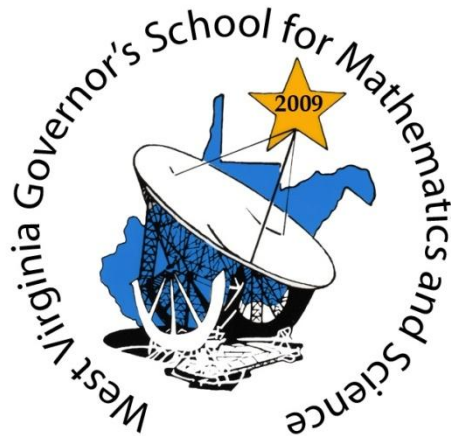


West Virginia Governor's School  
For Mathematics and Science  
at the  
*National Radio Astronomy Observatory*  
August 2-15, 2009

A Handbook for Students and Parents



*Governor's Schools of West Virginia*  
*Where dreams are realized*

West Virginia Department of Education and the Arts

Joe Manchin III, Governor

Kay Goodwin, Cabinet Secretary

# W.Va. Governor's School for Math and Science

## *Information and Guidelines*

### **A Message from the Cabinet Secretary of Education and the Arts**

Governor Joe Manchin III, the Department of Education and the Arts and the West Virginia Experimental Program to Stimulate Competitive Research (WV EPSCoR) proudly present the West Virginia Governor's School for Mathematics and Science at the National Radio Astronomy Observatory in Green Bank. Through an agreement with the National Youth Science Foundation and the National Radio Astronomy Observatory, this unique program celebrates the achievement and potential of 60 of the state's most promising math and science students who will be high school freshmen next year.

Governor's Schools are truly a community effort. Funded by the legislature as requested in the governor's budget, all of the Governor's Schools of West Virginia are administered by the West Virginia Department of Education and the Arts. The West Virginia Department of Education, through cooperative efforts, also plays an integral part in the programs.

The information provided here should answer many of the questions that parents/guardians have about the Governor's School for Mathematics and Science (GSMS). Participation in the GSMS is an opportunity for students to meet and interact with other students and adults in an academic environment that facilitates and encourages exploration and understanding of advanced topics in mathematics and science. GSMS Dean Andy Blackwood and NRAO Education Officer Sue Ann Heatherly will open your eyes and ears to some of the mysteries of science.

I am happy to congratulate you, not only for exploring the world of science and math, but for having the wisdom to know that GSMS at the National Radio Astronomy Observatory is the place where you should spend two exhilarating weeks this summer. You make West Virginia proud!

Sincerely,

Kay Goodwin

Cabinet Secretary of Education and the Arts

# W.Va. Governor's School for Math and Science

## *Information and Guidelines*

### **Students**

As a student attending the West Virginia Governor's School for Mathematics and Science (GSMS), you represent your school, county, and state; you are not simply a tourist visiting the National Radio Astronomy Observatory. The staff of the GSMS is concerned for your welfare and you are accountable for your personal behavior. These guidelines have been developed to protect you and to help insure the continued success of the GSMS program.

The GSMS setting is very intimate. Students, staff members, and guests share space and should appreciate each other's diverse backgrounds and tastes. Please consider your actions and attitudes carefully as you participate in the GSMS experience. Please respect your fellow students, staff members, and guests. This underlying principle of mutual appreciation and respect forms the basis of most of these guidelines. Sexual harassment is not tolerated and intimate physical contact is prohibited.

Your attendance at the GSMS is a challenging opportunity for you to meet and interact with other students and adults in an enriched, relaxed, academic environment where you may explore studies of particular interest to you. You will be living and learning on the campus of the National Radio Astronomy Observatory in Green Bank, West Virginia.

Your summer at the GSMS will be a memorable experience. Your potential for learning will be challenged as you discover new horizons while broadening your knowledge base. Moreover, you will become a member of a network of talented young West Virginians whose friendships will serve to support you throughout your lifetime.

Your acceptance of this opportunity carries with it an agreement to govern your behavior with integrity and a respect for others. You are to abide by all rules and regulations included in this packet. These guidelines are necessary in order for you to have the best possible learning experience.

Read this information carefully to familiarize yourself with the information you will need in order to have a successful and enjoyable experience at the GSMS.

### **Parents**

The information provided in this booklet should answer many of the questions that parents/guardians have about the Governor's School for Mathematics and Science (GSMS). Participation in the GSMS is an opportunity for students to meet and interact with other students and adults in an academic environment that facilitates and encourages exploration and understanding of advanced topics in mathematics and science. This session of the GSMS is held on the Green Bank campus of the National Radio Astronomy Observatory (NRAO) and is operated in partnership with the National Youth Science Foundation® (NYSF).

