INFORMAL YOUTH EDUCATIONAL PROGRAMMING AND ITS EFFECT ON ENVIRONMENTAL STEWARDSHIP AND FORMAL SCIENCE CLASSROOM PERFORMANCE

by

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Matthew Clinton McClellan

July 2014
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ABSTRACT

In this investigation, 4-H Outdoor Skills Programming was used to determine its effect on participants’ formal science classroom performance, development of life skills, leisure activity choices, and whether this type of adventure programming can increase a participants’ level of environmental awareness. Parent and participant surveys, interviews, and direct observation techniques were used to gather data during intervention sessions with two 4-H project clubs in Calcasieu Parish, Louisiana. Results indicated that these programs do accomplish life skill development and improvement in environmental awareness, but no correlation was found to indicate improvement in the formal classroom or in a decrease in reliance on electronic devices for entertainment.
INTRODUCTION AND BACKGROUND

4-H is a youth development program administered by the United States Department of Agriculture (USDA) and the states’ land grant universities; it is the largest such program in the world and reaches more than 6 million youth in the United States (National 4-H, 2014). 4-H Youth Development professionals, like me, are charged with developing “soft” skills in the youth participants which are summarized in the 4-H life skill wheel (Figure 1).

*Figure 1.* Visual representation of the 4-H Life skill Wheel (Rutgers Cooperative Extension, 2011). This wheel demonstrates the end goals of any 4-H program.

From its beginnings in the early part of the 20th century until today, 4-H has had a mission to impart education and improve the lives of the youth participants who enroll in
a local 4-H club. The program works; 4-H members excel beyond their non-4-H member peers by being nearly twice as likely to be civically engaged (grades 8-12); 4 times more likely to contribute to their communities (grades 7-12); twice as likely to engage in science, engineering, and computer technology programs outside of school (grades 10-12); and twice as likely to make healthier choices (grade 7) (Lerner, Lerner, & Colleagues, 2013). Programs like 4-H are effective because of the marriage of good practices like development of positive, sustained relationships of adults and youth, activities that build and encourage life skill development, and they provide opportunities for youth to use those skills as leaders and participants in relevant community activities (Lerner, et al., 2013). Participation in 4-H can also be a powerful tool for improving academic success. Participation in 4-H has been shown to provide an academic advantage for youth over their peers who are not enrolled in 4-H (Lerner, et al., 2013).

What started out as a means to impart agricultural education to rural youth over a century ago has become a powerful program using many different vehicles from robotics to shooting sports and adventure based camping programs to deliver relevant, research-based programs that are fun, educational, hands-on, and relevant to youth today.

In Louisiana, the 4-H program falls under the administration of the LSU AgCenter, a campus of the Louisiana State University System. The Louisiana State 4-H program is headquartered on the campus of Louisiana State University—Baton Rouge. A field office is located in every parish across the state.

4-H in Louisiana has three core missions: Citizenship, Healthy Living, and Science, Engineering, and Technology (SET). Under each core mission there are several project areas. In this study, the Outdoor Skills Program, which falls under the SET
mandate, was evaluated for its effectiveness in developing life skills (i.e. decision making skills, problem solving skills, teamwork, etc.), encouraging environmental awareness and stewardship, increasing physical activity of youth, decreasing the reliance of youth on electronic entertainment, increasing outdoor knowledge, and improving classroom science performance.

The study was carried out in Calcasieu Parish, located in Southwest Louisiana. The parish seat is Lake Charles and the parish has a population of approximately 194,000 as of 2012 (United States Census Bureau, 2013). The Calcasieu Parish 4-H program has a membership of 1,584 youth aged 9-18 for the 2013-2014 school year. The Outdoor Skills Program has the second largest project participation in the parish, with 275 youth involved in the parish Shooting Sports Club and 27 youth in the Outdoor Adventure Club; which are the two project clubs involved in this study.

“The mission of the Louisiana 4-H Shooting Sports Program is to assist youth in acquiring knowledge, developing life skills, and forming attitudes so that they may become self-directing, productive, and contributing members of society.” (LSU AgCenter, 2013) The Calcasieu Parish 4-H Shooting Sports Club is the largest project club in the parish 4-H program. The Shooting Sports Club (SSC) offers shooting skill training in archery, rifle, pistol, shotgun, hunting, and black powder disciplines. Adult volunteers go through a rigorous training in each discipline they wish to teach and are used to teach the youth participants safe firearm handling techniques, improve marksmanship, demonstrate conservation practices, and aid youth in developing a sense of self-worth and life skills.
The Calcasieu Parish Outdoor Adventure Club (OAC) is a much smaller project club; and is one of the newer clubs in the parish 4-H program, having been in existence since 2011. The Outdoor Adventure Club uses overnight primitive camping experiences, fishing, hiking, and community service projects as the tools to educate, build life skills, and to improve the health of the youth participants. The structure of the club has adult volunteers serve as facilitators, chaperones, and cooks. Teenaged Junior Leaders serve in program delivery, counselors, and role models to the elementary aged youth (grades 4-6). The club’s mission is to foster natural inquiry, increase physical activity, increase healthy living choices, and encourage participation in outdoor recreation.

**Project Description**

This action research project involved the Outdoor Skills Programs associated with the 4-H program in Calcasieu Parish, Louisiana. The project sought to evaluate the effectiveness of the Outdoor Skills program and determine if participants showed an increase in environmental awareness and stewardship, a reduction in reliance on video stimulation for entertainment purposes, and academic improvement in the classroom.

