***WORKING OF SATELLITE***

A satellite works by receiving radio signals sent from the Earth and resending the radio signals back down to the Earth. In a simple system, a signal is reflected, or "bounced," off the satellite. For example, it is possible to bounce a signal off the surface of the Moon back down to Earth. Because the Moon is very far away, for this to work the signal from the Earth must be very strong and the receiver receiving the signal must be sensitive enough to detect the very weak signal receive back from the moon.

Unlike a passive satellite such as the moon or the early ECHO satellite, a modern communications satellite receives the radio signal and sends it back down to Earth stronger than it was received. This process is called "amplification" of the radio signal. In addition to amplifying the signal, a communications satellite also typically converts the radio from one frequency to another so that the signal getting sent down is not confused with the signal being sent up.

People communicate to a satellite using an antenna on the ground, which called an "earth station" in technical terms. The earth station sends up radio signals to the satellite. These signals are called "uplinks."

The satellite receives these signals, makes them stronger, and then re-transmits them back down to the Earth. These signals back to the Earth are called "downlinks."

Sometimes the uplink and downlink earth stations perform various specialized functions. For example, some uplink stations deliver - or "feed" - video or audio programming to the satellite, which is then retransmitted to users all over the United States or world. These links are called "feederlinks." Other uplink stations are used to control the satellite. Such uplinks are called "control" links. Downlink stations can used to allow the satellite to connect with the telephone network or the Internet. These stations are often called "hub" stations or "gateway" stations. Other earth stations receive information from the satellite on how it is performing and what it is doing. This information is called "telemetry." Users also directly send information up to satellites and receive information directly from the satellite. The links that connect users to the satellite are called "service links."

The area that can be served by a satellite is determined by the "footprint" of the antennas on the satellite. The "footprint" of a satellite is the area of the Earth that is covered by a satellite's signal.

Some satellites are able to shape their footprints so that only certain areas are served. One way to do this is by the use of small beams called "spotbeams." Spotbeams allow satellites to target service to a specific area, or to provide different service to different areas.

In order to understand better the concepts of footprints and spotbeams, watch this [video](http://transition.fcc.gov/cgb/kidszone/satellite/kidz/rm/Demonstration_2_sub.rm) , in which two students from Thomas Jefferson High School in Alexandria , Virginia , demonstrate these concepts using two everyday objects: a flashlight and a globe.