



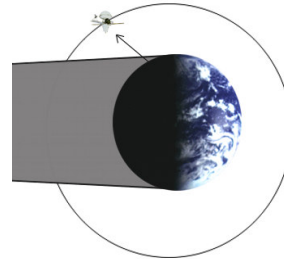
# Satelloids

## Satellites I Project

---

### Advisor's Notes

**Purpose:** The goal of the Satellites I project is to teach students how to predict and observe the passage of artificial satellites overhead.



**Directions:** Give student's a copy of the project and the "Parent's Notes" to explain the project to their parents. You will need to make sure students understand some basic concepts before attempting this project. You will need to explain to them what azimuth and altitude are. Azimuth is a measure of compass directions. For example 0 degrees Azimuth is north, 90 is east, 180 is south, and 270 is west. Altitude 0 is the horizon and 90 is the top of the sky. The second thing you'll need to explore with your students is how satellites can be seen at night. If you look at the image, you can see it is possible for someone on the night side of the planet to see a satellite still illuminated by the Sun before it drops into Earth's shadow and becomes hidden. Just as a valley is hidden from the Sun, while the top of the mountain is still sun lit. Likewise the satellites are so high it takes awhile for the Sun to set for them. Satellites can usually be seen up to two hours after sunset and two hours before sunrise.

**Computing a Satellite Pass:** There are various programs you can download to run the predictions and view the passes. However, for the most current information visit the website: <http://www.heavens-above.com>. Go through the steps to select your city. Once you've done this it is not a bad idea to bookmark the page. Under the headings SATELLITES you can choose to run 10 day predictions for the ISS | ENVISAT | HST. There is also the choice to run predictions for satellites brighter than 3.5 | 4.0 | 4.5 magnitudes for the evening. Click on ISS and you'll get predictions for viewing this Satellite that look similar to:

Date	Mag	Starts			Max. Altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
<a href="#">05 Apr</a>	1.8	05:21:30	65	SE	05:21:30	65	SE	05:25:24	10	E
<a href="#">06 Apr</a>	1.8	05:20:22	64	SE	05:20:22	64	SE	05:24:14	10	E

This pass will begin at 05:21am at an altitude of 65 degrees high in the southeast. This tells us during the first part of the pass (rising up from the horizon to 65 degrees high) the satellite is in the Earth's shadow, but experiences sunrise and becomes visible when it reaches this point. Notice the start and Max. Altitudes are the same, meaning this point is when it will be the highest in our sky. It then slowly moves across the sky for the next four minutes before sinking over the eastern horizon at 05:25am. As the satellite moves across the sky, look for variations in brightness that indicate it is spinning or flashes of reflected sunlight.

The website will have additional information on finding satellites. If you have trouble finding satellite passes wait a week or two to try again. Orbits are constantly shifting so generally satellites will have a series of evening passes and then a few weeks later morning passes.

They will need to observe any two of the following: Space Shuttle, Space Station (ISS), Hubble Space Telescope (HST), Tropical Rainforest Management Mission (TRMM), SeaSat1, or Rosat.

**This could also be used as a topic for a meeting. Have the students research these satellites before assigning them to search for them.**

**Things to look for:** Make sure students fully fill out the form and describe and date their observation. They should have listed the satellite they tracked, its' color, and any variations in brightness. Encourage them to draw in the brighter stars in the sky. Ask them if they understand what they were seeing.

**Advisor's Comments:** Before sending the form to Satelloid Headquarters please write a comment in the provided box. Start with a praise of some type and include any suggestions to the student for improvement.

**Chief Astronomer Comments:** The Chief Astronomer will review each submitted form and like-wise write a note of encouragement and offer suggestions for improvement, if needed.

**Completed Form:** If the project is properly completed the Chief Astronomer will sign and date the form. The form and certificate of completion will be included in the next package to you.

If you have any questions about predicting or observing satellite passes visit the Satelloids Yahoo! Group or e-mail me at the address below.

Satelloids website – <http://www.astroscan.net>

Satelloids Yahoo! Group – <http://groups.yahoo.com/groups/satelloids>

Chief Astronomer Stephen Meeks - [sameeks@astroscan.net](mailto:sameeks@astroscan.net)