If you questions remain after reviewing this information, please contact one of the following:

Dr. Andrew N. Blackwood, Ed.D.  
Dean, WV GSMS and  
Executive Director, NYSF  
P.O. Box 3387  
Charleston, WV  
304-342-3326  
Andrew.Blackwood@nysf.com

Mrs. Sherry Keffer  
State Director, WV Governor's Schools  
WV Department of Education and the Arts  
Building 5, Room 205  
1900 Kanawha Boulevard, East  
Charleston, WV 25305  
304-558-2440  
Sherry.L.Keffer@wv.gov,

Ms. Sue Ann Heatherly  
Education Officer, NRAO  
P.O. Box 2  
Green Bank, WV 24944  
sheather@nrao.edu

# W.Va. Governor's School for Math and Science

## *Information and Guidelines*

### **Arrival, Departure, and Residency Policy**

- You should plan to arrive at the bunkhouse at the National Radio Astronomy Observatory in Green Bank between 12:00 Noon and 3:00 PM on Sunday, August 2, 2009.
- The GSMS is intended to be an intensive residential learning experience; therefore, you are expected to remain on campus for the duration of the GSMS, including weekends.
- Exceptions can be granted only in the event of an emergency. You must request permission from the GSMS Dean stating the nature of the emergency your expected times for leaving and returning.
- You are required to attend all classes, seminars, meals, and special events. You are expected to participate actively in all instructional activities - this is the primary purpose of your being invited.
- Families are invited to attend the following two ceremonies:
  1. **Opening Ceremony** – 3:30 PM, Sunday, August 2, 2009 in the NRAO Science Center Auditorium
  2. **Graduation Ceremony** – 11:00 AM, Saturday, August 15, 2009 in the NRAO Science Center Auditorium You should plan to depart at 1:00 PM on Saturday, August 15.

### **Visitor Policy, Living Accommodations, and Bunk Hours**

- You will be living in the National Radio Astronomy Observatory bunkhouse. The bunkhouse is divided into two large rooms for sleeping (one male and one female) with adjacent staff quarters. Bathroom and laundry facilities are attached.
- You are not to receive or entertain non-GSMS visitors.
- You may visit with members of the opposite sex only in the lounge areas. Males may not enter the female side of the bunkhouse and females may not enter the male side of the bunkhouse. Students are not permitted in counselor's rooms.
- Families are requested not to visit during GSMS so that you will have sufficient time to interact socially with other GSMS students.
- Your mailing address:

Your name  
WV Governor's School for Mathematics and Science  
c/o National Radio Astronomy Observatory  
P.O. Box 2  
Green Bank, WV 24944.
- Bunk time is observed between 10:30 PM and 7:00 AM. You must be quiet and stay in your bunk except for brief visits to the restroom.

### **GSMS Boundaries**

- The GSMS boundaries are between the Bunkhouse, Science Center, and Jansky Laboratory. Please do not venture beyond these boundaries unless you are participating in a field trip with a staff member.
- You may enter the Jansky Laboratory only when accompanied by a staff member. Students may enter the cafeteria only during designated meal times. The Residence Hall is off limits at all times.

### **Stereos and Personal Electronics**

- Personal audio devices may only be used with headphones and are prohibited after lights out, during meals, during academic activities, and on overnights. Others may not share your taste in music and other audio. Please respect your neighbors.

# W.Va. Governor's School for Math and Science

## *Information and Guidelines*

### **Packing List**

As you prepare for your nearly two-week stay at the WV GSMS, the following list may help you make decisions about clothing and equipment needed for the many WV GSMS activities. Because personal space in the bunkhouse is limited, you should pack lightly while still being prepared for hot weather, cold weather, rainy days, formal banquets, bog slogs, etc. The weather in the eastern mountains of West Virginia can be quite erratic in July and August. Typical daily temperatures range from 50°F in the morning to 85°F in the mid-afternoon. Rainfall is fairly common with noticeable precipitation every 4 or 5 days.

Laundry facilities will be available during your stay (parents should make students familiar with the operation of residential washers and dryers), so keep that in mind as you pack. You will need to bring a **LAUNDRY BAG** to carry your clothes to be washed. If an item cannot go in a dryer, it would be best not to bring it – there is not sufficient space for air-drying laundry.