The two areas of the program under consideration were the Calcasieu Parish Shooting Sports Club and the Calcasieu Parish Outdoor Adventure Club. These two programs within the Outdoor Skills program use different vehicles to achieve the same goals: increases in life skills in the youth participants, increase in environmental stewardship, increase knowledge, and skill development. In the shooting sports program, these skills are achieved through indirect means by directly teaching youth firearms safety, marksmanship, and ethics they should see development in other areas (i.e. responsibility, good decision making skills, increased environmental awareness, greater sense of
stewardship, etc.). In the Outdoor Adventure Club, these skills are taught directly through the use of primitive camping situations, community service projects, physical health programs, and stewardship activities.

The focus of this action research project is to measure the effectiveness of the Calcasieu Parish Outdoor Adventure 4-H project club in its goals of changing participants’ behaviors towards environmental stewardship, awareness, reducing the reliance on video stimulation, and improving science performance in the classroom. Questions that will be answered are:

- Do participants in Outdoor Adventure Club choose different leisure activities and require less video stimuli (games, phones, social media, etc.) than 4-H members who are not part of the club?
- Do participants in the Outdoor Adventure Club show improved environmental awareness and a greater sense of stewardship than 4-H members who are not members of the club?
- Do participants in the Outdoor Adventure Club show mastery of the skills being taught (“leave no trace”, outdoor cooking, campground etiquette, etc.)?
- Does participation in 4-H Outdoor Skills programs improve science achievement in the classroom?

CONCEPTUAL FRAMEWORK

There is a considerable amount of research that describes the issues that youth deal with today. Even a cursory search of the literature could lead one to come away with a conclusion that many of today’s youth are “at risk” for dangerous behavior or
situations (Lerner, et al., 2013). The 4-H program assumes a different paradigm; one that assumes that youth have the capacity and desire to be productive, engaged, responsible members of society and only need the training to accomplish these goals. The 4-H program focuses on positive youth development techniques (PYD) in its programming efforts. (Lerner, et al., 2013)

4-H clubs can trace their beginnings back to the early 1900’s and the mission of the club was to teach youth about appreciation and opportunities in rural life. The first 4-H clubs were boys’ “Corn Clubs” or “Tomato Clubs” and girls’ “Home Demonstration Clubs”. These clubs taught youth about raising and caring for farm animals, machinery skills, cooking, and sewing all while using a “hands on” approach to teaching. Today “Learn by Doing” is a slogan used widely in the 4-H program. (National 4-H, 2014)

Since the early days of the 4-H program, the projects and learning vehicles used in the program have branched out from the agricultural and domestic projects to meet the needs of a less rural and more diverse clientele.

Discussion of PYD must include the “6 C’s”: Competence, Confidence, Connection, Character, Caring, and Contribution (Lerner, et al., 2013). A definition of each “C” is given (Table 1).
Table 1

**Definition of the 6 "C's" of PYD**

<table>
<thead>
<tr>
<th>“C”</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competence</strong></td>
<td>Positive view of one’s actions in specific areas, including social and academic skills.</td>
</tr>
<tr>
<td><strong>Confidence</strong></td>
<td>An internal sense of overall positive self-worth and self-efficacy.</td>
</tr>
<tr>
<td><strong>Connection</strong></td>
<td>Positive bonds with people and institutions that are reflected in exchanges between the individual and his or her peers, family, school, and community and in which both parties contribute to the relationship.</td>
</tr>
<tr>
<td><strong>Character</strong></td>
<td>Respect for societal and cultural norms, possession of standards for correct behaviors, a sense of right and wrong (morality), and integrity.</td>
</tr>
<tr>
<td><strong>Caring</strong></td>
<td>A sense of sympathy and empathy for others.</td>
</tr>
<tr>
<td><strong>Contribution</strong></td>
<td>Contributions to self, family, community, and to the institutions of a civil society.</td>
</tr>
</tbody>
</table>

(Lerner, et al., 2013)

The principles of the 6 “C’s” are incorporated into every 4-H program, especially into the two project clubs that are being evaluated in this project.

Youth camping programs have been in existence for over 150 years and their use as a tool for youth development has a long track record of producing positive results (Garst, Browne, & Bialeschki, 2011). Annually, an estimated 12 million youth participate in a resident or day camp program, making these programs one of the largest organized interventions in youth development in the country (Bialeschki, Henderson, & James, 2007). In a 2005 study conducted by the American Camping Association (ACA), youth surveyed rated their camp experience at 8.79 (out of 10) indicating a high level of enjoyment of the participants for the experience (Bialeschki, Henderson, & James, 2007). Garst, Browne, and Bialescki found that camping programs differ in their youth...
development goals, most do share some commonalities such as connecting with nature, living in a group setting, personal growth, and fun (2011). Resident and day camping programs allow youth to “escape” his or her daily life. Camps that are set in natural settings have been shown to have a positive effect on youth by reduction in stress and anxiety. Since most youth are removed from the natural setting, having a resident or day camp setting in a remote place can increase the novelty of the camping experience as well as increase the restorative effect for the youth. (Garst, Browne, & Bialeschki, 2011) These traits of living in a group setting, being in a natural environment, and fun are essential elements to the development and implementation of the Outdoor Adventure Club program. The program encourages youth to share lodging accommodations (segregated by gender), the club makes extensive use of the Louisiana State Park System for program activities to remove the youth from the urban settings that most of the participants live in, and the program promotes physically active play and nature activities that are meant to be enjoyable and informative for the participants.

