Golden Bear Pharmacy
Summer Camp
Manual 2019

June 24th - 28th

Thank You to Our Sponsors:

WNE Alumni Association
Walgreens Pipeline Initiative Development Grant
MassHire Hampden County Workforce Board
Western Mass Pharmacists Association
Bob Dobek
Welcome!

Welcome to the Western New England University College of Pharmacy and Health Sciences Golden Bear Pharmacy Summer Camp! I hope you are excited for all the experiences that this fun-filled week has to offer. By the end of the week, you will learn about different career paths in the field of pharmacy, and perform many hands-on activities with our pharmacy practice, pharmaceutical and administrative sciences faculty. You will also spend time with our occupational therapy faculty learning about other health care careers. Throughout the camp, current pharmacy and occupational therapy students will be available for assistance or to discuss their experiences.

I ask that you arrive on time so we can start promptly every day. Many of the activities will require participation and engagement. Come excited to learn! The most important thing, besides safety of course, is to have fun. Faculty will provide instructions through lectures, discussions, and hands-on activities. If students should need any learning or physical accommodations, please contact me in advance.

In this manual, you will find safety guidelines that must be followed throughout the camp. No bullying or disrespect towards other students, faculty or staff will be tolerated. For all activities to run smoothly, all students in attendance will need to abide by the rules. The success of the activities can only be ensured if students follow directions and are actively engaged in the sessions.

Throughout the camp, faculty, staff and pharmacy interns will regularly distribute green squares of paper to any student/group who is performing exceptionally (attentive, respectful, engaged, answering/asking questions). They can also distribute pink/red sheets of paper to students/groups who are behaving disruptively (distracted, disrespectful). At the end of the week, the group with the most green squares (minus the pinks/reds) will win a prize.

If at any point you have questions during activities, please feel free to ask! We want you to have an enjoyable and safe experience.

Please do not hesitate to contact me with questions or concerns.

Looking forward to meeting all of you!

Arin C Whitman, PharmD, BCOP
arin.whitman@wne.edu
413-796-2452.
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Campus Accessibility Map

1. Kevin S. Delbridge Welcome Center
   Admissions (Undergraduate)
   Center for Graduate and Advanced Studies
   Community Relations
   Marketing and External Affairs
   Office of Strategic Initiatives
   Visitors Center
2. Herman Hall*
   Classrooms and Faculty Offices
   College of Arts and Sciences
   Mathematics Center
   Student Disability Services
   Writing Center
3. Joseph J. Deliso Sr. Hall**
   Administration
   Controller's Office
   Payroll
4. Emerson Hall*
   Classrooms and Faculty Offices
5. Center for the Sciences and Pharmacy**
   College of Pharmacy
   Pharmacy, Pre-pharmacy, Science and Psychology
   Classrooms/Laboratories
   Faculty Offices
   Health Services
6. D'Amour Library*
   Academic Scheduling
   Business Analytics Center
   Digital Learning Center
   Educational Technology Center
   Student Administrative Services*
   TV Studio/Classroom
7. Churchill Hall
   Classrooms
   Cohen Trading Room
   College of Business
   Information Technology
8. St. Germain Campus Center*
   Academic Success Center
   Art Gallery
   Bookstore
   Campus Events
   Career Development Center
   Center for Civic Engagement
   Convenience Store
   Counseling
   Dean of Students
   Dining Halls
   Diversity Programs
   Food Court
   First Year Students & Students in Transition
   International Student and Scholar Services
   Learning Beyond the Classroom
   Residence Life
   Spiritual Life
   Student Activities
   Student Affairs
9. Slicht Hall*
   Classrooms/Laboratories
   College of Engineering
   Lyman and Leslie Wood Auditorium
10. Rivers Memorial Hall*
    Drama/Music Programs
    Human Resources
    Radio Station
    Student Publication Offices
11. Blake Law Center**
    School of Law
    Law Library
    Law School Common
12. Law Clinics
13. Information Technology Office
14. Faculty Offices
15. Faculty Offices
16. Faculty Offices
17. Commonwealth Hall*
    Residence Hall
18. Windham Hall
    Residence Hall
19. LaRiviere Center
    Residential Living and Learning Center
20. Evergreen Village Townhouses
    Residence Townhouses
21. Southwood Hall
    Residence Hall
22. Campus Utilities Building
    Campus Post Office
    Facilities Management
    Printing Services
    Procurement Services
23. Franklin Hall
    Residence Hall
24. Hampden Hall
    Residence Hall
25. Berkshire Hall
    Residence Hall
26. Tennis Courts
27. Golden Bear
    Multipurpose Turf Stadium
28. Softball Field
29. Recreational Fields
30. George E. Trelease Memorial Baseball Park
31. Supenrant Field
    Soccer Field
32. Alumni Healthful Living Center*
    Athletics
33. Flynn Family Pavilion*
34. Public Safety**
35. Plymouth Complex
36. ROTC
37. Advancement Office
38. Faculty Offices
39. Advancement Operations
40. Residence Houses
41. Residence House
42. Gateway Village
    Resident Apartments

* Buildings with accessible auto door openers
** Buildings with Gender Inclusive bathrooms

Any accessibility concerns should be addressed to the Office of Human Resources for faculty and staff and to the Office of Student Disability Services for students.
Pharmacy Intern Assignments

Laboratory/Sterile Products
Learner #1 (M/T): Gianna Comparone
Learner #2 (M/T): Tayla Gonsalves
Learner #3 (M/T): William Chan
Learner #4 (Thur/Fri): Cara O’Toole
Learner #5 (Thur/Fri): Katie Burke
Learner #6 (Thur/Fri): Justin Adamczyk

Q & A with current students, SIM Man Demonstration & Toastmasters Leadership
Learner #7 (M/T): Francine Baliao
Learner #8 (M/T): Alicia Salazar

Yoga, Mock Pharmacy/Ambulatory Care & Herbal Garden
Learner #9 (M/T): Emily Castle
Learner #10 (M/T): Bethany Brown
Learner #11 (M/T): Ridge Sulkey
Learner #12 (M/T): Benjamin Horton

