



## **Green Camp**

### **Application Packet**

# **Summer 2020 Green Camp Academic Enrichment Program**

## **The City of Memphis Storm Water Department**

**Contact:**

Y. Sonia Holmes

Storm Water Environmental Project Coordinator

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 free, summer program that provides students with hands-on learning in relation to the topics of environmental engineering, chemistry, environmental issues, urban development, and storm water pollution.

Green Camp is scheduled from 8:30 am to 3:30 pm on the scheduled days provided in Table 1. In the event that excursions exceed 3:30 pm, parents will be contacted. Each group will attend 5 classes over a 1-week period (Monday through Friday) and must be prepared for a full 7 hours each day. Students can select a preferred week in the application section. Groups will be assigned and confirmed with the acceptance letter mailed by April 26, 2020. Weeks will be assigned on a “first-come-first-approved” basis with enough space for 22 participants (11 students per week).

**Table 1: SCHEDULE**

GROUP	Group 1	Group 2
ACTIVITY DATES	June 1, 2, 3, 4, 5, 2020 (1 <sup>st</sup> week of June 2020)	June 8, 9, 10, 11, 12, 2020 (2 <sup>nd</sup> week of June 2020)

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 tri-fold presentation or watershed model display with essay that supports or disproves their original hypothesis. The Storm Water Department requests the final paper, tri-fold, or model by July 31, 2020. 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. Tri-folds will be displayed at a special public event. All the 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 <http://www.mhhe.com/biosci/genbio/maderinquiry/writing.html> for instructions and format for the scientific paper. Students may reference [http://castlenorth.net/Science%20Fair/display\\_example\\_4.jpg](http://castlenorth.net/Science%20Fair/display_example_4.jpg) for format of their presentation display on a traditional sized tri-fold board (36" h x 48" w) to be purchased by student.

#### **Admission Requirements:**

Each participant MUST complete and sign ALL application forms mentioned below and submit by **April 17, 2020**.

Each participant MUST agree to adhere to the Attire Code (noted on page 10, item 4) and have a ride to and from Benjamin Hooks Library (see next section). Boxed lunches will be provided on all days a student participates in activities unless declined by the student. Students will be performing tasks that involve walking, bending, lifting (not to exceed 20 lbs.), sorting, and note-taking. An opportunity will be available for students to enter a waterway and multiple locations will be available for them to gather their own samples. Should the student feel uncomfortable collecting a sample at the designated sites, a sample will be gathered for them by a member of the Storm Water Department team to analyze. Activities are detailed on pages 3-7 of this packet. Personal Protective Equipment (PPE) will be provided for all activities.

**Activity Pick-Up, Drop-Off, and Transportation:**

Arrangements will be made by the City of Memphis to pick up participants from the Benjamin L. Hooks Library main entrance located at 3030 Poplar Avenue Memphis, TN 38111. The pick-up time will promptly be at 8:30 am. Please be on time. However, if notified in advance, the Storm Water Environmental Project Coordinator (Y. Sonia Holmes cell 901-500-6346) will try to accommodate and include the student. Participants will be dropped off at that same location at the conclusion of the day's excursions at 3:30 pm.

**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:

City of Memphis Storm Water Department  
ATTN: GREEN CAMP COORDINATOR  
245 Bass Pro Dr.  
Memphis, TN 38103

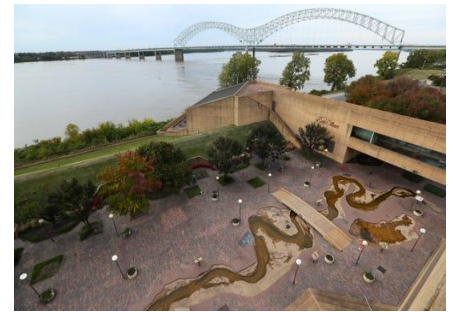
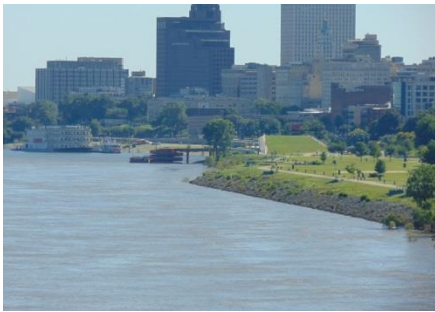
Alternatively, the application forms can be dropped off at the address listed above between 8:00 am to 4:00 pm, from Monday through Friday (excluding City holidays) or scanned and emailed to [yvette.holmes@memphistn.gov](mailto:yvette.holmes@memphistn.gov). If arrangements have been made between the teacher and the Storm Water Environmental Project 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 17, 2020.**