The Outdoor Adventure program differs in its attempt to not only encourage youth to connect with nature, but to learn about the natural world, engage in community leadership, and increase the youths’ desire to practice environmental stewardship. Use of a camping or outdoor skills program to foster environmental stewardship is a relatively new idea but evidence does support the notion that use of these programs can provide an optimum opportunity for youth engagement in environmental issues, promote “pro-environmental” behaviors, and develop the skills necessary for youth to affect community change (Browne, Garst, & Bialeschki, 2011). To truly be effective and reach the goals set
for the program, design of the outdoor experiences need to be both educational and goal oriented as well as enjoyable for the participants (Morgan & Sibthorp, 2011).

Shooting programs have been a part of 4-H since the 1930’s in Texas when smallbore rifle competitions were held in conjunction with state and district events (4-H National Shooting Sports, 2004). An expanded shooting sports program was developed and piloted in 1977 and 4-H Shooting Sports was taken nationwide in 1979 (4-H National Shooting Sports, 2004). An evaluation of the 4-H Shooting Sports Program in Texas indicates that 4-H Shooting Sports programs are very effective in developing life skills such as pride/self-esteem, ability to communicate with adults, personal responsibility, and decision-making skills (Howard, n.d.). In this evaluation a scalar response evaluation was used (scale 1-8) with a score of 4 indicating an average level of program effectiveness (Howard, n.d.). Modal score for questions regarding respect for the environment and awareness of conservation practices were 7 indicating a very high degree of program effectiveness in developing awareness and behavior modification in those areas (Howard, n.d.). Evaluation of Louisiana’s 4-H Shooting Sports program on a state wide basis is currently on-going. Anecdotal evidence would suggest that the trends seen in Texas are also evident in Louisiana’s program.

METHODOLOGY

This study relied on “advanced” participation in the Calcasieu Parish 4-H program; that is, participation in more than “just” a school 4-H club. Study participants joined not only a school or community based 4-H club, but a project club to be included in this study. Project clubs allow members to delve deeper into a particular project and experience more from the project than is usually expected from a participant simply
relying on a project book. The Calcasieu Parish 4-H program has several project clubs for youth to participate in from Shooting Sports and Outdoor Adventure Club (the two involved in this study) to a horse club, gardening club, a teen leadership club, and a rabbit club. Project club membership enhances the youths’ involvement in 4-H and from my experience, leads to more active and engaged members who stay with the program longer than youth who do not participate in a project club.

Demographics

Participants in this study were aged 9-18 and are members of the Calcasieu Parish 4-H program. Participation in a project club is not required for 4-H enrollment. Members who participate in a project club (Outdoor Adventure, Livestock, Shooting Sports, etc.) tend to be more active, dedicated 4-H members. Youth in the study were enrolled in the Calcasieu Parish Outdoor Adventure Club (the “treatment” group) or the Calcasieu Parish Shooting Sports Club (the “comparison” group). Enrollment in both clubs is possible, but there were no participants in the study who chose to join both project clubs. These two projects were selected to study due to their goals being similar, but methodologies of teaching being different. Both clubs require participation of parents with the youth, both clubs require participation on weekends, both clubs require a significant time commitment from participants, and both clubs’ goals are “outdoorsy” in nature.

Enrollment in the project clubs is open to any 4-H member of the parish. Members of the Calcasieu Parish Outdoor Adventure Club consisted of 17 girls and 10 boys. Of the 27 participants, 16 were first year 4-H members, 5 were second year members, and 6 had been members of 4-H for at least 3 years. Ages of the Outdoor Adventure Club participants ranged from 9-17 years of age. Enrollment in the Calcasieu
Parish Shooting Sports Club was 275 members for the 2013-2014 school year. Members of the shooting club were selected to participate in the study who met the same demographics (age, years in 4-H) as the Outdoor Adventure Club. Final participation in the study was 10 girls and 15 boys. The two clubs’ goals are similar but seem to attract a different type of youth. Youth tend to stay enrolled in the shooting sports club throughout their 4-H career, where members of the Outdoor Adventure Club tend to drop out of the project club and enter other project areas of 4-H when they graduate to middle school. 4-H enrollment in general tends to decline as the youth age into middle (6th grade) and high school (9th grade) as shown in Figure 2.

Figure 2. 4-H Enrollment for Calcasieu Parish, Louisiana by grade for years 2012-2014 (LSU AgCenter, 2014).
**Intervention**

For this project, evaluations were performed on behavior changes, attitude changes, and skill development. The intervention; joining and participating in the Outdoor Adventure Club, was hypothesized to increase the participants’ knowledge, behaviors, and attitudes as they relate to environmental stewardship, healthier lifestyle choices, less video stimulation, and greater life skill development than their peers in another project club. It was further theorized that participants involved in the 4-H Outdoor skills program, in particular Outdoor Adventure Club would perform better in science classes at school than they did prior to involvement in the clubs. Participants in the “treatment” group will be exposed to primitive camping situations, outdoor cooking, physical activity programs, outdoor recreation programs, and environmental monitoring programs. Participants in the “comparison” group will be exposed to firearms safety programs, marksmanship skills program, and shooting competitions. A schedule of dates, locations, and brief description of each intervention for the Outdoor Adventure Club (Table 2) and Shooting Sports Club (Table 3) can be found below.

