

## 3.7

# EDUCATIONAL PROGRAMS OF THE MOUNT WASHINGTON OBSERVATORY

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## 1. INTRODUCTION

The Mount Washington Observatory is a private, non-profit, scientific and educational institution which maintains a permanently staffed weather observatory at summit of New Hampshire's Mount Washington. The Observatory makes and reports hourly weather observations and also supports a wide variety of scientific research. Additionally, the Observatory is involved in numerous educational efforts which seek to inform individuals about the many significant aspects of weather, area history, and the mountain environment.

## 2. MOUNT WASHINGTON

Mount Washington is located at latitude 44.28° N, longitude 71.3° W, in New Hampshire, USA. It is part of the Presidential Range, a ridge line about twelve miles in length, with the greatest contiguous alpine area in the United States east of the Mississippi.

With a summit elevation of 6,288 feet (1917 meters), Mount Washington is the highest peak in the northeast United States. The world's fastest observed surface wind speed of 231 mph was measured on Mount Washington on April 12, 1934, a world record which stands to this day. Mount Washington's extreme climatic conditions, including cold temperatures, high winds, and frequent atmospheric icing, give Mount Washington the reputation for being the "Home of the World's Worst Weather."

## 3. MOUNT WASHINGTON OBSERVATORY

The Mount Washington Observatory is a private, non-profit, membership supported organization which was founded in 1932. The mission of the Observatory is to advance understanding of the natural systems that create the Earth's weather and climate. The organization aims to fulfill this mission by maintaining its mountaintop weather station, conducting research and educational programs and interpreting the heritage of the Mount Washington region.

### 3.1 Summit Weather Station

The first regular meteorological observations on Mount Washington were conducted by the U.S. Signal Service, a precursor of the Weather Bureau, from 1870 to 1892.

The Mount Washington Observatory reoccupied the summit in 1932 through the enthusiasm of a group of individuals who recognized the value of a scientific facility at that demanding location. For the first several years, the Observatory was set up in existing summit buildings. From 1937 to 1980, the Observatory was housed in its own wooden building on the mountain summit. Since 1980, the Observatory has leased a portion of the Sherman Adams summit building from the Mount Washington State Park, which is administered by the State of New Hampshire.

The weather Observatory is staffed 24 hours a day, 365 days a year by crews typically made up of two Observers, one or more interns, and a volunteer. The Observatory maintains two crews, working on an every other week schedule. At all times of the day, an Observer is awake and on duty.

Observatory facilities include the weather room, instrument tower, office space, a conference room, computer facilities and living quarters.

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Telephone service and wireless internet connect this summit outpost to the outside world.

### **3.2 Weather Observation**

One of the primary duties of the Observatory staff is to make and report weather observations, continuing the data set started in 1932. Each hour, observers measure temperature, pressure, humidity, wind speed and direction, visibility and cloud cover and make observations of any precipitation, icing or limits to visibility. At six hour intervals, additional data are collected. All observations and daily weather summaries are reported to the National Weather Service.

### **3.3 Research Programs**

Since its establishment in 1932, the Observatory has contributed to landmark research efforts in short-wave radio propagation, ice physics, the constitution of clouds, and the composition of the atmosphere. Current research projects address summit weather and climate, regional air quality and global tropospheric chemistry. Additionally, the summit facility has been used from testing of products including tents, clothing, paint, and windows.

## **4. EDUCATIONAL PROGRAMS AT THE SUMMIT OBSERVATORY**

The summit Observatory serves as the venue for many of the Mount Washington Observatory's educational programs. This location allows participants to directly experience aspects of Mount Washington's weather including hurricane force winds, sub-zero temperatures, zero visibility, accumulating rime ice or, alternatively, brilliant sunshine and views of up to 130 miles that encompass parts of five states, Canada and the Atlantic Ocean.

### **4.1 EduTrips**

EduTrips are overnight educational experiences held during the winter at the summit Observatory. The Mount Washington Observatory EduTrip Program provides an opportunity for properly prepared individuals to encounter the summit of Mount Washington in winter. The educational value of the visit is enhanced by the instruction in subjects pertinent to the mountain environment offered by experienced instructors.

Travel to and from the summit is effected by snow tractor, and overnight accommodations are provided at the summit Observatory.

EduTrips focus on such diverse subjects as mountain photography, mountain meteorology, the glacial geology of the White Mountains, the natural history of Mount Washington, and life and work atop Mount Washington. Some trips have been specially designed for teachers, encouraging them to bring weather and Mount Washington into their classrooms.

### **4.2 Summer Seminars**

The summer seminars offered on the Summit give Mount Washington Observatory members the opportunity to have an extended, overnight visit to the Observatory, to sample the mountain in some of its many moods, to become personally acquainted with the work of the Observatory, and to learn more about the mountain's weather, environment, and history.

The trips ascend to the summit via Observatory van, stopping along the way to discuss aspects of the mountain environment. On-the-summit activities include a guided tour of the Mount Washington Museum, a very detailed tour of the Observatory's weather station (and behind the scenes at the summit), and informal presentations on the weather, natural history, and human history of the mountain. Specific sessions vary depending on weather and participant interest.

