instead the lack of oxygen will kill them, although they have about two minutes before this happens. Before that the astronaut may experience moisture from the nose and mouth boiling away, slight sunburn, a painless swelling of the skin and underlying tissues and 'the bends'.
- Going to the loo isn't easy. Astronauts have to place themselves, and are often strapped, exactly in the centre of the space commode to do their business, which is then sucked out. Astronauts use adult nappies for space walks, launch and landing.

DID YOU KNOW?

Astronauts undergo lots of scuba diving as part of their training. Scuba diving is as close as it gets to experiencing weightlessness on Earth for long periods of time. Astronauts can also train for weightlessness by going on parabolic flights. These flights involve a modified plane following the flight path of a parabola and create periods where the passengers are in free fall.