Sign -In/Sign-Out Supervision, Activity Attendance/Behavior, Yoga, Pharmacy Law & Ethics Challenge, Pharmacy Games, Toastmasters Leadership
Learner #13 (W): Elizabeth Mielnicki
Learner #14 (W): Ashbouk Kasim
Learner #15 (W): Lauren Bertocci
Learner #16 (W): Vanessa Frempong
Learner #17 (W): Alicia Len

Supervision Groups 1-5 (Sign -In/Sign-Out & Activity Attendance/Behavior)
Learner #18 (M/T): Laura Cruz
Learner #19 (Thur/Fri): Alan Keeley

Supervision Groups 6-10 (Sign -In/Sign-Out & Activity Attendance/Behavior)
Learner #20 (M/T): Pearl Eben
Learner #21 (Thur/Fri): Mansi Mehta

Dr. Whitman & Dr. Ostroff Assistance
Learner #22 (M/T): Makaylla Whalen
Learner #23 (M/T): Sabrina Gaffney
Learner #24 (Thur/Fri): Marie Noelle Bate Baiyee
Learner #25 (Thur/Fri): James Ridenour
<table>
<thead>
<tr>
<th>Time</th>
<th>Monday 6/24/19</th>
<th>Tuesday 6/25/19</th>
<th>Wednesday 6/26/19</th>
<th>Thursday 6/27/19</th>
<th>Friday 6/28/19</th>
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</thead>
<tbody>
<tr>
<td>9:00 – 9:55 am</td>
<td>Orientation</td>
<td>Yoga</td>
<td>Tai Chi</td>
<td>Yoga</td>
<td>Admissions</td>
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<tr>
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<td>*All 50 students</td>
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<td></td>
<td></td>
<td>Dr. Mattison</td>
<td>Dr. Kinney</td>
<td>Dr. Mattison</td>
<td>CSP 200 Berg, Woods</td>
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<tr>
<td>10:00 – 10:55 am</td>
<td>Medicinal Chemistry Lab</td>
<td>Q&amp;A with current students</td>
<td>Pharmacy Law &amp; Ethics Challenge</td>
<td>Example Lecture/Quiz Drugs of Abuse</td>
<td>Yoga or Fun Run</td>
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<td>CSP 111</td>
<td>CSP 111/119</td>
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<td>*All 50 students</td>
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<td></td>
<td>Dean Dintzner</td>
<td>Dr. Klee</td>
<td>Dr. Mattison, Dr.</td>
<td>Dr. Whitman</td>
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<td>Mr. Raschilla</td>
<td>Charbonneau, Dr.</td>
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<td>Doyle-Campbell</td>
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<tr>
<td>11:00 – 11:55 am</td>
<td>Lunch</td>
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<td>Lunch &amp; Pharmacy Presentation</td>
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<td>CSP 200 Berg, Woods</td>
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<td>12:00 - 12:55 pm</td>
<td>50% Sterile Products</td>
<td>50% in Mock Pharmacy</td>
<td>Pharmacy Games</td>
<td>DNA Extraction/Purification</td>
<td>Occupational Therapy</td>
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<td>50% Sim Man</td>
<td>50% Ambulatory Care</td>
<td>*All 50 students</td>
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<td>Dr. Adams, Dr.</td>
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<td>Dr. Ostroff, Dr.</td>
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<td>Dr. Doyle-Campbell</td>
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<td>Dr. Doyle-Campbell</td>
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<td>2:00 – 2:55 pm</td>
<td>Compounding LAB</td>
<td>Herbal Garden Outside/Review Game</td>
<td>Pharmacy Games</td>
<td>Micro lab #1</td>
<td>Education dept. #2</td>
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<td></td>
<td>CSP 111</td>
<td>Outside/Review Game</td>
<td>*All 50 students</td>
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<td>CSP 200 Dr. Ostendorf</td>
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<td></td>
<td>(Hand Sanitizer, Lip balm)</td>
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<td>Dr. Ostroff, Dr.</td>
<td>Dr. Housman</td>
<td>Dr. Ekong</td>
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<td>Dr. Siwale, Dr. Gilzad-Kohan, Ms. Kat</td>
<td>Dr. Bose, Dr. Zimmermann</td>
<td>Whitman</td>
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<td>3:00 – 3:55 pm</td>
<td>Toastmasters/Pick up</td>
<td>Toastmasters/Pick up</td>
<td>Toastmasters/Pick up</td>
<td>Toastmasters/Pick up</td>
<td>Micro lab #2</td>
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<td>*All 50 students</td>
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<td>4:00 – 4:30 pm</td>
<td>Pick-up</td>
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<td>Wrap-up</td>
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<td>*Can review DNA results</td>
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Comments:
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<tr>
<th>Time</th>
<th>Activity</th>
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<th>Instructor(s)</th>
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<td>Dr. Shecherbakova</td>
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<tr>
<td>4:00 – 4:30pm</td>
<td>Pick-up</td>
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</tbody>
</table>

**Other Activities:**
- **Monday 6/24/19:** All 50 students together all day!!
- **Tuesday 6/25/19:** Group Photo
- **Wednesday 6/26/19:**
  - Yoga: *All 50 students* Dr. Mattison
  - Tai Chi: *All 50 students* Dr. Kinney
- **Thursday 6/27/19:**
  - Example Lecture/Quiz
  - Drugs of Abuse: *All 50 students* CSP 200 Dr. Whitman
- **Friday 6/28/19:**
  - Yoga or Fun Run: *All 50 students* Dr. Mattison

