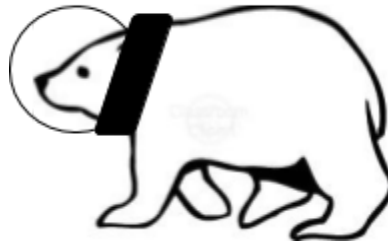


Physics In Space! *Newton's Laws In Action*



Pete the Polar Bear has a mass of 650 kg.

Planet or Moon	Earth	Luna	Mars	Jupiter	Saturn
Acceleration Due to Gravity	9.8 m/s ²	1.6 m/s ²	3.8 m/s ²	23.6 m/s ²	10.1 m/s ²

1. Pete will be starting on Earth and traveling to the four other locations listed above. Where will he weigh the most?
2. Once Pete's spaceship reaches its cruising speed, how much force is needed to keep it going at that speed in space?
3. What is the Newton's third law action-reaction force pair for the rockets on Pete's ship?
4. What is Pete's weight on Earth – in other words, what is the force of gravity on Pete?
5. What is Pete's weight on Earth's moon, Luna?
6. What is Pete's weight on Mars?
7. What is Pete's weight on Jupiter?
8. What is Pete's weight on Saturn?

9. On his return trip, a meteoroid hits Pete's ship. The meteoroid experiences a force of 50 N. What is the force experienced by Pete's ship?
10. Pete's ship has a mass of 250,000 kg. **What is the acceleration** of Pete's ship due to the force of the meteoroid impact? *SHOW YOUR EQUATION & WORK!*
11. Pete has to go outside to make repairs. As he is working, he accidentally knocks a screwdriver off of his toolbox, and it tumbles away from his ship. What will happen to the screwdriver?
12. If Pete tumbled off the ship during his spacewalk, he would be able to use his jetpack to return to the ship. **What force** would the jetpack have to exert to give Pete an acceleration of 5 m/s²? *SHOW YOUR EQUATION & WORK!*
13. Pete finally returns safely to Earth. He goes out for dinner with his girlfriend Petra. Petra's mass is 500 kg. Do Pete and Petra experience the same force of gravity? Do they experience the same acceleration due to gravity?