





Virtual Green Camp Application Packet

Summer 2021 Green Camp Academic Enrichment Program The City of Memphis Storm Water Department

Contact:

Y. Sonia Holmes Storm Water Environmental Project Coordinator II 245 Bass Pro Drive Memphis, TN 38103 (Office): 901-636-4357 (Cell): 901-500-6346 The City of Memphis Storm Water Department invites current and entering high school students to participate in Green Camp. Green Camp is a <u>free</u>, summer program that provides students with hands-on learning in relation to the topics of storm water awareness, storm water pollution, environmental issues, urban development, chemistry, environmental engineering, and sustainability. <u>NOTE: GREEN CAMP 2021 WILL BE OFFERED VIRTUALLY THIS YEAR, therefore former transportation and lunch options will not apply. Some destinations may be substituted if closed due to Covid-19)</u>

Green Camp is scheduled from 8:30 am to 3:30 pm on the scheduled days provided in Table 1. Each group will attend 5 classes over a 1-week period (Monday through Friday) and must be prepared for approximately 7 hours each day. Students can select a preferred week in the application section. Weeks will be assigned on a "first-come-first-approved" basis with enough space for 30 participants (15 students per week). Green Camp Applications are due by April 16, 2021 and groups will be assigned and confirmed with an acceptance letter mailed by April 30, 2021.

Table 1: SCHEDULE

GROUP	Group 1	Group 2	
ACTIVITY DATES	July 12, 13, 14, 15, 16, 2021	July 19, 20, 21, 22, 23, 2021	
	(2nd week of July 2021)	(3rd week of July 2021)	

There is no cost to participate in Green Camp. By participating in the program, each student will receive a Certificate of Participation with up to 35 hours of community service credits for participating in the study. To receive the full 35 hours of community service hours, you must fully participate each day you are scheduled.

With this application, students are asked for their hypothesis (page 9 of the application) in regard to 3 subjects covered during the study. At the conclusion of Green Camp, each student will be asked to either write a scientific paper or create a trifold presentation or watershed model display with essay that supports or disproves their original hypothesis. The Storm Water Department requests the final paper, trifold, or model by August 6, 2021. Submittals will be reviewed by the Storm Water Department team and all qualified papers will be published on the City of Memphis website at MemphisStormWater.com. Trifolds will be displayed at a special public event. All students will also be recognized during a special event held to honor students participating in pollution prevention activities with Memphis Storm Water.

Students may reference https://writing.colostate.edu/guides/guide.cfm?guideid=83 for instructions and format for the scientific paper or http://www.sciencebuddies.org/science-fair-projects/science-fair/science-fair-project-display-boards for presentation display format on a traditional sized trifold board to be supplied by Storm Water. Students may reference various internet resources for suggestions on building a 3D watershed model or diorama. Some art materials will be supplied by Storm Water but additional items can be added. Students are encouraged to be creative and precise.

Admission Requirements:

Each participant MUST complete and sign ALL application forms mentioned below and submit by April 16, 2021.

Each participant will embark on virtual field trips with the Camp Coordinator, her son, (your "Camp Avatar"), and co-worker. Each participant is ENCOURAGED to engage in all camp activities and discussions to learn and understand the

lessons of the camp. The Green Camp virtual experience tends to be better with participation which may earn rewards.

Opportunities will be available for students to investigate multiple waterways and to observe the process of collecting storm water samples for chemical and/or biological testing. Green Camp t-shirts should be worn by ALL participants each day.

Activity Log-on, Log-off, and In-transit times:

Note: On the following activity pages, any descriptions involving words such as "visit" or "walk" will refer to the virtual experiences of the camp.

Students will be emailed an invitation each morning to attend Green Camp excursions via Microsoft Teams at 8:00 a.m. Invitations will be sent to the student email provided on the application form. If a student needs to change their email address in order to successfully access the Teams link, please call, text, or email the Green Camp Coordinator, Ms. Sonia, with the preferred email address in order to attend Green Camp sessions. Students without recognized email addresses will not be allowed in camp. Students will be able to leave and rejoin the Teams sessions during lunch time and multiple transit times throughout the week. During transit times, students will be expected to read Green Camp materials for later discussions and/or participate in activities/games. Roll call will be taken each morning. If a student is not able to attend that day, please notify the Green Camp Coordinator (Y. Sonia Holmes cell 901-500-6346) in advance. Again, students will earn community service hours (7 hours per day) based on the number of days in attendance unless otherwise approved by the Camp Coordinator.

