For the Teacher
The Ionosphere – How High Does It Go?

Materials required for this activity will include construction paper (5 x 7 sheets) for objects, scissors, rulers, and a large sheet of paper (2 m long and at least 0.75 m wide) for the scale drawing of the atmosphere.

Do not allow objects to exceed 5 x 7 in size

Upon completion of the activity, have students draw horizontal lines to designate the top of the troposphere (16 km), stratosphere (50 km), and mesosphere (80 km). Label these elevations.

A discussion of the ionosphere (80 – 1000 km) should follow. The two diagrams that follow this sheet should be presented as overheads to promote discussion regarding the change in density and temperature within the atmosphere. This is a critical component for the activity questions.

The following is a list of objects and altitudes

Object	Altitude (km)	Notes
Migrating birds	6 km	
Mt. Everest	8.85 km	World's highest mountain
Commercial aircraft	9 km	30,000 ft
Sky diver	31 km	World record, see http://en.wikipedia.org/wiki/Joseph_Kittinger for great discussion material
Manned balloon	34 km	World record for manned balloon
Unmanned balloon	51 km	World record for unmanned balloon
Meteors	70 – 80 km	
Space Shuttle	250 km	
ISS (International Space Station)	350 km	
Aurora	100 – 200 km	Bottom edge at 100km, top edge typically 200-300 km
CHAMP satellite	360 km	Studies earth gravitational field
Landsat Satellite	700 km	Takes digital photographs of earth
Orbcomm Satellite	800 km	Communications

Satellite Images

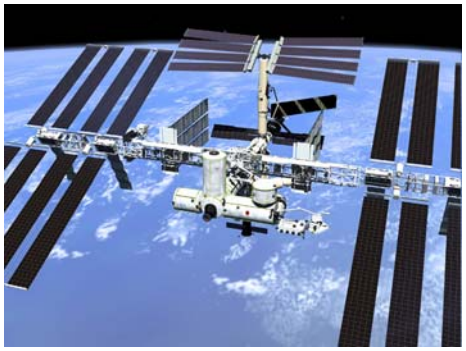
ISS 

Image courtesy of NASA

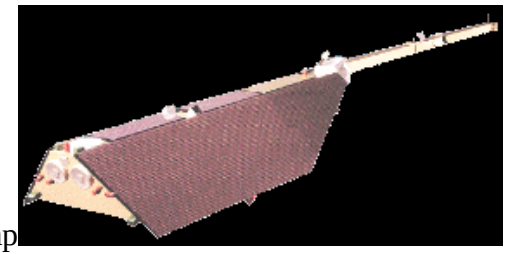
Champ 

Image courtesy of GFZ-Potsdam, Germany

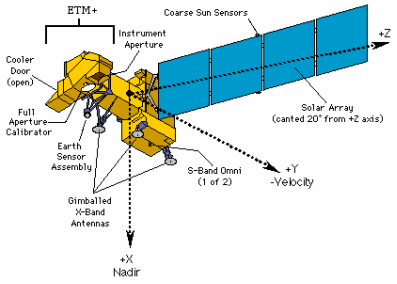
Landsat 

Image courtesy of NASA

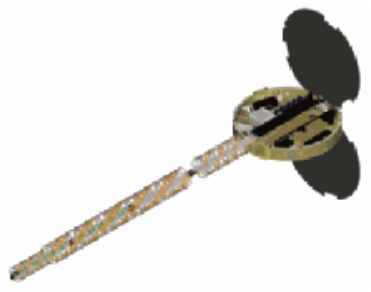
Orbcomm 

Image courtesy of Orbcomm, Inc.