The 2012 Transit of Venus

What is a Transit?

A 'transit' occurs when one celestial body, such as a planet or moon, passes in front of another from our perspective on Earth.

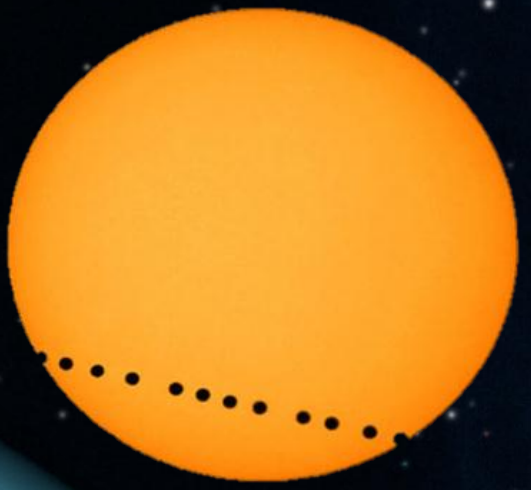
What Will Happen on June 5 ,2012?

On June 5, 2012, Venus will cross the face of the Sun starting at the times shown at right. This rare event has not happened since 2004 and will not happen again until 2117. The picture below shows a time-lapse of the last transit of Venus in 2004, which is similar to how this year's transit will look.

Start Watching on June 5, 2012 at:

Newfoundland (St. John's)	7:33 p.m.
Atlantic (Halifax)	7:03 p.m.
Eastern (Toronto)	6:04 p.m.
Central (Winnipeg)	5:05 p.m.
Mountain (Calgary)	4:05 p.m.
Pacific (Vancouver)	3:06 p.m.

Time-lapse of the transit of the 2004 transit of Venus. The black circles are Venus at different times as it crosses the face of the Sun (Credit: A. Cerezo, P. Alexandre, J. Merchán, and D. Marsán.)



How to Use Your Transit Glasses Safely

WARNING: Never look at the Sun with unprotected eyes! Permanent damage and even blindness will result. If in doubt, consult: http://rasc.ca/transit-venus

Home-made or improvised solar filters, such as smoked glass, exposed film, or CDs are not safe, as these provide no protection against harmful ultra-violet and infrared rays.

It is safe to view the **June 5th Transit of Venus**, the **2012 May 20th Solar Eclipse** and similar events through the Transit of Venus glasses. They are equipped with scratch resistant, double-aluminized material that filters out 99.999% of the solar radiation, including harmful ultra-violet and infrared rays. These glasses are for naked-eye use only.

Before viewing the Sun, always check the condition of your Transit of Venus glasses. Hold them up to a bright artificial light and look for holes, scratches and other abrasions. If the surfaces are damaged, do not use the glasses to view the Sun. Protect the optical parts of your Transit of Venus glasses, and store them away from humidity, dust, and sharp objects.

Background image credit: NASA/Ames/JPL-Caltech

Why Are Transits Important?

In the 1700s and 1800s, Transits of Venus gave astronomers their first accurate measurements of the distance to the Sun. Many famous figures from history were involved in these efforts, including Captain Cook who observed the 1769 transit from Tahiti. Today, astronomers use transits to find planets orbiting stars other than the Sun. We call these planets 'exoplanets'

How Can We Use Transits to Find Another Earth-like Planet?

Imagine looking at a distant star orbited by planets too small for us to see. When one of those planets passes between us and the star—when the planet *transits* the star—the star appears to dim a little. By measuring the amount and duration of the dimming, astronomers can work out how big the unseen planet is and how far it is from its parent star. This allows us to determine whether a planet is small, like Earth, and whether it orbits at the right distance from the star so that it is neither too hot nor too cold to support life.

How Have Canadians Contributed to the Study of Exoplanets?

Canadian astronomers have made immense contributions to the study of exoplanets. In the 1970s and 80s, Gordon Walker and Bruce Campbell developed the first successful technique for finding exoplanets around Sun-like stars. Canadian astronomer David Charbonneau was the first person to detect a transiting exoplanet—using a 10-cm telescope similar to one you might own! Dr. Charbonneau was also part of the first team to detect the atmosphere of an exoplanet, a key step in finding exoplanets that can support life. Dr. Charbonneau was inspired to study the atmosphere of an exoplanet because of earlier work done by Canadian Sara Seager and University of Toronto-educated astronomer Dimitar Sasselov. Canadian Jason Rowe has helped the team behind the planet-finding Kepler Space Telescope locate 61 confirmed exoplanets and a further 2300 candidates. University of Toronto astronomer Ray Jayawardhana and his former student Bryce Croll are using telescopes on the ground to measure the chemical make-up of exoplanets. A Canadian team including Christian Marois, David Lafrenière, René Doyon, and Bruce Macintosh, took the first actual picture of a system of exoplanets. Dr. Jayawardhana, Dr. Lafrenière, and the University of Toronto's Marten van Kerkwijk published the first-ever picture of an exoplanet orbiting a Sun-like star.

Canadian astronomers are leading the world in the discovery of exoplanets.

What Does the Future Hold for Exoplanet Discoveries?

Today, astronomers at the University of Toronto's Dunlap Institute (DI) for Astronomy and Astrophysics are building a telescope in the Canadian High Arctic. They hope to take advantage of the long arctic nights and the clear skies to locate many new transiting exoplanets. A Canadian/US team led by Dr. Macintosh and DI Director Dr. James Graham are constructing the Gemini Planet Imager (GPI), the most advanced camera yet built to take pictures and spectra of exoplanets. Most of GPI was built at the Herzberg Institute of Astrophysics in Victoria.

This curve shows the dimming of the light from the star GJ 1214 as it is transited by a super-Earth exoplanet (Credit: Dr. Bryce Croll).

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