**Acceptance letters will be postmarked no later than April 30, 2020.**



## Day One: Urban Development of Watersheds and Sources of Urban Pollution



Supplies Provided by the City	Supplies Required from Student
Journal, writing utensils, activity sheets, backpack, Personal Protection Equipment, gloves, trash bags, calculators, scales, insect repellent, reusable water bottles, boxed lunch, and drinking water	Proper attire, towel, sun screen, and eagerness to learn!

### Activities:

Students will walk part of 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)

The students will learn about the Mississippi River Watershed and the watershed effect as it pertains to storm water runoff as well as 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 structure 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 Bridges USA. (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 walk the Mississippi River model on Mud Island to better understand the connection between their respective watersheds and the Mississippi River watershed. Throughout the day's study, the students will learn to recognize point and non-point source pollution. During the Mud Island River walk, students will be asked to contemplate where and how the implementation of green structure 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 and Wetlands



Supplies Provided by the City	Supplies Required from Student
Journal, writing utensils, activity sheets, backpack, binoculars, field guide, insect repellent, water bottles, boxed lunch, drinking water, lab field testing equipment and meters, field microscopes, magnifying glasses, appropriate PPE	Proper attire, sunscreen, and eagerness to learn!

### Activities:

Students will observe sources of litter and be able to distinguish the two types of pollution, point and non-point source. Students will gain a better perspective on the effects of improper waste disposal and how this practice can negatively affect our environment and the public health of our citizens. Students will learn how litter is carried to waterways and participate in a cleanup at McKellar Lake (in the Nonconnah Creek Watershed). Litter collected will be sorted as recyclable and non-recyclable, counted and/or weighed, and the percentage of plastic litter will be calculated. Students will be asked to determine the decomposition times of each type of trash and what percentage of the trash is recyclable. Students will be able to learn and identify proper disposal methods for each type of trash gathered. Students will be introduced to structural pollution control measures such as trash booms. Students will be asked for possible solutions to diminish the amount of pollution observed at McKellar Lake. (Location within this area: south of South Parkway, north of Mallory Ave., east of Riverside, and west of Third Street. Zip 38109: Approximate duration 2 hours)

Students will learn about different types of pollution, such as chemical, that are not captured by traditional clean-ups. Students will learn about the filtering properties of certain plants. For example, certain green spaces, including wetlands, can filter and remove chemical pollutants. The urban man-made wetland at T.O. Fuller State Park (in the Nonconnah Watershed) will be visited. Students will learn to identify 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 and scat) through a nature walk and utilizing binoculars within the wetland. 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). (Location: T.O. Fuller State Park Wetlands in Memphis: Latitude 35.0680, Longitude -90.1020: Approximate duration: 3 hours)

Students will test for evidence of chemical pollution in an urban channelized waterway (Cypress Creek at Tillman St. and Summer Ave., in the Wolf River Watershed). Students will gather samples, perform temperature, pH, copper, phenols, DO, and chlorine field tests, reference their sampling activity sheets to compare acceptable test levels, and discuss possible pollution sources of abnormal amounts. Biological sampling will be discussed but not be performed within a channelized waterway due to the lack of root masses from channelization (part of the study). A visual bioassessment will be performed within and around the channelized waterway and an assessment on the waterway's condition will be hypothesized based on the evidence. (Location: Cypress Creek at Tillman and Summer: Latitude 35.1481, Longitude -89.9592: Approximate duration 2 hours)

## Day Three: Rural Waterways and Wetlands



Supplies Provided by the City	Supplies Required from Student
Journal, writing utensils, activity sheets, backpack, lab field testing equipment and meters, field microscopes, magnifying glasses, binoculars, field and dichotomous guide, dip nets, sampling buckets, insect repellent, appropriate PPE (including footwear), boxed lunch, & drink water.	A towel, sunscreen, proper attire, and eagerness to learn!

### Activities:

Much of this day (approximately 2-1/2 to 3 hours) will be spent traveling to and back from the rural locations in the Wolf River Watershed.