Application Submission Deadlines:

The following application forms must be completed and signed:

- Student Application form
- Regulations for Green Camp form
- ✓ Parental Consent for Green Camp form
- Liability Release Clause form

Please mail to:

ATTN GREEN CAMP COORDINATOR 245 Bass Pro Dr. Memphis, TN 38103

Alternatively, the application forms can be scanned and emailed to yvette.holmes@memphistn.gov. If arrangements have been made between the teacher and the Storm Water Department Coordinator, a member of the Storm Water Department team will pick up the application forms at the school.

Completed application must be postmarked by Friday, April 16, 2021.

Acceptance letters will be postmarked no later than April 30, 2021.

Day One: Urban Development of Watersheds







Supplies Provided by the City

Journal, writing utensils, background information packets, activity sheets, backpack, reusable water bottles, reusable straws

Camp Avatar - Personal Protection Equipment – PPE, as needed.

Supplies Required from Student

Computer/tablet/laptop, internet access, cell phone (for pictures/selfies) and eagerness to learn and participate!

Camp Avatar - proper attire and shoes, sunscreen, if desired.

Activities: Students will identify attributes within a watershed, discuss its hydrology, and adverse effects of urbanization upon it.

Students will visit the Big River Crossing Bridge and observe the river and bluff as it is now and compare it to historical maps. Students will see and learn how the Mississippi River has been channelized due to commerce and how the rivers and waterways that flow to the Mississippi have been channelized in different ways (natural channelization and urban channelization will be discussed and assessed throughout the study). Students will be able to see from a distance the impervious area of the City and will learn about the measures added to provide flood control, including the City's Municipal Separate Storm Sewer System (MS4). The history of the Gayoso Bayou will be discussed, specifically. Students will learn about the source of Memphis' drinking water in the past and in the present. (Location: Big River Crossing Bridge: Latitude 35.1264, Longitude -90.0720: Approximate duration 2.5 hours)

Students will learn about the Mississippi River Watershed and the watershed effect as it pertains to storm water runoff and the urban water cycle. Seeing historical maps and the current City riverfront will give the students a visual perspective on urban development and the urban water cycle. Students will visit Tom Lee Park and be introduced to the implementation of green infrastructure in urban development. The effects of green infrastructure implementation on the urban water cycle and storm water management will be discussed. Students will also visit examples of green infrastructure implementation at the UT Baptist Research Park and BridgesUSA. (Location: Tom Lee Park: Latitude 35.1376, Longitude -90.0617: UT Baptist Research Park/Tri-Metis Laboratory: Latitude 35.1392, Longitude: -90.0303, Bridges USA: Latitude: 35.1564, Longitude: -90.0434: Approximate duration 2.25 hours)

Students will reference satellite watershed maps and various watershed websites to better understand the connection between their respective watersheds and the Mississippi River watershed. Students will participate in a Watershed Mapping activity. Throughout the day's study, the students will learn to recognize point and non-point source pollution and identify possible sources within their own sub-watersheds. Students will be asked to contemplate where and how the implementation of green infrastructure could affect urban pollution abatement, the urban water cycle, and storm water runoff management. (Location: Mud Island: Latitude 35.1500, Longitude -90.0587: Approximate duration 2.25 hours)

Day Two: Urban Waterways, Storm Water Pollution, and Wetlands







Supplies Provided by the City

Journal, writing utensils, background information packet, activity sheets, backpack

Camp Avatar - binoculars, field guide, insect repellent, drinking water, lab field testing equipment and meters, field microscopes, magnifying glasses, appropriate PPE, boots.

Supplies Required from Student

Computer/tablet/laptop, internet access, cell phone (for pictures/selfies) with PlantNet and BirdNet apps installed, Green Camp materials, and eagerness to learn and participate!

Camp Avatar - proper attire and shoes, reusable water bottles, reusable straw, sunscreen, if desired.

Activities: Students will identify features of urban hydrology, types of storm water pollution, and benefits of green infrastructure.

