

CHAPTER 9

Sports on the Moon

Chapter Overview

Chapter Challenge

Will movies, card games, board games, or video games be the extent of leisure time possibilities, or will it be possible to have some active recreation and sports on the Moon? This question is at the heart of this chapter. Which, if any, of our familiar Earth sports can be played on the Moon? What will playing conditions be like on the Moon? What adjustments or modifications will be needed for those sports? Will you be in for major surprises, or do you think with your knowledge of physics you can anticipate how the sports will “work” on the Moon? Will the Moon be such an exciting place for some sports that literally “the whole world will be watching?”

NASA, the National Aeronautics and Space Administration, is the agency in our country that is responsible for planning a Moon base. They are experts at all sorts of specialized areas related to the technology of transporting people to the Moon and providing them with a suitable environment and supplies on the Moon. Nearly everything that is used or needed in the early colonies on the Moon will have to be sent from Earth, and NASA will have to get it there. But NASA might need advice related to human life support, social interactions, and human institutions. It is not clear which of our familiar sports, if any, can be played in a recognizable way on the Moon. NASA is in need of proposals that identify appropriate sports and recreation for the Moon colony.

In this chapter, students investigate these factors on Earth and the Moon. They learn about acceleration due to gravity, inertial mass and weight, projectile motion, and the effect of gravity on friction. After they complete each section, students will be asked to write a proposal for submission to NASA.

The proposal will explain what sort of facilities should be set up on the Moon, and/or why certain facilities and sports would not be advisable. They may evaluate the suitability of one or more specific activities for use on the Moon or invent their own sport, making use of the unique conditions that exist on the Moon.

Chapter Summary

Students explore how the differences in the atmosphere and gravity between Earth and on the Moon would affect the play of different sports. These experiences provide the opportunity for students to

- identify a sport and consider how different environments on Earth and the Moon can affect the outcome of a sport.
- compare the acceleration due to gravity on Earth to that on the Moon by using measurements from a slow-motion video and “double exposures” of an astronaut dropping objects on the Moon and on Earth.
- define inertia and weight and compare the weight and inertia of an object on Earth to that on the Moon.
- compare projectile motion on Earth to projectile motion on the Moon by calculating the range, maximum height, and time of flight for a projectile in each location.
- calculate the total change in height by recording different positions during a jump and predicting the height of a jump on the Moon using the principles of conservation of energy.
- compare the bounce height of different balls and consider how a golf club or golf ball could be modified to limit the range of a golf ball when hit on the Moon.