- Because of the close living arrangements, we do not permit the use of audio devices without headphones. **Please leave them at home.**
- Devices whose primary use is gaming are **not** permitted.
- The WV GSMS is held at the National Radio Astronomy Observatory within the National Radio Quiet Zone that protects the radio spectrum from interference. Cell phones do not have service – leave them at home.
- Use of electronic devices (audio players, cameras, etc.) is permitted only in approved areas.
- You will have access to a small computer lab and you will have opportunities to periodically check web-based E-mail. Do **not** bring your own computer.
- Except for postage for letters home, coins for the pay phone, and junk food money, we cover almost every cost associated with your stay at the WV GSMS. You need not bring much spending money to the GSMS.

### **I. Everyone should bring:**

**OLD CLOTHES** suitable for outdoor activities such as backpacking, caving, and mountain biking.

- \_\_\_\_\_ One pair of lightweight, loose-fitting pants for hiking
- \_\_\_\_\_ One pair of old jeans
- \_\_\_\_\_ Two comfortable lightweight shirts or t-shirts
- \_\_\_\_\_ Two warm sweaters or sweatshirts (mornings and evenings can be quite cool)
- \_\_\_\_\_ One warm hat
- \_\_\_\_\_ Hiking boots or other suitable footwear for hiking.
- \_\_\_\_\_ Three pairs of lightweight socks and three pairs of heavier socks (to be worn over the lightweight socks to prevent blisters.) Note that synthetic fabrics such as polypropylene are preferable to cotton.

**CASUAL CLOTHES** suitable for daily activities (clothes that you would wear to school).

- \_\_\_\_\_ Five casual shirts or t-shirts
- \_\_\_\_\_ Three long-sleeved shirts or sweatshirts
- \_\_\_\_\_ Three pairs of jeans or casual pants
- \_\_\_\_\_ Five pairs of shorts
- \_\_\_\_\_ **AT LEAST** seven pairs of socks (so that you'll have an extra pair of dry socks when it rains)
- \_\_\_\_\_ Athletic shorts/shirts (if you intend to run in the mornings or play sports during the afternoon)

### **BUSINESS CASUAL CLOTHES**

- \_\_\_\_\_ You will need one business casual outfit – you will wear it on the last day to graduation.

# W.Va. Governor's School for Math and Science

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**OTHER CLOTHES** which we suggest include:

- Warm pajamas
- Swimsuit
- Medium-weight jacket (synthetic fabric is best)
- Rain gear

**SHOES** which we suggest include:

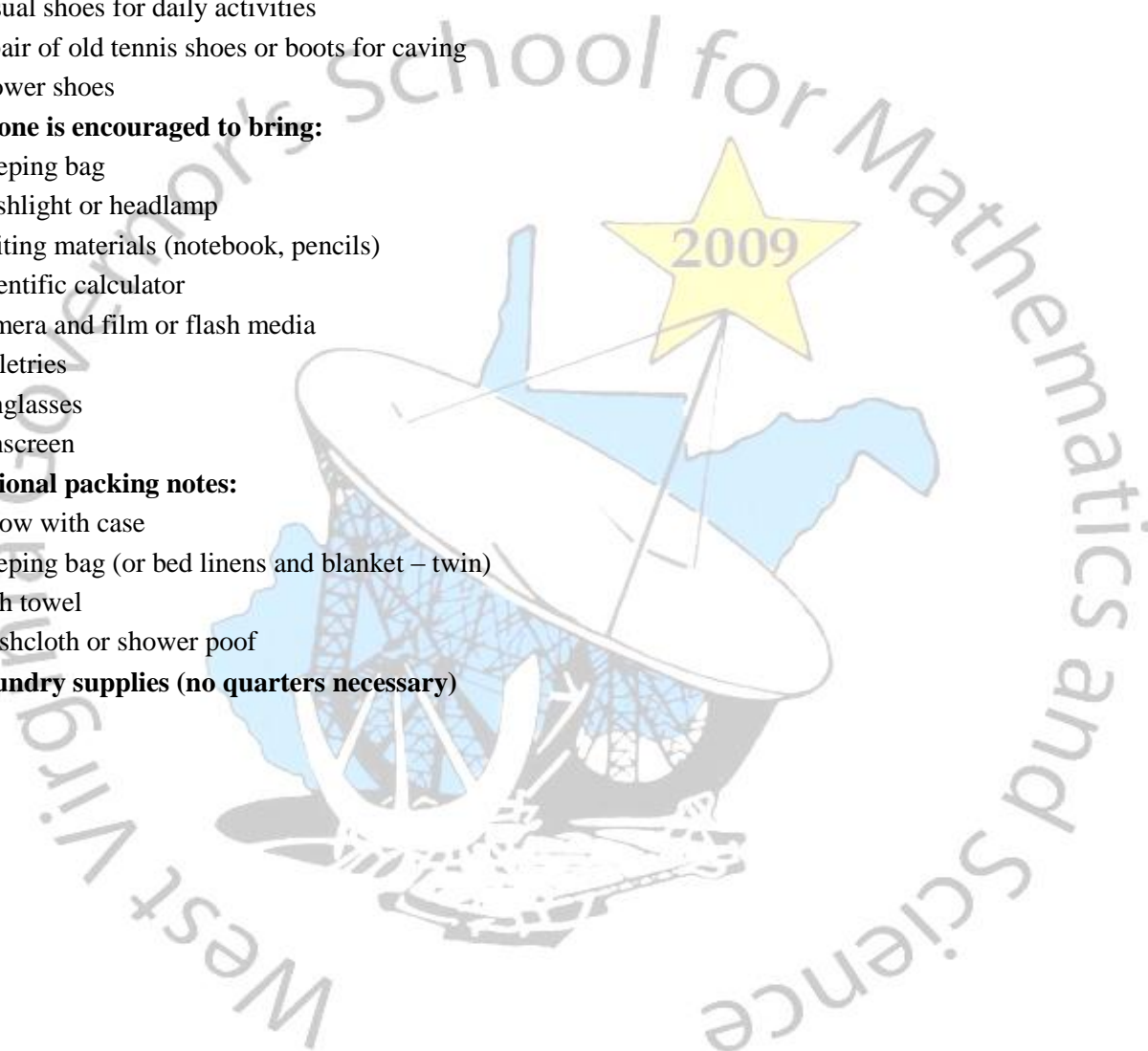
- Casual shoes for daily activities
- A pair of old tennis shoes or boots for caving
- Shower shoes