**Admissions:**
- *All 50 students* CSP 200 Berg, Woods

**Occupational Therapy:**
- Dr. Adams, Dr. Graves

**DNA Extraction/Purification:**
- CSP 111 Dr. Kinney

**Micro lab #1:**
- CSP 111 Dr. Housman

**Micro lab #2:**
- CSP 111 Dr. Housman

**Education dept. #1:**
- CSP 200 Dr. Ostendorf Dr. Ekong

**Education dept. #2:**
- CSP 200 Dr. Ostendorf Dr. Ekong

**Wrap-up:**
- *Can review DNA results*
General Policies and Procedures

1. Exercise good judgement.
2. Do not leave the building without notifying a group leader.
3. Follow the safety instructions provided by the group leader.
4. Be aware of where the exits, fire extinguisher, and first aid supplies are located in the room.
5. Avoid leaving the work area when in the middle of an experiment.
6. Organize and clean workbenches after finishing the experiment.
7. NO eating or drinking in laboratory setting (Lab room and SIM man room).
8. Footwear must be clean and in good condition. Closed footwear must be worn in laboratories; open-toed shoes and bare feet are not acceptable nor permitted in the laboratory settings.
9. Communicate positively and constructively with your groups and instructors.
10. Participate in team activities and do your share of the work.
11. Let an instructor or group leader know immediately if you are having difficulties.
12. To ensure that an environment conducive to teaching and learning is established, the University expects that individuals within its walls will treat each other with courtesy and respect.
13. When differences arise, these should be resolved in a civil manner.
14. Disruptive behavior, such as talking between students, leaving class while in session, or ringing cell phones, as well as disrespectful, hostile, abusive and/or threatening behavior or language will not be tolerated.
15. Learners are expected to be on time for class. If late, a learner shall enter from the rear of the room quietly, without creating a distraction.
Safety Guidelines

1. Leave all personal items (coats, non-essential books, etc.) in an unused portion of the laboratory.
2. Long hair, loose jewelry, and loose/baggy clothing should be secured.
3. **CLOSED TOED SHOES AND LONG PANTS** are required. Tank tops, shorts, and skirts are not allowed.
4. **Eating, drinking, or smoking is not allowed.** No food or beverages are allowed to be brought into the laboratory.
5. Be sure to wash hands when entering and leaving the laboratory.
6. At the beginning and end of each laboratory session, wipe bench tops with a disinfectant solution.
7. Keep your workspace clean at all times.
8. **NEVER** pipette by mouth.
9. Never remove equipment or reference materials from the laboratory.
10. Notify group leader of broken glassware for proper disposal.
11. Speak quietly and avoid unnecessary movement around the laboratory to prevent distractions that may cause accidents.
12. No running in the laboratory.
13. On completion of the laboratory session, place all materials in the designated disposal areas.
14. Always wear safety glasses with side shields in the laboratory when chemicals are present or actively being used. Safety glasses must be worn over prescription eyeglasses.
15. Contact an instructor before leaving the laboratory.
16. **ALL ACCIDENTS IN THE LABORATORY MUST BE IMMEDIATELY REPORTED TO THE INSTRUCTOR.**

The specific precautions outlined above **MUST** be observed at all times when in the laboratory.

By signing this document, I confirm I have read and understand the laboratory safety principles summarized on this page and I recognize my responsibility to abide by these principles while in the lab.

Date: ________________

Printed Name: _____________________ Signature: ___________________
Safety Equipment

Eye Protection
Eye/Face Wash Station
First Aid Kit
Fire Blanket
Fire Extinguishers

Emergency Shower
Laboratory Protocols
PUTTING DISINFECTANTS TO THE TEST

Description
This lab exercise shows that bacteria are found all around us and compares the effectiveness of common household disinfectants against common bacterial species.

Additional Safety in a Microbial Laboratory
1. Please review Safety Guidelines on page 3 for basic safety protocols while in a lab.
2. Most important: Do not touch or ingest the bacteria.
3. At the end of lab, disinfect the lab bench with 0.525% sodium hypochlorite solution (bleach).
4. If a spill occurs please report to the instructor for proper disinfection.
5. WASH YOUR HANDS! WASH YOUR HANDS! WASH YOUR HANDS!
   a. Wash hands thoroughly with soap before leaving the laboratory or touching hair, face, food, drink, or cell phone.

Background
- Microbes are everywhere!
  - Types of Microbes/ Bacteria we will be working with:
    - **Escherichia coli (E. coli)** - Gram negative bacteria
      - A common bacteria found in the intestines.
    - **Staphylococcus epidermidis** - Gram positive Bacteria
      - A common bacteria found on the skin.
- Culture media lets you sample and test an environment; bacteria are transferred from a sample surface to the petri dish and are allowed to grow and from colonies to be further examined.
- There are many different kinds of microorganisms that may grow, including potentially harmful bacteria and fungi.
- The appearance of a colony can help distinguish what type of organism is/was present. The difference in cell structure helps cells survive in different environment.
- Different disinfectants work by attacking these certain parts of different cell structures such as:
  - Sodium hypochlorite (bleach): destroys bacterial protein
Vinegar (acetic acid): damages proteins and lipids
Lysol (benzalkonium chloride/ quaternary ammonium compounds): binds to and destroys cell membranes

Part A: Testing the Effectiveness of Disinfectants in Killing Bacteria

Supplies:
- Tube of bacteria grown overnight (*Staphylococcus epidermidis* or *Escherichia coli*)
- Gloves (optional)
- Sterile swab
- Mueller-Hinton agar plate
- China or Sharpie marker (to label)
- Forceps
- Sterile paper discs pre-soaked in a beaker with disinfectant
  - Examples of disinfectants includes: 0.525% Sodium Hypochlorite (Bleach), Vinegar, Tea tree oil, 3% Hydrogen Peroxide, and other cleaning products (Lysol, Formula 409, Green works)
- Paper towel (to collect drips from discs)

Procedure

*Instructor will demonstrate aseptic technique first.*

Day 1:
1. Label the back of the petri plate with your name and the bacteria to be tested. Draw lines to **divide the plate into 4 sections** and label each section with the disinfectant to be tested.

2. Dip the swab into the tube of bacteria, then streak the swab in a **zig-zag motion** across the plate as demonstrated in the picture below to cover it with bacterial cells.