Students will observe and distinguish between the two types of pollution, point and non-point source. Students will gain a better perspective on the negative effects of improper waste disposal on our environment and public health. Students will review the MS4 drainage system and participate in a litter cleanup at McKellar Lake. Litter will be sorted as recyclable and non-recyclable, counted and/or weighed, and the percentage of plastic litter will be calculated. Students will participate with items in their home or possibly their own trash. Students will discuss the decomposition times of trash items and percentages of recyclable trash. Students will identify proper disposal methods for trash items and propose solutions to diminish the amount of pollution observed onsite or at home. (Location: Jack Curley Causeway/Trigg Ave., Latitude 35.1118578, Longitude -90.07939724: Approximate duration 1 hour)

Students will learn about chemical pollution which is not captured by traditional clean-ups. Students will learn about the filtering properties of certain green space plants such as those in wetlands that can filter and remove chemical pollutants. The urban manmade wetland at T.O. Fuller State Park will be visited as well as natural wetlands near South Cypress Creek, and an urban animal-made wetland within the Nonconnah Watershed. Students will learn about the physical/hydrological, biological, and chemical functions of a wetland. Students will participate in a field wetland assessment and be asked to find and identify key plants and wildlife (or evidence of animals via tracks, scat, or activity). Students will be able to recognize a wetland's ability to filtrate pollutants naturally as a storm water quality control measure versus implementation of structural control measures (structural BMPs - Best Management Practices). (Location: T.O. Fuller State Park: Latitude 35.0680, Longitude -90.1020, Alonzo Weaver Park: Latitude 35.0567588806, Longitude -90.0859222412, American Way Middle School: Latitude 35.0748117, Longitude -89.93635713: Approximate duration 4 hours)

Students will visit Cypress Creek and test for evidence of chemical pollution in this urban, concrete, channelized waterway. Students will participate in a home chemical testing activity with given materials testing for temperature, pH, and turbidity and observe staff and/or student avatar test additionally for chlorine, copper, phenols, and DO (dissolved oxygen). Students will compare acceptable test levels and discuss possible pollution sources of abnormal amounts. Biological sampling will be discussed but not performed due to the lack of available vegetation. An assessment of the waterway's condition will be hypothesized based on the evidence and recorded. (Location: Cypress Creek, Tillman and Summer: Latitude 35.1481, Longitude -89.9592: Approximate duration 2 hours)

Day Three: Rural Waterways, Storm Water Pollution, and Wetlands







Supplies Provided by the City

Journal, writing utensils, background information packets, activity sheets, backpack.

Camp Avatar - lab field testing equipment/meters, magnifying glasses, binoculars, field and dichotomous guide, dip nets, sampling buckets, insect repellent, appropriate PPE, boots, life jackets, drinking water.

Supplies Required from Student

Computer/tablet/laptop, internet access, cell phone (for pictures/selfies) with PlantNet and BirdNet apps installed, Green Camp materials, and eagerness to participate!

Camp Avatar - proper attire and shoes, reusable water bottles, reusable straw, sunscreen, if desired.

Activities: Students will identify features of rural hydrology, types of storm water pollution, and benefits of bioindicators. Much of this day (approximately 2.5 to 3 hours) will be spent traveling to and from the rural locations in the Wolf River Watershed and reading/researching Green Camp materials and/or participating in virtual activities.

Students will visit a safe access point to the Ghost River Section of the Wolf River, a rural, natural waterway at Bateman Bridge. Students will perform the same chemical tests as performed at Cypress Creek, an urban concrete channelized waterway. Students will record the result of each test and discuss possible pollution sources of abnormal amounts. Students will also perform biological sampling. Macroinvertebrates gathered will be examined with magnifying glasses, identified with a dichotomous key, and recorded. Virtual students will participate in a Macroinvertebrate Survey activity and record the results. A visual assessment will be performed for life within and around the natural waterway. Students will compare acceptable test levels and discuss possible pollution sources of abnormal amounts. An assessment of the onsite and virtual waterways' conditions will be hypothesized based on the evidence and recorded. (Location: Bateman Bridge, Moscow, TN: Latitude 35.0276, Longitude -89.3500: Approximate duration 3.25 hours)