**Table 2**
*Outdoor Adventure Club Schedule*

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcasieu Parish 4-H Office</td>
<td>Nov 9-10, 2013</td>
<td>Initial overnight adventure, introduction to camping set up, campground etiquette, and community service projects</td>
</tr>
<tr>
<td>Sam Houston Jones State Park, Lake Charles, LA</td>
<td>Dec 7-8, 2013</td>
<td>Overnight camping program, marsh plant and forest plant identification program, community service program</td>
</tr>
<tr>
<td>Calcasieu Point, Lake Charles, LA</td>
<td>Feb 3, 2014</td>
<td>Youth wetlands module</td>
</tr>
<tr>
<td>Hodges Gardens State Park, Many, LA</td>
<td>April 4-6, 2014</td>
<td>Weekend camping, primitive setting, survival skills program by park staff</td>
</tr>
</tbody>
</table>
Table 3
*Shooting Sports Club Schedule*

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Charles Gun Club</td>
<td>Nov 23, 2013</td>
<td>All discipline shooting practice</td>
</tr>
<tr>
<td>Lake Charles Gun Club</td>
<td>Dec 15, 2013</td>
<td>All discipline shooting practice</td>
</tr>
<tr>
<td>Lake Charles Gun Club</td>
<td>Jan 11, 2014</td>
<td>All discipline shooting practice</td>
</tr>
<tr>
<td>Lake Charles Gun Club</td>
<td>Feb 15, 2014</td>
<td>Crying eagle shooting tournament, shotgun and archery competition</td>
</tr>
</tbody>
</table>

**Treatment—Outdoor Adventure Club**

The Outdoor Adventure Club had a schedule of camping/fishing/environmental monitoring activities planned in a strategic manner throughout the 4-H program year.

Enrollment in the Outdoor Adventure Club requires the participant to fill out an enrollment pack. The enrollment pack contains camper expectations, codes of conduct, health forms, a tentative schedule of events, and supply list. Parents of youth are encouraged to participate in the Outdoor Adventure Club as well and are trained using Louisiana’s State 4-H Overnight Chaperone Training module. In addition to completing the Louisiana State 4-H Overnight Chaperone Training, adults participating in the Outdoor Adventure Club must pass a criminal background check prior to serving as a volunteer. 4-H Junior Leaders, 4-H members at least 13 years old, are trained using the Louisiana State 4-H Camp Counselor curriculum and used as camp counselors. The first activity of the Outdoor Adventure Club was an overnight campout at the Calcasieu Parish 4-H Office. The office provides an outdoor environment away from the youths’ home but still has all of the conveniences of home (shower, indoor restroom facilities, kitchen, phones, etc.). This single night outing is designed to teach the youth basic camping skills
such as pitching a tent, selecting a tent site, fire safety, campground etiquette, and first aid skills. As a community service project, youth cleaned the office and surrounding grounds.

The second intervention was a single overnight campout at Sam Houston Jones State Park in Lake Charles, LA. The second outing of the club moved youth further away from the modern comforts and conveniences of home. Youth were expected to erect their own tents, keep the camp area clean, and observe campground etiquette expectations. A community service project was implemented at this campout as well. Youth were asked to clean up campground and along the Calcasieu River’s bank that adjoins the park. Hiking one of the many nature trails was offered as a means to introduce youth to the natural surroundings and flora and fauna identification activities were conducted while in the woods.

The third outing for the Outdoor Adventure Club was a day trip to fish at Calcasieu Point and observe and learn about the marsh ecosystem that is prevalent in Southwest Louisiana. Educational programming consisted of lessons on watersheds and how marshes can affect water quality. The Louisiana Youth Wetlands program’s curriculum from 2010 was used for the watershed program. This program is distributed by the LSU AgCenter and is made available to state science educators. A copy of the lesson can be found in Appendix B.

The fourth, and final outing included in the study was a weekend campout at Hodges Gardens State Park in Many, LA. This campout is the most primitive of the camping excursions as the group camped in an open field away from all modern conveniences. The primary focus of this outing was to truly “stretch” the youths’
comfort zone and let them experience life away from all electronic distractions. Youth participated in trail maintenance for the park, hiked many of the nature and garden trails in the park, explored forest and lake ecosystems, and lessons on emergency survival techniques were provided.

Comparison—Shooting Sports Club

As a comparison, the Shooting Sports Club had monthly sessions planned throughout the program year beginning in October and concluding with the 4-H Crying Eagle Competition held in the spring (February). Youth interested in participating in the Shooting Sports Club must attend a safety and orientation program held in October each year. Orientation attendance is required only once during a 4-H members tenure in the program. Safety programs begin each session and practice sponsored by the club. Youth may participate in any of the 6 disciplines offered by Louisiana 4-H: rifle (BB, air rifle, smallbore), shotgun (advanced (skeet, trap, sporting clays, 5 stand) or modified trap (3/4 cock mechanical trap)), archery (recurve, compound, genesis), muzzleloader, pistol (air pistol, smallbore), or hunting. Each discipline is taught by adult volunteers who undergo rigorous training in the discipline that they desire to work with (i.e. a shotgun instructor cannot teach rifle, etc.). Each month a club date was scheduled at the Lake Charles Gun Club where all disciplines can shoot safely and simultaneously. The club days began with registration where attendance was recorded, followed by a general safety meeting for all participants, coaches, and spectators. This safety meeting is meant as a refresher to follow range safety protocols, firearm safety, proper eye and ear protection requirements, and sportsmanship. After the safety meeting, individual disciplines dismissed to their designated range (archery to the archery field, rifle to the rifle range, etc.) where more
discipline specific safety instruction was given by coaches. Once the coaches felt that everyone was ready to begin live fire, the practices began with participants practicing the shooting skills needed to engage in that discipline. This process was the same for the first 3 intervention sessions. The fourth intervention session was a competition where youth were expected to use the skills developed in the first 3 interventions to show mastery of the discipline.