At Bateman Bridge, a safe and easy access sampling point exists at a rural, natural waterway for students to perform chemical and biological sampling. Students will gather samples and will perform the same chemical tests as they did at the Cypress Creek, an urban concrete channelized waterway. Students will reference their sampling activity sheets to record the result of each test that is discuss possible pollution sources of abnormal amounts. Students will also perform biological sampling. Macroinvertebrates gathered will be examined with microscopes and/or magnifying glasses and identified with the dichotomous key. Students will utilize their Benthic Macro Activity Sheet to identify the macroinvertebrates pollution tolerance. A visual assessment will be performed for life within and around the natural waterway. Students will make an assessment on the waterway's condition from the evidence that they have found. (Location: Bateman Bridge Moscow, TN: Latitude 35.0276, Longitude -89.3500: Approximate duration (3.25 hours)

The rural natural wetland, Ghost River State Natural Area will be visited. Students will discuss 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 key animals via tracks and scat) through a nature walk and utilizing binoculars within the wetland. Students will note the differences between the rural wetland (Ghost River State Natural Area Boardwalk) and urban man-made wetland (T.O. Fuller). (Location: Ghost River State Natural Area at Beasley Drive, La Grange, TN: Latitude 35.0269, Longitude - 89.2724: Approximate duration 1-1/2 hours)

At Pine Crest Camp, students will view the natural layers of soil, sand, silt, and clay (which are the properties of the Memphis Sand Aquifer) in this natural eroded area where the layers are visible. Students will learn that this area is part of the Wolf River that is down stream of the headwaters at Baker's Pond. It will be reiterated that Memphis drinking water comes from the aquifer, not the River. Students will learn the importance of the geographic layers present for the filtration and protection of the aquifer. (Location: Pine Crest Camp, 21430 Hwy 57, Moscow, TN 38057: Latitude, 35.0520, Longitude: -89.3495: Approximate duration 3.25 hours)



**Day Four: Storm Water Management and Sustainability**



Supplies Provided by the City	Supplies Required from Student
Journal, writing utensils, activity sheets, backpack, lab field testing equipment and meters, field microscopes, magnifying glasses, binoculars, field and dichotomous guide, dip nets, sampling buckets, insect repellent, appropriate PPE (including footwear), boxed lunch, & drink water	Proper attire, sunscreen, and eagerness to learn!

**Activities**

Students will visit Meeman-Shelby Forest State Park (in the Loosahatchie River Watershed) to participate in multiple fun and educational activities to reinforce their knowledge of environmental and storm water awareness issues. Students will embark on a nature walk to a natural spring, a point at which water flows from an aquifer to the Earth’s surface. Chemical water testing of the spring will be performed to compare with collected samples from urban and non-urban surface waterbodies (where water has been exposed to explored variables). Students will identify various flora and fauna and compare the data to other visited ecosystems. 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). Students will review and discuss the impacts of urban development in the watersheds by participating in fun activities and games lead by the Project Coordinator. Such activities/games shall include, but are not limited to, a demonstration of the EnviroScape Watershed model, Recycle Re-shop Remix (relay game), Watershed Trivia Feud (trivia game show style), Why Are You So Green? (Environmental debates), and One For All (Population Education activity). All activities are designed to reinforce and enhance understanding of the material prior to the students’ work on their chosen project. Student will decide whether their data and observations from the week will be used to produce a scientific paper, a tri-fold presentation, or a watershed model (with accompanying essay). Students will begin a preliminary outline of their scientific paper, tri-fold essay, or model presentation essay. Students may also use this time to request photos from the week’s excursions to use in their paper or tri-fold/model presentations from the Project Coordinator for use on Day 5 when they begin their final project. (Location: Meeman-Shelby Forest State Park: Latitude 35.3337, Longitude: -90.0684: Approximate duration: 7 hours)

**Day Five: Reflection and Review**



Supplies Provided by the City	Supplies Required from Student
Benjamin L. Hooks Library resources and the Project Coordinator’s assistance with information for the scientific paper or tri-fold/model display guidance.	A drink, their back pack with all information gathered in the previous 4 days, and materials to work on project!

**Activities:**

The students will meet at the Benjamin L. Hooks Library at 8:30 AM. Pick up time is 2:30 PM. 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, create a tri-fold presentation or watershed model display (both with accompanying essay) that supports or disproves their original hypothesis. At the library, the students will be given the opportunity to gather additional research resources and work on their scientific paper, tri-fold, or model presentations. The instructors will help the students by providing answers to questions, guide them in finding supporting resources while stressing factual content and research.