Students will visit the Ghost River State Natural Area, a rural, natural wetland. Students will review the physical/hydrological, biological, and chemical functions of a wetland. Students will participate in a field wetland assessment and be asked to identify key plants and wildlife (or evidence of key animals via tracks and scat) within the wetland. Virtual students will use phone apps to identify flora and fauna as well. Students will compare and contrast attributes of the rural wetland (Ghost River State Natural Area Boardwalk) and urban man-made wetland (T.O. Fuller). Water testing may also be performed. (Location: Ghost River State Natural Area, La Grange, TN: Latitude 35.0269, Longitude -89.2724: Approximate duration 2.5 hours)

Students will visit Pine Crest Camp and view the natural layers of soil, sand, silt, and clay (layers of the Memphis Sand Aquifer). Students will learn the importance of the geographic layers present for the filtration and protection of the aquifer. Students will participate in an Aquifer Activity. (Location: Pine Crest Camp, 21430 Hwy 57, Moscow, TN 38057: Latitude, 35.0520, Longitude: -89.3495: Approximate duration 1.25 hours)

Day Four: Storm Water Management and Sustainability







Supplies Provided by the City

Journal, writing utensils, activity sheets, backpack.

Camp Avatar - lab field testing equipment and meters, field microscopes, magnifying glasses, binoculars, field and dichotomous guide, dip nets, sampling buckets, insect repellent, appropriate PPE.

Supplies Required from Student

Computer/tablet/laptop, internet access, cell phone (for pictures/selfies) with PlantNet and BirdNet apps installed, Green Camp materials, and eagerness to participate!

Camp Avatar - proper attire and shoes, reusable water bottles, reusable straw, sunscreen, if desired.

Activities: Students will review the three visited watersheds, their hydrology, and discuss sustainable management practices.

Students will visit the Loosahatchie River Watershed and chemical testing of samples from a Loosahatchie River tributary will be performed. Biological observations within the Loosahatchie Watershed will also be performed. From multiple observations and collected data, students will discuss environmental issues while strengthening their problem solving skills. Students will explore their knowledge of watersheds and compare their observations from the three watersheds visited (Nonconnah, Wolf, and Loosahatchie). (Location: Allentown Mobile Home Park, Latitude:35.2583379, Longitude:-89.92661528, Approximate duration: 1.5hr)

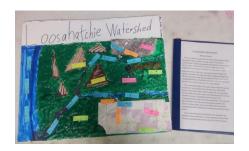
Students will tour a Semi-Solar Powered Aquaponics Community Garden and learn about alternative methods to solving environmental issues, the advantages of sustainable management practices, and gain insight on volunteering and community service. Students will take notes during tour and review Green Camp materials during transit for later discussion. (Location: Fish N' Loaves Inc.: Latitude: 35.21558897, Longitude: -90.03843595, Approximate duration: 0.5 hr)

Students will visit Shelby Farms Park and learn more about watershed landscapes. Students will observe a demonstration of the EnviroScape Watershed model and discuss the impacts of urban development in watersheds. Students will participate in a storm water hydrology activity and gain insight on how to construct their own watershed models. Students will visit Lucius Birch Jr State Natural Area, observe, and identify flora and fauna en route to the Wolf River. Students will engage in fun activities and games in the outdoor classroom. Proposed activities/games may include Watershed Trivia Feud (trivia game show), Why Are You So Green? (Environmental debates), and One For All (Population Education activity). All activities are designed to reinforce understanding of the material prior to the students' work on their chosen project. Students will contemplate whether their data and observations will be used to produce a scientific paper, a trifold presentation, or a watershed model (with accompanying essay). Students will begin a preliminary outline of their scientific paper, trifold essay, or model presentation essay. Students may also use this time to request photos from the Coordinator of the week's excursions to use in their paper or trifold/model presentations. (Location: Shelby Farms Park: Latitude 35.3337, Longitude: -90.0684: Approximate duration: 5.5 hrs)

Day Five: Reflection and Review







Supplies Provided by the City	Supplies Required from Student
Green Camp Coordinator's assistance with	Green Camp information packet, all information
information for the scientific paper or	gathered in the previous 4 days, and materials to
trifold/model display guidance. Project supplies	work on project.
including glue, construction paper, paint and	
brushes, modeling clay, poster board, or trifold.	

Activities: Students will apply knowledge to plan and begin their scientific paper or display.