Data Collection

Data was collected using pre and posttest evaluation tools, student interviews, parent interviews, and direct observation by 4-H staff to ensure that data received during interviews and from surveys were being shown during club activities. All of the participants in the Outdoor Adventure Club were interviewed, and received the evaluation tool; while participants in the shooting sports club were randomly selected from those members who closely matched the demographics of the Outdoor Adventure Club (i.e. similar age, similar years in 4-H, etc.). Parents of the youth selected were also all administered pre and posttest evaluations to gauge perceived changes in behavior in the youth participants. Copies of the evaluation surveys can be found in Appendix A.

Parent and youth interview questions were “open ended” and provided an insight into what the perceptions of the programs were.

All participant and parental evaluation forms were coded, to protect the identities of the respondents. Forms were kept in a locked file cabinet in the Calcasieu Parish Extension office. Reports of the evaluation data will not include any personal information and the reported data had no identifiers to connect respondents to the data. All health and personal information collected was kept under lock at the Calcasieu Parish
Extension office with the exception that all health forms must be in the 4-H Agent’s possession during all Outdoor Adventure Club and Shooting Sports Club activities.

To answer the questions posed by this action research project, a triangulation matrix was developed (Table 4).

Table 4  
*Triangulation Matrix*

<table>
<thead>
<tr>
<th>Focus Questions</th>
<th>Data Source 1</th>
<th>Data Source 2</th>
<th>Data Source 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do participants in this project club choose different leisure activities and require less video stimuli (games, phones, social media, etc.) than 4-H members who are not part of the club?</td>
<td>Pre-test evaluation form.</td>
<td>Participant interview; direct observation</td>
<td>Post program evaluation form</td>
</tr>
<tr>
<td>2. Do participants in this project club show improved environmental awareness and a greater sense of stewardship than 4-H members who are not members of the club?</td>
<td>Pre-test evaluation form.</td>
<td>Participant interview</td>
<td>Post program evaluation form, direct observation</td>
</tr>
<tr>
<td>3. Do participants in the project club show mastery of the skills being taught (“leave no trace”, outdoor cooking, campground etiquette, etc.)?</td>
<td>Parental Pre-test evaluation form.</td>
<td>Parental interview, direct observation</td>
<td>Direct Observation, Parental Post-test evaluation form</td>
</tr>
<tr>
<td>4. Does participation in 4-H Outdoor Skills programs improve science achievement in the classroom?</td>
<td>Parental pre and post interview</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DATA AND ANALYSIS**

A closer look at each study question will be given by examining survey results, parental and student interview responses, and 4-H staff observations.

**Impact of the 4-H Outdoor Skills Program on Participant Electronic Device Usage**

The study’s design assumed that when youth were exposed to other forms of recreation (i.e. hiking, boating, etc.) that dependence on electronic recreation options would decrease. A goal of the program was to encourage youth to be more physically active.
active and learn about nature by actually experiencing the outdoors rather than spend the “average” of 7 hours per day on an electronic device (Rideout, Foehr, & Roberts, 2010).

When asked about daily electronic device usage (phone, tablet, computer, television, video games, etc.) in the pre-test 33% ($N=7$) of youth in the Outdoor Adventure Club responded that they “couldn’t live without their device” which correlated to “more than 3 hours of daily use” in this scale. By comparison, 52% ($N=11$) of the youth respondents in the shooting sports club indicated more than 3 hours of daily electronic device use. When questioned about what participants were using electronic devices for, the most common answers were games and communication (i.e. social media, texting, voice calls, etc.). These numbers are still lower than the “average” American youth that spends an average of more than 7 hours on electronic devices (Rideout, Foehr, & Roberts, 2010).

After the treatments, the results remained virtually unchanged with 33% ($N=7$) respondents in the Outdoor Adventure Club and 48% ($N=10$) respondents in the Shooting Sports Club indicating more than 3 hours of daily electronic device usage.

No correlation was found to electronic device use and any other reported demographic (i.e. gender, age, etc.). The respondents that indicated less reliance on electronic entertainment also showed more parental involvement than those participants more reliant on electronic entertainment.

**Impact of Outdoor Skills Program and Participants’ Level of Environmental Awareness and Interest in Stewardship**

During the implementation of the program, youth were interviewed about their feelings on how they “fit” into the environment, how humans impact nature, and whether
or not humans have a responsibility to protect or conserve the natural world. The results of the interviews showed that participants in the Outdoor Adventure Club tended to be more conscious of environmental issues than their peers in the Shooting Sports Club and that environmental awareness seemed to follow gender lines with girls being more aware than boys. Interview questions were asked in an “open ended” format, meaning that respondent answers could not be simply a “yes” or “no”. Tables 5 summarizes some of the respondent answers to select interview questions, denotes which project club they belonged to, and the participant’s gender.