3. Use forceps to lift a paper disc soaked in disinfectant, touch the disc to the paper towel to **remove any excess liquid**, and then place the disc flat on the petri plate in the correctly labeled section.
4. Incubate the petri plate overnight at 37°C (98.6 °F)

Day 2:
1. Return and find your petri plate to examine.
2. Use a ruler to measure the “zones of inhibition” or clearing where bacteria were inhibited by the chemical.

3. Measure the zone of inhibition in millimeters and record in the table below.
4. Collect class results and compare the effectiveness of the different disinfectants on the two types of bacteria.

<table>
<thead>
<tr>
<th>Type of Disinfectant</th>
<th>Escherichia coli (Gram negative bacteria)</th>
<th>Staphylococcus epidermidis (Gram positive bacteria)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clorox (0.525% NaOCl)</td>
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<td>Lysol All-Purpose Cleaner</td>
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<td>Windex Disinfectant</td>
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<tr>
<td>Green Works Cleaner</td>
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<tr>
<td>3% Hydrogen Peroxide</td>
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<tr>
<td>Tea Tree Oil</td>
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<td>Vinegar (5% acetic acid)</td>
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Part B: Sampling an Environment Before and After Disinfectant

Supplies:
- 2 RODAC tryptic soy agar (TSA) plates (for surface sampling, marked with a grid)
- China or Sharpie marker to label
- Disinfectant or cleaning product
- Sampling surface (can sample benchtop or desktop if available)

Procedure
Day 1:
1. Label RODAC plates with name, where sampled, and “Before” and “After”

2. Press “Before” plate firmly against sampling surface, hold for several seconds, remove, and place cap on.

3. Disinfect the surface with a cleaning product and paper towels.

4. Wait 5 - 10 minutes

5. Repeat sampling with the “After” plate, such as in step 2.

6. Incubate plates overnight at 37°C (98.6 °F).

Day 2:
1. Return and find your RODAC plate to examine. *DO NOT OPEN!*

2. Count the total number of colonies and estimate the number of colony-forming units (CFU) per cm²:

   Surface Sampled: ___________________  Disinfectant Used: ___________________

   # CFU/ cm² BEFORE: ___________________  # CFU/ cm² AFTER: ___________________

3. Record the number of different colony morphologies/types: ___________________

4. Compare class results for colony counts and effectiveness of the cleaning products
Introduction to Compounding

What is compounding?
The art and science of preparing individualized medications for patients that contain specific ingredients that are to be mixed together in the exact strength and dosage that is required and prescribed by a doctor.

Reading a Prescription

Important Steps for Preparing a Compound
- Read over the prescription and make sure it makes sense.
- Calculate the amount of ingredients you need.
- Collect all of your ingredients and supplies.
- Determine the order of how you will make your compound.
- Make sure your final product looks like it should.
- Package the compound in an appropriate container.
- Put on appropriate labels with patient information as well as extra warnings for the patient (such as ‘shake well’ or ‘keep refrigerated’).
Basic Lip Balm

**Ingredients:**
- 5 g (1 teaspoon) Beeswax
- 10 g (2 teaspoons) Coconut Oil
- 5 drops Vitamin E Oil (30,000 IU)
- Two ½ ounce jars

**Instructions:**
1. Melt the beeswax and coconut oil in a 50 mL beaker
2. Once melted, add 5 drops of Vitamin E oil
3. Let it cool down to room temperature
4. Add a flavor such as cherry or peppermint oil
5. Place in two ½ ounce jars and let it cool further
6. Use on your lips several times a day!

Hand Sanitizer

**Ingredients:**
- 50 mL (1.5 ounces) Alcohol, Isopropyl 70%
- 2.5 mL (1/2 teaspoon) Glycerin
- 2.5 mL (1/2 teaspoon) Aloe Vera Juice
- 10 drops Orange Essential Oil
- 1 Spray Bottle (2 ounces)

**Instructions:**
Mix all the above ingredients and transfer the mixture to a spray bottle. Use to sanitize hands when needed.
Genetics and Pharmacy: What’s the Connection?

A person’s genes can affect how one responds to the use of drugs.

Bitter Taste Test

**PLEASE NOTE:** If you have a concern about a possible allergic reaction to one of the chemicals used in the test strips, please contact the instructor and do not perform the activity.**

Background:

In humans, and many other species, certain chemicals in food stimulate taste cells on our tongue, which in turn send messages to a specific region of our brain. Your brain then interprets what these messages mean and determines the appropriate response (continue chewing OR spit it out). Chemoreceptors are a type of protein found in taste cells that detect the specific chemicals in our food. In humans, there are five different classes of these chemoreceptors: sour, salty, sweet, umami, and bitter. All 5 categories of receptors are found somewhere on the tongue. It was proven that there is only one type of receptor for sweet, sour, and umami but at least 30 different receptors for bitter explaining why individuals perceive foods differently.

One such bitter receptor is encoded by the gene TAS2R38. There are several known alleles (different forms) for the TAS2R38 gene, but 2 of these are most frequent in the human population outside of Africa. Considering that each person has two copies of any given gene, there are three phenotypes that are generally expressed. These include those who perceive PTC as extremely bitter, those who perceive it as bitter, and those who do not find PTC bitter. Generally, students who find PTC paper very bitter are considered tasters, while students who don’t taste anything are considered non-tasters. One study found people who can taste PTC are more likely to be non-smokers and to not be in the habit of drinking coffee or tea. People who are super-tasters are more likely to find green vegetables bitter. You will now determine if you have at least one copy of the allele that codes for a receptor that perceives PTC as bitter.