Green Camp will conclude with a visit to a man-made wetland at Wolf River Greenway-Epping Way. With this application, students are asked for their hypothesis (page 9 of the application) in regard to 3 subjects covered during the study. Each student will decide whether to write a scientific paper, create a trifold presentation or watershed model display (both with accompanying essay) that supports or disproves their original hypothesis. Students will review, contemplate, gather additional research resources, and outline their project. The instructor will help the students by providing answers to questions, guidance in finding supporting resources while stressing factual content and research.

Students may reference https://writing.colostate.edu/guides/guide.cfm?guideid=83 for instructions and format for the scientific paper. Students may reference http://www.sciencebuddies.org/science-fair-projects/science-fair/science-fair-project-display-boards for presentation display format on a traditional sized trifold board to be purchased by student. Students may also reference various online sources on how to build a 3D watershed model for presentation.

The Storm Water Department requests the final paper, trifold, or model by August 6, 2021. Submittals will be reviewed by the Storm Water Department team and all qualified papers will be published on the City of Memphis website at MemphisStormWater.com. Trifolds/models will be displayed at a special public event (see below). The Storm Water Department team is looking for submissions to meet research (with properly documented reference sources), factual content (which must be supplemented with their documented research or documented reference sources), and basic format standards. The student's individual hypothesis and conclusion is not reason for a paper to be unpublished or trifold/model not be displayed so long as they properly support it with reference and research!

All students will also be recognized during a special event held to honor students participating in pollution prevention activities with Memphis Storm Water, where they will receive their Certificate of Participation with their community service hours (not to exceed 35). Participants who submit a publishable paper or presentable trifold/model display approved by the Storm Water Department team will also receive a Certificate of Completion verifying the publication of the paper on our website or the display of the trifold/model presentation at this special event.



Student Application Form

			Birthdate:	
Address:			Phone:	
City:		State:	Zip:	
Student email:				
		What Careers Are You Interested In?		
Preference Dates: Gre	en Camp will be off	ered during the 2 nd	or 3 rd work week (Monday through Friday)	of July.

Preference Dates: Green Camp will be offered during the 2nd or 3rd work week (Monday through Friday) of July. Groups will be assigned and confirmed with the acceptance letter mailed by April 30, 2021. Weeks will be assigned on a "first-come-first-approved" basis and we are planning for 30 participants (15 students per week). <u>However</u>, due to the virtual offering of this program, the number of participants may be increased.

Please circle your preferred week to participate below for Preference 1. If you can attend both weeks, Preference 2 will be your second choice. If you cannot attend one week, leave the Preference 2 selection blank.

Preference 1: Group 1 Group 2

July 12 - 16 July 19 - 23

Preference 2: Group 1 Group 2

July 12 - 16 July 19 - 23

STUDENT HYPOTHESES: This section ned	eds to be filled out for your final paper,	trifold, or model presentation!
Does Memphis have an adverse effect or and waterways? Briefly explain the reas assumptions.		•
What methods of education or other str watersheds? Briefly explain the reasonin	•	·
What effects could wetland preservation storm water management and water que reasoning for your answer based on you	rality within Memphis' watersheds? Is it	
Program participation will not be forms. These forms are for the he		_
STUDENT SIGNATURE REQUIRED. PLEA	SE READ CAREFULLY.	
I have read the Program description and I will ad listen, and follow instructions. I understand that I will wear the provided T-Shirt and follow the ru	t my photo and scientific paper/presentation m	
Printed Name of Participant	Signature of Participant	Date
PARENT/GUARDIAN PERMISSION STAT	EMENT	
I hereby grant permission for my child to apply a Program.	and fully participate. Also, I will allow my child t	o complete surveys to evaluate the
Printed Name of Parent/Guardian	Signature of Parent/Guardian	Date



We are pleased you are interested in participating in the City of Memphis Storm Water Department Green Camp! While we do not want to limit your learning experience, we do require that you pay close attention to a few rules of order. We are responsible for your safety and well-being. We must also achieve the academic guidelines of this Program.