Table 5
Selected participant responses to interview questions

<table>
<thead>
<tr>
<th>Interview Question</th>
<th>Project Club Membership</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>“People have caused animals to become extinct.”</td>
<td>Outdoor Adventure Club</td>
<td>F</td>
</tr>
<tr>
<td>“People make trash and pollute.”</td>
<td>Outdoor Adventure Club</td>
<td>F</td>
</tr>
<tr>
<td>“We made the water dirty, and we should make someone clean it up.”</td>
<td>Outdoor Adventure Club</td>
<td>M</td>
</tr>
<tr>
<td>“I don’t know.”</td>
<td>Outdoor Adventure Club</td>
<td>F</td>
</tr>
<tr>
<td>“I don’t think that people impact the environment.”</td>
<td>Outdoor Adventure Club</td>
<td>M</td>
</tr>
<tr>
<td>“I don’t know.”</td>
<td>Shooting Sports Club</td>
<td>M</td>
</tr>
<tr>
<td>“We pollute.”</td>
<td>Shooting Sports Club</td>
<td>F</td>
</tr>
<tr>
<td>“I don’t know.”</td>
<td>Shooting Sports Club</td>
<td>M</td>
</tr>
<tr>
<td>“I don’t know.”</td>
<td>Shooting Sports Club</td>
<td>F</td>
</tr>
<tr>
<td>“I pick up litter”</td>
<td>Outdoor Adventure Club</td>
<td>F</td>
</tr>
<tr>
<td>“I don’t know.”</td>
<td>Outdoor Adventure Club</td>
<td>F</td>
</tr>
<tr>
<td>“I don’t throw trash on the ground.”</td>
<td>Outdoor Adventure Club</td>
<td>F</td>
</tr>
</tbody>
</table>
In a pre and post program evaluation form participants were asked about their feelings regarding environmental stewardship, their role in nature, and how they feel the 4-H program connected them to nature. Responses to evaluation questions regarding environmental stewardship, awareness, and how respondents see their role in it show that youth that participate in the Outdoor Adventure Club are more conscientious of environmental issues and are more likely to feel closely connected to nature than their peers in the Shooting Sports Club. The number of youth who responded “strongly agree” or “agree” on these issues is summarized in Table 6.

Table 6
*Environmental Stewardship and Awareness Evaluation Results—Number of Youth who “Strongly Agree” or “Agree” with the question in the pre and post program evaluation.*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Humans have the right to change nature anyway we want to suit our needs.</td>
<td>21</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>I don’t think about how my actions affect nature.</td>
<td>21</td>
<td>20</td>
<td>-1</td>
</tr>
<tr>
<td>I feel more connected to nature and feel more responsible to be a good steward of the environment since beginning the year in 4-H.</td>
<td>N/A</td>
<td>5</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Humans have the right to change nature anyway we want to suit our needs.

<table>
<thead>
<tr>
<th></th>
<th>Outdoor Adventure—Pre (N=27)</th>
<th>Outdoor Adventure—Post (N=27)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humans have the right to change nature anyway we want to suit our needs.</td>
<td>20</td>
<td>16</td>
<td>-4</td>
</tr>
<tr>
<td>I don’t think about how my actions affect nature.</td>
<td>14</td>
<td>12</td>
<td>-2</td>
</tr>
<tr>
<td>I feel more connected to nature and feel more responsible to be a good steward of the environment since beginning the year in 4-H.</td>
<td>N/A</td>
<td>11</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The results of the pre and post evaluation tools indicate that youth in the Outdoor Adventure Club showed a modest improvement in understanding conservation and stewardship concepts while their counterparts in the Shooting Sports Club showed no change in their perceptions and understanding of conservation and stewardship concepts. Data collected during the intervention through interviews showed that youth understanding of these concepts is minimal and further development of the program will need to be completed to fully develop these concepts for the youth.

**Impact of the Outdoor Adventure Club on Participant Skill Development**

Life skill development was measured through the parental response survey as well as through direct observation during Outdoor Adventure Club activities. Parents were asked about their impressions of the level of responsibility and problem solving skills in the pre and post program evaluations. Questions asked were “Which best describes your child’s problem solving skills?” and “Which best describes your child’s level of responsibility”. Responses were on a 3 point scalar system where a response of “1” indicates complete proficiency, a response of “2” indicates an average level of proficiency in the skill, and a response of “3” indicates complete lack of the skill.
Youth were monitored by 4-H staff to determine whether or not they were developing skills such as responsibility (do they clean up after themselves or are they told to do so, do they set up camp without assistance or do they wait around for someone to do it for them, etc.), teamwork, good decision making, and problem solving skills (how they cope with adverse weather, insects, primitive camping scenarios, etc.). These monitored observations were scored on the same scale as the parental survey and then combined with the parental survey responses to determine a level of growth for the youth in life skill development. The arithmetic mean for each question can be found in Table 7; the lower the score, the more proficient the participants are.

Table 7
Life Skill Development, Outdoor Adventure Club—Scale 1-3 with 1 being “proficient” and 3 being “complete lack of skill”. Arithmetic mean of 4-H staff and parental survey responses provided. A lower score demonstrates higher proficiency.

<table>
<thead>
<tr>
<th>Source of Data</th>
<th>Parental Pre-Survey</th>
<th>Parental Post-Survey</th>
<th>Direct Observation at First Campout</th>
<th>Direct Observation at Final Campout</th>
<th>Avg. Pre</th>
<th>Avg. Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility</td>
<td>2.25</td>
<td>2.125</td>
<td>3</td>
<td>1.5</td>
<td>2.65</td>
<td>1.81</td>
</tr>
<tr>
<td>Problem Solving Skills</td>
<td>2.5</td>
<td>2.375</td>
<td>2</td>
<td>2</td>
<td>2.25</td>
<td>2.19</td>
</tr>
<tr>
<td>Decision Making Skills</td>
<td>2.5</td>
<td>2.5</td>
<td>2</td>
<td>2</td>
<td>2.25</td>
<td>2.25</td>
</tr>
</tbody>
</table>

The same scale was used for the Shooting Sports Club where direct observation and parental survey responses were averaged together to determine a level of growth for the youth participants in the program. The responses for the Shooting Sports Club are summarized in Table 8.
Table 8  
Life Skill Development, Shooting Sports Club—Scale 1-3 with 1 being “proficient” and 3 being “complete lack of skill”. Arithmetic mean of 4-H staff and parental survey responses provided. A lower score demonstrates higher proficiency.

