



This illustration depicts the International Space Station in its completed and fully operational state with elements from the United States, Europe, Canada, Japan, and Russia.

Future Directions

Microgravity science has come a long way since the early days of space flight when researchers realized that they might be able to take advantage of the reduced gravity environment of orbiting spacecraft to study different phenomena. Shuttle and Mir based experiments that study biotechnology, combustion science, fluid physics, fundamental physics, and materials science have opened the doors to a better understanding of many of the basic scientific principles that drive much of what we do on Earth and in space.

To reach the next level of understanding about phenomena in a microgravity environment, we need to perform experiments for longer periods of time, to be able to conduct a series of experiments as is done on Earth, and to have improved environmental conditions. The International Space Station is being developed as a microgravity research platform. Considerable attention has been given to the design of the station and experiment facility components so that experiments can be performed under high-quality microgravity conditions. The International Space Station will provide researchers with continuous, controlled microgravity conditions for up to thirty days at a time. (The time in between these thirty day increments is used for vibration-intensive activities such as Shuttle dockings, station reconfiguration, and upkeep.) This is almost twice as long as the microgravity periods available on the Space Shuttle and there will be a better environment than that provided by Mir. This increase in experiment time and improvement in conditions will be conducive to improved understanding of microgravity phenomena.

Continued microgravity research on the Shuttles, Mir, and on the International Space Station will lead to, among other things, the design of



improved drugs, fire protection and detection systems, spacecraft systems, high-precision clocks, and semiconductor materials. In addition, this research will allow us to create outposts on the Moon where we can build habitats and research facilities. The end result of research in microgravity and on the Moon will be the increased knowledge base necessary for our trips to and exploration of Mars.