Students may reference <http://www.mhhe.com/biosci/genbio/maderinquiry/writing.html> for instructions and format for the scientific paper. Students may reference [http://castlenorth.net/Science%20Fair/display\\_example\\_4.jpg](http://castlenorth.net/Science%20Fair/display_example_4.jpg) for format of their presentation display on a traditional sized trifold board (36” h x 48” w) 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, tri-fold, or model by July 31, 2020. 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. Tri-folds/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 tri-fold/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 tri-fold/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

Name: (first, middle, last) \_\_\_\_\_

Age/Grade: \_\_\_\_\_ School: \_\_\_\_\_ Birthdate: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Student email: \_\_\_\_\_

T-Shirt Size: \_\_\_\_\_ Boot Size: \_\_\_\_\_

What Careers Are You Interested In? \_\_\_\_\_

If undecided, what is your favorite or easiest class? \_\_\_\_\_

**Lunch Preferences:** The City of Memphis Storm Water Department is prepared to supply each participant with a boxed sandwich lunch. Please list any allergens and your preference between meat or veggie sandwich type below: *Please notate if you elect to supply your own bagged lunch, and note that there will be no refrigerator, microwave, or any oven on any day.*

**Preference Dates:** Green Camp will be offered during the 1<sup>st</sup> or 2<sup>nd</sup> work week (Monday through Friday) of June. Please circle the preferred week to participate. Preference 1 will be the first choice and Preference 2 will be 2<sup>nd</sup> choice. Groups will be assigned and confirmed with the acceptance letter mailed by April 30, 2020. Weeks will be assigned on a “first-come-first-approved” basis and there are only enough spaces for 22 participants (11 students per week). Only circle the week that you can attend. If you cannot attend one week, leave the appropriate preference selection blank.

<b>Preference 1:</b>	<b>Group 1</b>	<b>Group 2</b>
	June 1 - 5	June 8 - 12

<b>Preference 2:</b>	<b>Group 1</b>	<b>Group 2</b>
	June 1 - 5	June 8 - 12





## Regulations for Green Camp

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 and will supply appropriate Personal Protective Equipment (PPE). We must also achieve the academic guidelines of this Program.

1. We expect you to display courtesy, generosity, and high moral stature for yourself and toward your peers, staff, and guests.
2. You may only use cell phones for documentation purposes or emergencies during activities or lessons.
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 wear closed-toe shoes suitable for urban and rural walking excursions. 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](mailto:stormwater@memphistn.gov) by July 31, 2020. 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 tri-fold presentation display, this will also be requested by July 31, 2020. 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.

**I HAVE READ AND UNDERSTAND THE ABOVE REGULATIONS.**

<b>Printed Name of Student</b>	<b>Signature of Student</b>	<b>Date</b>
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Please indicate any particular medical problems such as medications being taken, allergies, etc. that the person in charge and/or any attending medical person should be aware of:

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I give my permission for any medical treatment that may be necessary in case of an emergency involving my child.

<b>Printed Name of Guardian</b>	<b>Signature of Guardian</b>	<b>Date</b>
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## 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 1<sup>st</sup> or 2<sup>nd</sup> work week of June 2020 (to be assigned after acceptance). Participant's involvement will include, but is not limited to, the following activities: to be transported in a bus to various sites described in the schedule, assist the City of Memphis Storm Water Department in activities designed by them, and participate in various educational exercises.

In the event of illness, I authorize the securing of necessary treatment.

In case of emergency, the following person should be contacted:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Work Phone: \_\_\_\_\_

Mobile Phone: \_\_\_\_\_ List preferred phone type: \_\_\_\_\_

Medical Information on Participant:

Allergies: \_\_\_\_\_

Medical Insurance Carrier (If none, write "none"): \_\_\_\_\_

Policy Number: \_\_\_\_\_

Doctor (If no PCP, write "none"): \_\_\_\_\_

Office Phone: \_\_\_\_\_

I fully understand and acknowledge that: my participation in this Program has inherent risks, dangers and hazards; that my participation in such activities may result in injury; and by my participation in these activities and, I hereby assume all risks and dangers 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 BEFORE SIGNING.

\_\_\_\_\_  
Printed Name of Participant

\_\_\_\_\_  
Printed Name of Guardian

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Signature of Guardian

\_\_\_\_\_  
Relationship of Guardian to Participant