**II. Everyone is encouraged to bring:**

- Sleeping bag
- Flashlight or headlamp
- Writing materials (notebook, pencils)
- Scientific calculator
- Camera and film or flash media
- Toiletries
- Sunglasses
- Sunscreen

**III. Additional packing notes:**

- Pillow with case
- Sleeping bag (or bed linens and blanket – twin)
- Bath towel
- Washcloth or shower poof
- Laundry supplies (no quarters necessary)**



# W.Va. Governor's School for Math and Science

## *Information and Guidelines*

### **Disciplinary Policy**

As a representative of your school, county, and state, you are expected to be an exemplary citizen. Certain behavior is incompatible with the philosophy of the GSMS. Disciplinary action in response to misbehavior is the responsibility of staff members.

There are three levels of discipline, the use of which is determined by the nature, frequency, or severity of the infraction.

1. **Verbal reprimand** by staff with written notice to the GSMS Dean.
2. **Written warning** by the GSMS Dean (Notice of Disciplinary Probation). A copy will be sent to the parent/guardian and local school counselor.
3. **Dismissal** by the GSMS Dean.

Final decisions regarding dismissal from the GSMS will be made by the GSMS Dean in consultation with the appropriate faculty and staff.

Should a student be dismissed, a letter setting forth the reason for the student's dismissal will be sent to the parent/guardian, high school principal and county superintendent of schools.

Destroying or damaging property is a serious matter requiring full compensation, resulting in a written warning or probation or dismissal.

Reasons for dismissal include, but are not limited to, the following:

- Absence from campus without permission from the GSMS Dean;
- Any unexcused absence;
- Disobeying visitation policies;
- The use or possession of tobacco, alcoholic beverages or controlled substance, whether on-campus or off-campus;
- Unauthorized riding in a vehicle with another person;
- Any other behavior deemed to be inappropriate, dangerous, or damaging to self, staff, guests, or the institutions (GSMS, NYSF, or NRAO).

Students who are determined to have violated the tobacco, alcohol, and controlled substances rule will be **dismissed immediately**.

Students who leave the authorized areas will be restricted to quarters on the first offense and dismissed immediately if the offense is repeated.

### **Additional Guidelines**

- Students may not eat in the bunkhouse sleeping rooms.
- Students are not permitted to ride NRAO 'cruiser' bicycles.
- Students may ride mountain bikes only when supervised by a staff member and must always wear a helmet. Bikes must be returned to the tent.
- Students must sign up for afternoon activities in each block. Napping is occasionally scheduled as an afternoon activity and is only available to students with nighttime observations.
- Students may only use the computers in the computer lab and only when supervised by a staff member.
- Students are not permitted to drive any motor vehicle.
- Competitive sports must not be overly aggressive.
- Horseplay is not permitted.