Materials:

- PTC (phenylthiocarbamide) taste test paper
PTC taste test paper

Instructions:
- Remove a strip of PTC taste test paper from the vial
- Stick out your tongue, and place the strip on your tongue
- There are 2 basic results – taster or non-taster
How to Extract DNA from a Strawberry

**Form groups of 5 for the following activity**

**Supplies:**
- 1 Re-sealable plastic bag
- 2 Strawberries (fresh or frozen)
- 2 teaspoons Dish detergent
- ½ cup Water
- 1 teaspoon salt
- 2 Plastic cups
- 1 Coffee filter
- ½ cup COLD Rubbing Alcohol
- 1 Coffee Stirrer

**Procedure:**

1. Pull off any green leaves on the strawberry that have not been removed yet
2. Put the strawberries into the plastic bag, seal it and gently smash it for about 2 minutes. Completely crush the strawberries. This starts to break open the cells and release the DNA.
3. In a plastic cup, make your DNA extraction liquid: mix together 2 teaspoons of detergent, 1 teaspoon of salt, and ½ cup of water.
4. Add 2 teaspoons of the DNA extraction liquid into the bag with the smashed strawberries. This will further break open the cells.
5. Reseal the bag and gently smash for another minute (avoid making too many soap bubbles).
6. Place the coffee filter inside the other plastic cup
7. Open the bag and pour the strawberry liquid into the filter. You can twist the filter just above the liquid and gently squeeze the remaining liquid into the cup.
8. Next, pour down the side of the cup an equal amount of cold rubbing alcohol, as there is strawberry liquid. Do not mix or stir. You have just isolated the DNA from the rest of the material contained in the cells of the strawberry.

9. Within a few seconds, watch for the development of a white cloudy substance (DNA) in the top layer above the strawberry extract layer.

10. Tilt the cup and pick up the DNA using a plastic coffee stirrer or wooden stick and divide the DNA into 2 test tubes.

11. Take one portion of your DNA (~200mcL), put it into a 1.5mL microcentrifuge tube, and perform an assigned manipulation. Take another portion of your DNA to keep as an unmanipulated control sample. Instructors will help your group to do one of the following:
   a. Sonication: Using high intensity sound waves to break apart DNA into smaller fragments.
   b. Freezing and Thawing: Causes strain on the DNA leading to breaks.
   c. Boiling: Many of the bonds holding DNA in shape will break and strands will disconnect and fold in on themselves.
   d. Cutting by a DNA Restriction Enzyme: An enzyme that breaks the phosphodiester bonds of the DNA back bone.
   e. Exposure to UV light: Bombard the DNA with high energy electromagnetic waves to break the strands into smaller pieces.

12. Then we will load a gel as described in the next procedure.
Gel Electrophoresis

Background
What is gel electrophoresis? A laboratory method used to separate mixtures of DNA, RNA, or proteins according to molecular size. The electrophoresis tank contains a negative node (cathode) and a positive node (anode) on either side of the gel. Nucleic acids like DNA and RNA are negatively charged molecules so by conducting negatively charged electrons through the gel from the negative node to the positive node, we can “push” negatively charged DNA through the gel toward the positive node. Note that the DNA must be loaded into well on the side of the gel closest to the anode or it will move in the wrong direction and no separation will be visible. Ultimately, separation occurs based on molecular size because smaller fragments of DNA more readily move through the pores in the gel than larger fragments so they are pushed at a faster rate than the larger fragments.

Supplies

Solutions
- Agarose
- 1X TAE buffer
- GreenGlo
- DNA ladder
- Loading dye

Equipment:

**Equipment that each group will need for the lab**

- 8 Well Comb
- Bio-Rad Power Supply
- Small Electrophoresis Tank and Lid
- Small Gel Tray
- Pipettes and Tips
Gel Assignments:
**Due to limitations on the number of electrophoresis tanks that we have, some groups may have to share a gel. There should be plenty of wells to conduct the experiment.**

- Group 1: Large Gel (Top)
- Group 2: Large Gel (Bottom)
- Group 3: Small Gel A (Top)
- Group 4: Small Gel A (Bottom)
- Group 5: Small Gel B

Preparing and loading samples
1. Take your DNA from the strawberry extraction and to prepare it to load in the gel.
2. Using a micropipette, add 5 mcL of loading dye to 25 mcL of your manipulated DNA. Swirl and flick to mix evenly. Do the same for your non-manipulated DNA.
3. Obtain electrophoresis tank.
4. Fill tank to just above small plateau in the center with 1X TAE buffer.
5. Carefully remove tape from one end of the gel. Keep gel tray level as gel can slide out of the tray. Carefully remove tape from other end.
6. Carefully lower the tray onto the plateau of the electrophoresis tank. ORIENTATION IS IMPORTANT! The electric current will carry the DNA from the black cathode to the red anode! Therefore, the gel must be positioned so that the wells are closest to the black cathode (negative node)!
7. Pour additional 1X TAE buffer until the gel is submerged. Fill to the max fill line on the tank.
8. Carefully remove the comb from the gel for your group. Remove slowly to ensure gel remains in place.

9. **Loading samples requires precision.** While loading, slowly insert the tip of the pipette into the well, but do not penetrate the bottom of the well. Slowly deposit the sample into the well only going to the first stop. **Do not bottom out the pipette trigger as this may force the sample out of the well!** After the sample has been deposited, keep thumb positioned as it is on pipette and do not release, as this will suck up the sample you just deposited. Slowly pull the pipette straight up and out then release your thumb.
   a. In the first well, we will add 25 mcL of the DNA that was **NOT** manipulated + loading dye solution previously made in step 2.
   b. In the second well, add 25 mcL of non-manipulated DNA + loading dye solution previously made in step 2.
   c. In subsequent wells, each group will add their manipulated DNA/non-manipulated DNA. Keep track of which well you added your DNA in.

10. Place the cover on the electrophoresis tank, ensuring that the anode and cathode align (red end with red end, black end with black end).

11. Plug the tank cover into the Bio-Rad power supply by inserting the prongs in the matching colored outlets. Turn the machine on by flipping the switch located on the side right corner of the machine.

12. Set the machine to constant voltage and set to 120 volts for 20 minutes (00:20). To run the machine, hit the button with the “running man”. Bubbles should appear in end of tank, signifying that current is flowing.