<table>
<thead>
<tr>
<th>Source of Data</th>
<th>Parental Pre-Survey</th>
<th>Parental Post-Survey</th>
<th>Direct Observation at First Shoot</th>
<th>Direct Observation at Final Shoot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility</td>
<td>2</td>
<td>1.6</td>
<td>1.75</td>
<td>1.5</td>
</tr>
<tr>
<td>Problem Solving Skills</td>
<td>2.25</td>
<td>1.9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Decision Making Skills</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

The two project clubs’ participants showed growth in life skill development. Youth in the Outdoor Adventure club showed significant gains in skills and knowledge in camping practices and etiquette. Youth in the Outdoor Adventure Club showed significant gains in responsibility from the initial camping experience to the final campout. Youth in the Shooting Sports Club showed gains in responsibility, problem solving, and decision making skills as well. Overall, impact on life skill development was the strongest for the study.

Impact of the Outdoor Adventure Club and Classroom Science Performance

Since gathering student report cards was not a viable option to determine science classroom performance improvement, parent and youth evaluation questions asked about this topic. Youth and parents were asked how they were performing in school (participation in 4-H requires that the student maintain a passing grades) prior to participation in the Outdoor Adventure Club and/or Shooting Sports Club. Responses indicated that the participants were average to above average. Parental responses for classroom performance can be found in Figures 3 and 4.
Figure 3. Pre and Post program science grade distribution for youth in Outdoor Adventure Club.

Figure 4. Pre and Post program science grade distribution for youth in the Shooting Sports Club.
Parents of youth were surveyed and a correlation between in class science performance and participation in the 4-H Outdoor Skills Program could not be found. The data indicate that there was no difference in performance in science grades from the beginning to the end of the intervention.

**INTERPRETATION AND CONCLUSION**

So what does this all mean? The data indicate that 4-H Outdoor Skills programming is effective at instilling and developing life skills in the youth participants. Skills like responsibility, good decision making, problem solving, teamwork, and self-reliance show increases throughout the program’s duration. Not only is the 4-H staff seeing the increases in life skill development, but parents are commenting on this increase as well. These findings are consistent with the literature dealing with youth camping and adventure programming. The 4-H program’s overall goal of building “soft” skills through “hands on” learning is an effective model to develop programming for positive youth development.

Data also indicates that participation in the Outdoor Adventure Club does build a sense of environmental awareness and make the youth more likely to practice good conservation and stewardship attitudes. The data seem to indicate that girls are more environmentally aware than boys but that overall environmental awareness is low for the group. If environmental stewardship and awareness are going to continue to foci for the Outdoor Skills 4-H program, then further theory evaluation will have to be conducted to ensure that the program can achieve that goal. Another method of increasing environmental awareness could be to increase the number of interventions or increase the duration of the interventions (conducting all weekend trips rather than just 2 for the
Outdoor Adventure Club or increasing the coaching time at each shooting sports day). The Shooting Sports program as a vehicle to develop environmental awareness is, in my opinion, limited in its reach. Youth in Calcasieu Parish tend to join the Shooting Sports program primarily for the social interaction, the competition, or because of parental desire; environmental education is limited to this group also due to volume. It takes a large number of people to facilitate the Calcasieu Parish Shooting Sports program due to the nature of the program and the volume of the participation; teaching the marksmanship and safety skills in the project demands most of the time allotted for the program.

This project failed to show a correlation between 4-H Outdoor Skill program participation and improved academic success or a decrease in the reliance on electronic devices for entertainment. Again, further theory evaluation should be conducted if these goals are going to continue to be major foci of the program. Stricter controls on electronic devices at Outdoor Adventure Club outings will need to be implemented so youth will be more likely to develop recreational opportunities that do not use electronics. In the Shooting Sports program, youth cannot have electronics on the firing lines, but “capturing the moment” with a camera is a very important aspect of the program from a cultural perspective. It is likely that a goal of reducing electronic stimulation using the Shooting Sports Club is futile. Academic success has already been established for 4-H participation through the literature review. This study failed to show a difference in academic performance between project clubs. I believe that the participants in the 4-H program will be higher performing students than non 4-H members and that youth that are more active participants in the 4-H program (joining project clubs in addition to school clubs) will be more successful academically than less active 4-H members. I
believe that success comes not only from the student, but the more active a 4-H member is, the more supportive and engaged his or her parents are. I believe that parental engagement is a major factor in academic success for students.

While failing to show a correlation between the 4-H Outdoor Skills program and improved academic performance or change in leisure pursuits could been seen as a failure of the program, I believe that due to the brevity of the study (4 interventions over a 4 month time frame) was a contributing factor. I believe that demonstrating an increase in life skill development will ultimately lead these youth to develop higher academic achievement. Following the participants for multiple years in the program should bear out my theory. I also believe that if these participants replicate club outings with their families independently of the club that reliance on video stimulation should decline. For this to happen, parental support and participant initiative will be necessary and those parents need to “buy in” to the goal of a reduction in electronic device use.