### **4.3 Winter Day Trips**

The mountain's summit is visited by a quarter-million people in summer, but its winter secrets are known only to a hardy few. A Mount Washington Observatory winter day trip introduces mountain and weather enthusiasts to Mount Washington in winter. winter day trips include transportation up and down the mountain (typically via snow tractor), a guided tour of the weather station and lunch while at the summit, as well as informal educational sessions from Observatory guides throughout the Trip.

### **4.4 Mount Washington Museum**

The Mount Washington Museum is located on the summit of Mount Washington, and includes

exhibits about the weather on the mountain, and the natural and human history of the White Mountains. The museum is typically open from late May through mid-October, when the State Park is open, and public transportation is available to the summit.

#### **4.5 Observatory Tours**

Tours of the summit weather station and research facility are available to Observatory members and educational groups. Tours can include visits to the work quarters, living quarters, and instrument tower, weather permitting.

### **5. EDUCATIONAL PROGRAMS IN NORTH CONWAY, NEW HAMPSHIRE**

The Mount Washington Observatory maintains a valley establishment in North Conway, New Hampshire, which includes administrative headquarters and public facilities and is accessible year round. Public facilities in this building include the Weather Discovery Center, Gladys Brooks Memorial Library, a small theater and a large classroom/conference room.

#### **5.1 Weather Discovery Center**

The Mount Washington Observatory's Weather Discovery Center was created as a result of a collaboration between the Mount Washington Observatory and the National Oceanic and Atmospheric Administration Forecast Systems laboratory (NOAA-FSL), and has received additional support through the National Weather Service (NWS).

The mission of the Weather Discovery Center is to enhance awareness, understanding, and appreciation of the atmosphere, its complexity, its impact on the human experience, and the many ways in which atmospheric phenomena are observed and interpreted.

The Weather Discovery Center provides information and interactive exhibits on Mount Washington and the weather that surrounds it. It is open to the general public, as well as educational groups. Interactive video conferencing capabilities allow visitors to participation in live, two-way interactions with observers on the summit.

#### **5.2 Gladys Brooks Memorial Library**

The Observatory's Gladys Brooks Memorial Library features a large collection of materials related to the White Mountains. It includes books, maps, prints, photographs, and artifactual material. Strongest holdings are in historical material, but the sciences are also represented.

#### **5.3 Workshops and Symposia**

The Observatory offers workshops, held in the Spring and Fall, to give participants the opportunity to learn about the glacial geology of the northern White Mountain region, and about the history of geological exploration and understanding of the area.

Periodically, the Observatory also sponsors special symposia which focus on important topics in the sciences and the humanities which are particularly relevant to Mount Washington and its environs. Topics of the conferences have included weather, the glacial geology of the White Mountains, the alpine zone of the White Mountains, the interaction of Native Americans and European colonists in the area, the grand resort hotels and tourism in the White Mountains, and the visual arts and the White Mountains. The symposia draw leading authorities in their respective fields, who share their knowledge with and stimulate the learning of attendees. A 75th anniversary symposium is currently being planned for September, 2007.

### **6. OFF-SITE EDUCATIONAL PROGRAMS**

For people who cannot travel to either the summit Observatory, or the Mount Washington Center, the Observatory provides a number of off-site educational programs.

#### **6.1 Traveling Outreach Programs**

The Observatory offers a variety of educational programs for schools, camps, Scouts, and other groups. Through a generous grant from Subaru of America the Mount Washington Observatory Weathermobile allows Observatory educators to travel to off-site locations with experiments, demonstrations and lessons which help students, teachers and the general public understand

weather concepts.

Classroom presentations, designed to fit into a regular class period, include topics such as:

- Whether the Weather
- The Classroom Observatory
- Zap! Bang! What Was That?

Teacher programs are designed to enhance educators' knowledge of weather, plus provide options for reaching all students. A number of teacher programs have been designed, but can be customized for an individual school's needs. These offerings include:

- Incorporating Weather in the Classroom
- Weather on the Web
- Creating a Classroom Observatory

The Outreach Program can also offer informative, interesting sessions for non-classroom settings, including slideshows, talks, and demonstrations. The WeatherMobile can even set up a weather station at an off-site location.

## **6.2 Video Conferencing**

The Observatory runs a daily "Live from the Summit" interactive video conference between the summit Observers and visitors to the Weather Discovery Center. The Observatory is working to facilitate off-site video conferencing to schools and other venues with the necessary technology.

## **6.3 MWO Website**

The Mount Washington Observatory web site: <http://www.mountwashington.org/> provides visitors with a virtual trip to Mount Washington. Highlights of the web site include current and archived weather data, web cams on Mount Washington and surrounding peaks, a photo gallery, information about membership, programs and visiting the mountain and an on-line shop of weather and mountain books, prints and materials.

## **7. INVITATION TO PARTICIPATE**

Membership in the Mount Washington Observatory is open to all. For additional information about the Observatory's membership, research, or educational opportunities, please contact:

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