13. Run machine for allotted time.

**Imaging gel**

1. Remove gel tray from tank and place into small container. Remove slowly and carefully so gel does not slide off tray.

2. Take gel to imaging lab.

3. Open the Bio-Rad Image Lab software on the computer next to the ChemiDoc camera system.

4. Before setting up the protocol, ensure the XcitaBlue screen is slid into bottom drawer, and system set to filter 1.

5. In the software
   a. Application > nucleic acid > EtB
   b. Imaging area > Bio-Rad Mini-PROTEAN Gel (position gel if required)
   c. Optimize exposure time for FAINT BANDS, and DESELECT highlight saturated pixels

6. Close the door and click run protocol and a picture of your gel will appear on the screen.
Chromatography of M&M Candies

BACKGROUND
What is chromatography? A stationary phase usually a solid, thick liquid, or bonded coating that stays fixed in one place, and a mobile phase or eluent (usually a liquid or gas) that moves through it or across it.

The chromatography technique that you will be using in this experiment is paper chromatography.

What is paper chromatography? A technique for separating dissolved chemical substances by taking advantage of their different rates of migration across sheets of paper.

You will be testing the colors of the M&Ms, referring to the FD&C Dyes.

What is FD&C Dyes? FD&C stands for Food, Drugs & Cosmetics, which represents the colors that are FDA approves for use in foods, drugs and cosmetics.

PURPOSE
Establish the chromatographic behavior of the red, blue, and yellow food dyes that are used to color M&M candies using paper chromatography. Then establish whether these dyes or others are used to create the other colored M&Ms candies such as orange, green, brown, etc.

INTRODUCTION
FD&C Dyes yellow #5, red #40, and blue #1 are approved by the FDA for use in a wide variety of food and medicine. These three dyes are used to color the yellow, red, and blue M&Ms. However, M&Ms also come in other colors such as green, brown, and orange. Chromatographic analysis of the dyes present in the various colored M&M candies will answer these questions.
PROCEDURE

1. Obtain a piece of chromatography paper (7 x 11 cm) and measure 1 cm from the bottom of the ‘short’ side. Draw a straight line across using a ruler and a pencil.

2. Along your pencil line, make five small equally spaced pencil marks.

3. Add M&M candies to small test tubes (one per tube) – be sure to use a red, a blue, and a yellow M&M in addition to two other colored candies (5 tubes total). Add 1-2 drops of water to each tube.

4. Dip a toothpick into the first colored solution and apply a drop of the dye solution to one of the marks on your chromatography paper. Be sure to make a SMALL dot (as small as possible). Dip a clean toothpick into the second colored solution and repeat as indicated above applying this second sample to the second mark on the paper. Using a clean toothpick each time, repeat this procedure with the remaining three M&M dye solutions. When you have finished your first round of ‘spotting’ you should have 5 separate spots on your pencil line. Allow the spots to dry (wave the paper gently to speed up the drying) and then apply a second drop of each of the SAME solutions to their SAME spots on the paper. Dry the spots thoroughly and then repeat spotting the samples for a third time. Dry the spots thoroughly. When you have finished your spotting, you should have 5 small highly colored spots on your pencil line.

5. Prepare your chromatography development chamber by adding approximately 30 mL of water to an empty beaker.

6. Carefully clamp the chromatography paper strip onto a glass stirring rod using the provided clamp.

7. Place the paper into the chamber laying the attached stirring rod across the top of the beaker to support the paper. 

8. Allow the chromatogram to develop until the solvent has traveled to about 2-3 cm from the top of the chromatography strip. Remove the paper and using a pencil, draw a line across the paper to mark the distance traveled by the solvent.
9. Outline all of the spots in pencil and record the observed spot colors. Note the position of yellow #1 (from the yellow M&M), red #40 (red M&M), and blue #1 (blue M&M). Inspect the chromatogram lanes of the other M&Ms and note if the positions of any yellow, red, or blue spots correspond to those of the standards (red, yellow, and/or blue).

10. Record your observations below. Indicate with a ‘YES’ or a ‘NO’ as to whether you could confirm the presence of yellow #5, red #40, and/or blue #1 in the candy samples. If other spots (other dyes) are present indicate their colors and in which colored candies they were detected.

M&M CANDY ANALYSIS
DATA SHEET

<table>
<thead>
<tr>
<th>M&amp;M COLOR</th>
<th>YELLOW#1</th>
<th>RED #40</th>
<th>BLUE #1</th>
<th>OTHER DYES?</th>
</tr>
</thead>
</table>

ADDITIONAL COMMENTS / OBSERVATIONS:
Clinical Skills Instructions
GET A CLUE!

Gain confidence
Evaluate and assess
Try to be verbal

Apply knowledge

Clinical skills and thinking
Laboratory Value assessment
Utilize all resources
Exert yourself through participation
Addressing and Assessing your Patient!

Sometimes it may be hard to find out why your patient is experiencing discomfort and it may be difficult for them to explain everything that’s going on so following these quick steps can help to paint a full picture of the patient’s illness: QUEST SCHOLAR-MAC

**Quickly and Accurately Assess the Patient**

**E**stablish that the patient is an appropriate self-care candidate

**S**uggest appropriate self-care strategies

**T**alk with the patient

---

**Symptoms:**
- What are the main symptoms of the problem?

**Characteristics**
- What are the symptoms of the problem like?

**History**
- What have you done so far to treat the problem? Has this problem happened before?

**Onset**
- When did this particular problem start?

**Location**
- Where are you feeling this problem?

**Aggravating factors:**
- What makes the problem worse?

**Remitting factors:**
- What makes this problem better?

**Medications:**
- Is the patient taking any prescription and non-prescription medications?

**Allergies:**
- Is the patient allergic to any medications and if so what kind of reaction do they have when they take it?

**Conditions:** Does the patient have any other medical conditions?
Steps for Taking Blood Pressure in Adults

1. The patient should be seated with his/her arm bared, supported on a smooth surface and positioned at heart level. The patient should be relaxed and should not have smoked or ingested caffeine within 30 minutes prior to measurement. The measurement should begin after the patient has been at rest for 5 minutes.

2. Locate the brachial artery along the upper inner arm by feeling for the brachial pulse.

3. Measure the arm circumference and select the appropriate cuff size. Wrap the deflated cuff around the upper arm with the arrow on the cuff pointing to the area where the brachial pulse was felt.