- 1. We expect you to display courtesy, generosity, and respect for yourself and toward your peers, staff, and guests.
- 2. You may only use cell phones to participate during activities or lessons or in event of emergencies.
- 3. Students should report tardiness and absences to the Coordinator (Y. Sonia Holmes cell 901-500-6346). Reporting tardiness does not guarantee participation for the day due to the tight schedule, but the Coordinator will make all best efforts if notified.
- 4. Students must not wear overly-revealing clothing (transparent material) and improperly fitted clothing (sagging or inappropriate fitting attire). Shorts must not be shorter than 4 inches above the knees. Students will be supplied 2 T-Shirts. The t-shirt MUST be worn for the entire duration of all planned activities.
- 5. Students must email their scientific paper to stormwater@memphistn.gov by August 6, 2021. Papers will not be graded; they are being requested to gauge effectiveness of the Program. However, papers must be of certain quality to be published. If a student chooses to instead complete a trifold presentation display, this will also be requested by August 6, 2021. Students should contact Coordinator, Y. Sonia Holmes, for arrangements to have display dropped off or picked up. All participating students will receive a certificate of participation with community service hours for the amount of time participated in the study, not to exceed 35 hours. Students who submit a publishable scientific paper or approved tri-fold presentation display will receive a certificate of completion and additional honors and awards herein.

HAVE READ AND UNDERSTAND THE ABOVE REGULATIONS.				
Printed Name of Student	Signature of Student	Date		



Parental Consent for Green Camp

This release and information form must be filled out completely with current information, signed, and turned in before the Participant will be allowed to attend the Program.

This is a legally binding agreement executed by:			
Name of Participant/Student:			
Residential Address:			
City, State, Zip:	Phone Number:		
Date of Birth:	Age:		
(hereinafter referred to as "Participant"), and by,			
Name of Parent or Guardian:			
Relationship of Guardian to Participant:			
Residential Address:			
City, State, Zip:	Phone Number:		
(hereinafter referred to as "Parent/Guardian"),			

to The City of Memphis Storm Water Department, a division of the City of Memphis Public Works (hereinafter, "City").

We, the undersigned, request that Participant be granted permission to participate in the Storm Water Green Program (hereafter "Activity") to be conducted by the City of Memphis Storm Water Department for the 2nd or 3rd work week of July 2021 (to be assigned after acceptance). Participant's involvement will include the virtual topics and activities described within the 2021 Green Camp application.

I fully understand and acknowledge that: my participation in this Program has inherent risks; that by my participation in these activities I hereby assume all risks and all responsibility for any losses and/or damages, whether caused in whole or in part by the negligence or other conduct of the officers, agents, officers, or employees of the City of Memphis, or by any other partnering organization.

The City of Memphis reserves the right to cancel any activity or event included as part of Activity or prevent Participant from participating in such activities or events, if, in the City's sole judgment, Participant's participation in such activities may seriously endanger Participant, other participants, or otherwise be harmful or inconsistent with the rules and regulations of City and all applicable policies and guidelines of the Storm Water Green Camp Program.

Parent/Guardian further states that I/We am/are the Participant's legal parent or guardian, and am fully competent to sign this Agreement; and that I execute this Agreement for full, adequate, and complete consideration fully intending to be bound by the terms herein.

LIABILITY RELEASE CLAUSE

The undersigned hereby releases and holds harmless the City of Memphis, its Mayor and Council, and any officers, employees or agents thereof (collectively referred to as Releasees), from any and all claims, liabilities or demands whatsoever arising or claimed to have arisen out of the enrollment or participation in the Program by the participant herein, regardless of whether such loss is caused by the negligence of the Releasees. This release shall survive the expiration or termination of this activity. I also hereby consent to the sponsor's use of my child's name, likeness or participation in the event for public purposes.

INDEMNIFICATION CLAUSE

Additionally, the undersigned agrees to indemnify and hold harmless the City of Memphis, its officers, agents, and employees from and against any and all claims, demands, suits, actions, damages, or other liabilities of any kind or character, arising out of or in connection with any activities performed in connection with this Program. This obligation shall survive the expiration or termination of this activity.

IN WITNESS WHEREOF, we have executed this release this _	day of	, 20
BOTH PARTICIPANT AND PARENT/GUARDIAN MUST READ B	EFORE SIGNING.	
Printed Name of Participant	Printed Name of Guardia	n
Signature of Participant	Signature of Guardian	
	Relationship of Guardian	to Participant