# W.Va. Governor's School for Math and Science

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- Nametags must be displayed on the front, upper torso at all times - clipped to clothing or suitable lanyard.
- If you are ill/injured, please consult a member of the staff immediately. Students are not permitted to access the med-kits.
- If the fire alarm sounds, please exit the building and assemble in the parking lot adjacent to the building. If this location is unsafe, please assemble by the Grote Reber telescope (red, white, and blue) in front of the Science Center.
- Never play with fire equipment. Do not prop open a fire door
- Report any suspicious people to a staff member

### **About the National Youth Science Foundation**

The National Youth Science Foundation, Inc., is a nonprofit 501 (c)(3) corporation established in 1983 to plan, raise financial support for and oversee the operation of the National Youth Science Camp (NYSC). The NYSC, founded in 1963 by the State of West Virginia as part of its Centennial Celebration, was supported by the State for 20 years without private funding. Alumni and interested West Virginians who believed in the ideals of the NYSC formed the Foundation in 1983 to supplement funding for the NYSC and to research and develop programs of similar focus for different audiences.

### **About the National Radio Astronomy Observatory**

The National Radio Astronomy Observatory (NRAO) is a research facility of the U.S. National Science Foundation, operated under a cooperative agreement by the Associated Universities, Inc., a 501(c)(3) not-for-profit educational and research corporation. The NRAO's scientific mission is to provide state-of-the-art radio telescope facilities for use by the scientific community. The NRAO conceives, designs, builds, operates and maintains radio telescopes used by scientists from around the world. Scientists use the NRAO facilities to study virtually all types of astronomical objects known, from planets and comets in our own solar system to quasars and galaxies billions of light-years away. Recently, the Robert C. Byrd Green Bank telescope was used by a team of scientists to monitor the progress of the Huygens probe as it descended through the atmosphere of Titan.

The NRAO's educational mission is to support the development of a society that is both scientifically and technically literate. In Green Bank, the NRAO's aim to accomplish this mission through a combination of formal programs for teachers and informal programs for school children and the general public. NRAO is one of the world's premier research facilities for radio astronomy, operating powerful, advanced radio telescopes spanning the western hemisphere. Scientists from around the world use these instruments to probe fundamental questions in astronomy and physics.

The Green Bank campus of the NRAO is home to the world-class Robert C. Byrd Green Bank Telescope, and provides a perfect setting for learning and exploration. The 2,700-acre NRAO facility is situated in a rural community contiguous with the Monongahela National Forest. The contrast between high-tech scientific instruments and the natural laboratory of the National Forest provides unique intellectual opportunities for the GSMS students. The NRAO also operates the new Science Center at Green Bank that is comprised of three large classrooms,

networked computer lab, exhibit hall and auditorium space sufficient for instruction and research projects. The basement is a large utilitarian area (3,000 square feet) suitable to use for larger group activities. This space also functions as the electronics lab. Twenty soldering stations have been set up around the perimeter. The Star Party patio just outside provides a location for optical telescopes. The Science Center is adjacent to the NRAO research laboratory which contains the Green Bank Telescope Control Room, the electronic lab and the Telescope Control Room, the electronic lab and the library. The NRAO Recreational Area includes a swimming pool, tennis court, basketball court, volleyball court and picnic shelter.

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## *Information and Guidelines*

### Frequently Asked Questions

**Q: If I discover that I need to leave GSMS for a day to participate in another school-related activity, can I have a leave of absence?**

A: No, you may not. You will be a member of a research team and so your commitment to the GSMS and your team requires your full-time participation.

**Q: My sister is getting married. May I miss GSMS for two days to take part in the festivities?**

A: Again, you may not. If you know of an important event that is scheduled during the GSMS, you must make a choice before agreeing to attend the GSMS.

**Q: Can my parents visit during the GSMS?**

A: No, the GSMS is designed as a parent-free experience so that you can be totally focused on all of the activities planned for you.

**Q: Will I be able to leave the campus for any reason?**

A: You will only be able to leave campus only for official GSMS outings.

**Q: If I get homesick, will I be allowed to go home?**

A: A bit of homesickness is not unusual. Please keep in mind, however, that your selection to attend the GSMS was very competitive and, if you choose to not complete the session, you will have prevented another student from attending. If a student leaves the GSMS before completing the program, the student's principal and superintendent will be notified. Furthermore, the student shall *not* make reference to being selected to attend the GSMS on further applications or resumes.