4. Determine the level for maximal inflation by observing the pressure at which the radial pulse is no longer felt as the cuff is rapidly inflated and add 30 mm Hg. Then rapidly and steadily deflate the cuff. Wait at least 15 – 30 seconds before re-inflating.

5. Position the head of the stethoscope over the brachial artery below the cuff. The stethoscope should be applied with light pressure, ensuring skin contact at all points. Use of the bell head may enhance sound detection.

6. Rapidly and steadily inflate the cuff
7. Release the air in the cuff so that the pressure falls at a rate of 2 to 3 mm per second.
8. Listen and note the systolic pressure at the onset of at least two consecutive beats. Blood pressure levels should be recorded in even numbers and read to the nearest 2 mm Hg mark on the manometer.
9. Listen and note the diastolic pressure at the point you can no longer hear the sounds of beating. Listen for 10 to 20 mm Hg below the last sound heard to confirm disappearance. Then, deflate the cuff and remove it from the patients arm completely.
10. Announce/record the blood pressure reading.
Toastmasters Information

Western Massachusetts Toastmasters Clubs

Toastmasters of Downtown Springfield, MA
Meeting Times: 1st & 3rd Wednesday 12:00 pm
Location: Cambridge College Springfield
Tower Square
1500 Main Street Springfield, MA 01115 United States

Eastman Pioneer Valley Banters
Phone: +1 413-730-2024
Meeting Times: Wednesday 12:00 PM
Location: B43 (1-2-3)
730 Worcester St Indian Orchard, MA 01151-1022 United States

Baystate Toastmasters
Phone: 413.794.7739
Meeting Times: Thursday 5:30 PM
Location: Baystate Medical Center - Chestnut Conference Room 3
Meets every other Thursday, effective 7/10/14
759 Chestnut Street Springfield, MA 01109-3161 United States

Not from Western MA? Look-up your nearest club here: 
https://www.toastmasters.org/
THE ICE BREAKER

By now you’ve heard speeches by Club members and have probably participated in table topics. Here is your opportunity to give your first prepared talk and “break the ice.”

The best way to begin your speaking experience is to talk about the subject closest to you – yourself. You will introduce yourself to your fellow Club members and give them some information about your background, interests, and ambitions. As you prepare and deliver your talk, you will become aware of speaking skills you already have and areas that require some work. Your fellow members will help you understand these needs, as they see them.

As you read this project, make notes in the margin. Underline the key phrases to help you quickly review what is expected of you. Read the entire project before preparing your talk.

NARROW THE SUBJECT

The general subject of this talk is you, but that subject is too broad for a short four-to six-minute talk. You must narrow the subject by selecting three or four interesting aspects of your life that will give your fellow members insight and understanding of you as an individual. These might include your birthplace, education, or family. You could explain how you came to be in your present occupation and tell the audience something about your ambitions. Should you prefer to avoid autobiography, you might talk about your business, your hobbies, or anything relating to you as an individual.

Once you have the highlights of your talk in mind, weave them into a story, just as if you were telling it to friends around the dinner table. Share significant personal experiences. The more personal you make your talk, the warmer will be the relationship between you and your audience.

OPENING, BODY, AND CONCLUSION

Like any good story, your talk needs a clear beginning and an ending. Create an interesting opening sentence that captures the audience’s attention. Memorize it, if necessary, and use it even if a better idea occurs to you just before you speak. Then devise a good closing and memorize it, too.

Giving your audience too much information will only overwhelm them. A memorized beginning and ending enable you to start and finish your talk with confidence and ease. In any speech, it’s best to select a few main points (three or four at the most) and
emphasize them by using examples, stories, or anecdotes. If you merely state a fact and then continue, most of your audience will miss the point. You should make a point, say it again in different words, illustrate the point, and then state it once more in order to be clearly understood. This is a good skill to learn.

If you think you will need notes, write a brief speech outline on 3x5 cards, which you can place on the lectern. Refer to them only when you need them. Remember, you’re speaking, not reading. Many speakers begin by writing out an entire speech, then breaking it down into parts, with a key word for each part, and finally writing just the key words on one note card.

PREPARING YOURSELF

Now the talk is ready, but are you ready to present it? You will need to rehearse. Practice the talk until you are comfortable with it. You won’t need to memorize the body of the talk, since you already know all about the subject. As mentioned earlier, you should memorize your opening and close.

Present the talk to a family member, a friend, or your Toastmasters mentor. Ask for comments. They may give you some helpful suggestions. If you have a tape recorder, record the talk and listen to it carefully, making any necessary improvements. Using a tape recorder is one of the best ways to improve your speaking ability.

Rather than thinking of this presentation as “making a speech,” think of it as a talk before a group of friends, sharing information of interest. Don’t be afraid of the audience. They have already experienced the same feelings you are having. They want you to succeed and they’re eager to help you.

Appearance is important. Be well groomed and appropriately dressed for your presentation. When you look right, you feel good about yourself. You will then forget about your appearance and concentrate on presenting your talk. You will have increased confidence because you know you have made a good first impression on your audience.

PRESENTING YOUR TALK

Once you’ve completed your speech preparation… relax. Nervousness is common to every speaker, no matter how experienced. In fact, you can put this nervous energy to work for you by using it to add excitement to your delivery. No one is going to notice a little quavering in your voice, and it will soon disappear anyway as you become involved with what you’re saying. (More information for controlling nervousness appears on pages 80 and 81.)

While being introduced, take a deep breath and slowly exhale. This will help your voice sound resonant and natural. Begin by facing the Toastmaster and saying, “Mr. (or Madam) Toastmaster”; then face the audience and say, “Ladies and gentlemen…” or “Fellow Toastmasters and welcome guests…” Pause, then plunge in with your prepared opening sentences.

While speaking, make “eye contact” with various members of the audience, first looking directly at one person for a few seconds, then looking at another, so no one feels left out of your talk. As you’re doing this, glance periodically at the timer. If the red light comes on while you’re
talking, move smoothly to your conclusion and finish quickly. Observe time limits whenever you speak.

