

# TOUCHDOWN CHARLIE

- SuperBowl LI this year is being hosted in Houston, TX... Home of NASA Astronaut Training
- Find out if you have what it takes to play football and be an astronaut
- Submit team points to the MX website and receive a special e-Badge
- Learn about proprioception!



**Mission X: Train Like an Astronaut**





# Introduction



Did you know that many sports relate to astronaut training? On the surface, preparing to play a game of American football may not seem similar to astronaut preparations in that the sport of football is very fast-paced with high amounts of bodily contact. However, if we look a bit deeper into both, we can find some similarities.







It takes a team to win



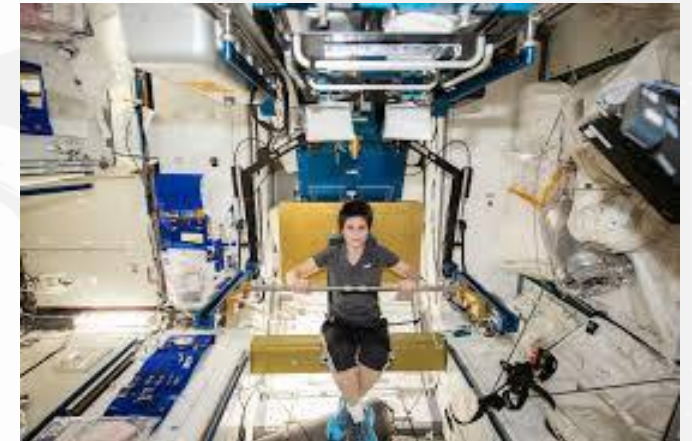
Playing sports requires teamwork and preparation. Teammates must work together. In space, astronauts also must react to new situations as a team. Their teamwork is imperative to the success of a mission, and often such teamwork ensures the safety of the crew.





# Muscles and Bones

In space, astronauts float and have very small loads on their bodies. Their bodies would lose a significant amount of muscle and bone, so astronauts exercise on the International Space Station (ISS) for about two hours per day. It is crucial to their health to exercise with heavy loads, just as football players must lift weights.







## Recovery from the game



After a game, athletes have tired muscles and must take care to let their bodies recover. Similarly, astronauts return to Earth with less balance and muscle control than when they left our planet.

**Proprioception** is the term for how our bodies sense the world around us and what lets us react to our environment. When astronauts first return to Earth, they are tested to see how well they can balance. Typically, astronauts' balance returns to their normal, pre-flight, condition in a few weeks after landing. What does this have to do with football practice? Well, the balance tests are very similar to several football exercises.

# Let's play!

**When your teacher says, “walk”, walk in a straight line:**

- When your teacher says “Proprioception”, turn to change directions and step with high feet as if you are walking over an obstacle
- When your teacher says “Corner Back”, turn and run backwards for 10 steps and then spin around to run 10 steps forwards. Run with high steps over any lines or cracks on the ground

**When your teacher says, “Nadir”, lie on the ground: (Nadir is the term for the direction that points towards the Earth)**

- When your teacher says “Balance”, rise to your feet and stand on one leg
- When your teacher says “Lineman” rise to your feet and run in place

**To have the students walk heel-toe, say “heel-toe”:**

- When your teacher says, “Soyuz Landing” walk 4 more steps heel-toe and then jump in the air and land with good balance
- When your teacher says, “Sideline” take 4 more steps and stop with both toes next to each other as you lean forward without falling. Try to maintain balance

# Let's play!

**Have the students run like a football player:**

- To test speed, american football players run 40 yards (37 meters). Starting from rest, try to run it in the least amount of time. How much time does it take you to run 40 yards?
  - Chris Johnson, of the Arizona Cardinals, ran the 40-yard dash in 4.24 seconds.
  - Large lineman players are often over 130 kg and run 40 yards in 5 seconds.



NASA  
astronaut Mike  
Hopkins!