Don’t worry about what to do with your hands. Leave them at your sides if you wish. You’ll have opportunities to practice “body language” later.

One final comment: Don’t end by saying “Thank you.” The audience should thank you for the information you’ve shared. Instead, just close with your prepared ending, nod at the Toastmaster of the meeting, and say, “Mr. [or Madam] Toastmaster” – then enjoy the applause!

YOUR EVALUATION

After you finish, you will probably begin evaluating yourself even before you sit down. You may think you left out some of the best parts. Everybody thinks that. Just congratulate yourself on having delivered your first speech, then write down the things you did well and the things you want to improve. Try to avoid making the same mistakes in your next speech. To supplement your own evaluation, an experienced Club member has been assigned to evaluate your efforts. Before the meeting begins, give this manual to your evaluator so he or she may make notes on the evaluation page for this project. This will give you a permanent record of your progress. If you want the evaluator to observe something in particular, be sure to inform the evaluator in advance.

Ask other members for additional comments after the meeting. All of these comments may not be useful to you, but you should consider them carefully. Remember the evaluations are representations of how the audience perceived you and your talk. They are usually – but not always – helpful to your self-development.

**SPEAKERS CHECKLIST**

- Bring this manual to the meeting whenever you are scheduled to speak.
- Review your talk with your mentor.
- Discuss any special points with your evaluator before giving the talk.
- Give the evaluator your manual before you speak, so he or she can make written comments on your performance.
- Have the Club Vice President Education initial the “Project Completion Record” on page 56 after you complete each project. This will give you credit toward your Competent Toastmaster (CTM) certificate.
- Don’t be discouraged if your evaluator “missed the point.” Evaluators have varying degrees of experience in speaking, and evaluation is a “learn by doing” skill, just as speaking is.
- If you have not already done so, read the Effective Speech Evaluation manual. It will help you understand how to get the most out of the Toastmasters program.
NOTE TO THE EVALUATOR: The purpose of this speech was for a new member to “break the ice” – to introduce him- self/herself to the Club and begin speaking before an audience. The speech should have a clear beginning, body, and ending. The speaker has been advised to use notes, if necessary, and to forget body language. Point the speaker toward methods of improvement, but don’t “pour it on.” Strive to have the speaker look forward to his/her next speech. Above all, be encouraging. Your evaluation should help the speaker feel glad about joining Toastmasters and presenting this speech. In addition to your oral evaluation, please write answers to the questions below:

What strong points does the speaker already have?

How well did the audience get to know the speaker?

Did the speech reflect adequate preparation?

Did the speaker talk clearly and audibly?

Did the speech have a definite opening, body, and conclusion?

Please comment on the speaker’s use of notes.

What one or two specific suggestions can you give to help the speaker improve? (Focus on showing the speaker how he/she can make the greatest amount of improvement in his/her next speech.)

What did the speaker do especially well?
Additional Information
### Careers in Pharmacy

<table>
<thead>
<tr>
<th>Career Pathway</th>
<th>Activities from Summer Camp</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community Pharmacist</strong></td>
<td>• Fill prescriptions&lt;br&gt;• Counsel patients about medications and proper use&lt;br&gt;• Answer questions from patients and other healthcare providers</td>
</tr>
<tr>
<td><strong>Hospital Pharmacist</strong></td>
<td>• Can work to compound medications&lt;br&gt;• Makes sure medication orders are verified&lt;br&gt;• Can specialize in different areas- Emergency, Cancer, General Medicine, Pediatrics, etc.</td>
</tr>
<tr>
<td><strong>Ambulatory Care Pharmacist</strong></td>
<td>• Uses clinical skills needed to evaluate patients in a clinic setting&lt;br&gt;• Takes blood pressure and evaluates results&lt;br&gt;• Can also specialize in different areas- Diabetes, Asthma, Nutrition, etc.</td>
</tr>
<tr>
<td><strong>Pharmaceutics</strong></td>
<td>• Development of pharmaceutical products&lt;br&gt;  ○ basic creams&lt;br&gt;  ○ lip balms&lt;br&gt;  ○ syrups&lt;br&gt;  ○ tablets and capsules&lt;br&gt;• Works for drug companies</td>
</tr>
<tr>
<td><strong>Pharmacogenomics and Pharmacogenetics</strong></td>
<td>• Perform DNA extractions on Strawberries&lt;br&gt;• Bitter taste test&lt;br&gt;• Studying genes and how drugs impact on the body&lt;br&gt;  ○ Dominant and recessive genes&lt;br&gt;  ○ Some genes can cause drugs to become ineffective</td>
</tr>
</tbody>
</table>

Many other careers in pharmacy exist! These are just a few examples of how the activities you participated in throughout the week translate into the real world.
What are the requirements to get into WNE Pre-Pharmacy Program?

• Strong GPA and standardized exam scores
  – SAT: ≥ 1080 (math, critical reading)
  – ACT: ≥ 24

• High school biology, chemistry coursework
  – Physics also preferred
  – Student must be ready to take calculus

• Unlimited AP credits accepted for social science courses. No physical sciences
<table>
<thead>
<tr>
<th>General Biology I &amp; II</th>
<th>General Chemistry I &amp; II</th>
<th>Psychology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy and Physiology I &amp; II</td>
<td>Organic Chemistry I &amp; II</td>
<td>Statistics</td>
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<tr>
<td>Microbiology</td>
<td><strong>PRE PHARMACY COURSEWORK</strong></td>
<td>Calculus</td>
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<td>Microeconomics</td>
<td>English Composition I &amp; II</td>
<td>Social Science Elective</td>
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</table>
## Contact Information

### Health Services
The Center for the Sciences and Pharmacy, Suite 235  
413-782-1211  
On WNE phones dial 1211

### Public Safety on WNE Campus
*For Emergencies: 413-782-1411 | For Non-Emergencies: 413-782-1300*  
On WNE phones dial 1207 or email: police@wne.edu

<table>
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References


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