VALUE

With formal education settings moving more and more toward “high stakes” testing, there is little room in a school day to teach the “soft” skills that youth need to develop. Informal educational programs like 4-H can bridge that gap and help develop the skills that are no longer being taught in the formal educational setting. These skills, as summarized in Figure 1 (4-H Life Skill Wheel) can contribute to overall academic success and development of well rounded, productive adults. If a student is more responsible, has better problem solving skills, is able to communicate effectively with peers and adults, makes good decisions, and works well with others, then that student should perform better in a formal educational setting than his or her contemporaries.
Even if a student with those skills does not perform better in school, those skills should give that youth an advantage in life as compared with youth who are not given the opportunity to develop those traits.

Personally, this project has allowed me to see how long term, strategic planning and research can produce a higher quality program for my clientele. It has changed the way I approach programming, from an “activity” perspective to an “end goal” perspective. It is no longer all about the quantity of projects I do, but the quality of the projects. Good programming takes time, but the rewards of achieving those goals are worth the investment.
REFERENCES CITED


REFERENCES CITED CONTINUED

APPENDICES
APPENDIX A

EVALUATION TOOLS
Outdoor Skills Program Pre-Test Evaluation

1.) How many years have you been in 4-H?__________________

2.) Which projects are you enrolled in?_______________________________________

3.) Which best describes your daily usage of electronic devices?
   A. Not a lot (less than 1 hour)
   B. Some (more than 1 hour, but less than 3 hours)
   C. I can’t function without my phone or device (more than 3 hours)

4.) Which best describes your daily physical activity level?
   A. I move when I have to (less than 1 hour)
   B. I am moderately active (more than 1 hour but less than 2 hours)
   C. I am an exercising machine (more than 2 hours)

5.) Which best describes your opinion of exercise?
   A. Why bother, that’s why we have gym class?
   B. I don’t think about exercise.
   C. I like to be active and play.

6.) When you get home from school, do you:
   A. Do homework
   B. Snack
   C. Play outside
   D. Reach for your phone or electronic device

7.) On a Saturday what is your most likely activity?
   A. Play outside
   B. Video games, phone, computer
   C. Watch television
   D. Family activities

8.) What is your preferred snack?
   A. Chips
   B. Fruit
C. Candy

9.) Humans have the right to change the environment to suit our wants and needs

   A. Strongly Agree   B. Agree   C. Disagree   D. Strongly Disagree

10.) I don’t think about how my actions affect nature

   A. Strongly Agree   B. Agree   C. Disagree   D. Strongly Disagree
Outdoor Skills Program Post Evaluation

11.) Which best describes your daily usage of electronic devices?

D. Not a lot (less than 1 hour)
E. Some (more than 1 hour, but less than 3 hours)
F. I can’t function without my phone or device (more than 3 hours)

12.) Which best describes your daily physical activity level?

D. I move when I have to (less than 1 hour)
E. I am moderately active (more than 1 hour but less than 2 hours)
F. I am an exercising machine (more than 2 hours)

13.) Which best describes your opinion of exercise?

D. Why bother, that’s why we have gym class?
E. I don’t think about exercise.
F. I like to be active and play.

14.) When you get home from school, do you:

E. Do homework
F. Snack
G. Play outside
H. Reach for your phone or electronic device

15.) On a Saturday what is your most likely activity?

E. Play outside
F. Video games, phone, computer
G. Watch television
H. Family activities

16.) What is your preferred snack?

D. Chips
E. Fruit
F. Candy
17.) Humans have the right to change the environment to suit our wants and needs
   A. Strongly Agree  B. Agree  C. Disagree  D. Strongly Disagree

18.) I don’t think about how my actions affect nature
   A. Strongly Agree  B. Agree  C. Disagree  D. Strongly Disagree

19.) I feel more connected to nature and feel more responsible to be a good steward of the environment since beginning the year in 4-H.
   A. Strongly Agree  B. Agree  C. Disagree  D. Strongly Disagree
Outdoor Skills Program Parent Survey Pre Evaluation

Child’s Name_____________________________________

1.) What knowledge and skills do you want your child to gain through the 4-H Outdoor Skills program?

2.) Which best describes your child’s problem solving skills?
   A. He/she can handle any challenge
   B. He/she can handle most challenges
   C. He/she gets frustrated easily

3.) Which best describes your child’s level of responsibility?
   A. Completely irresponsible
   B. Somewhat responsible
   C. Very responsible

4.) What is your family’s physical activity level?
   A. We are a couch potato family
   B. We are a moderately active family
   C. We believe an active life is the only way to go

5.) How does your child score in their science classes at school
   A. A student
   B. A-B student
   C. B-C student
   D. C student
   E. C-D student
   F. D-F student
   G. F student

6.) How involved with your child’s 4-H projects are you?
   A. I am very involved
   B. I am aware of his/her projects and help when asked
   C. I feel lost with his/her 4-H projects and don’t know a lot about it
Outdoor Skills Program Parent Survey Post Evaluation

Child’s name_____________________________________

7.) What knowledge and skills did your child gain through the 4-H Outdoor Skills program?

8.) Which best describes your child’s problem solving skills?
   D. He/she can handle any challenge
   E. He/she can handle most challenges
   F. He/she gets frustrated easily

9.) Which best describes your child’s level of responsibility?
   D. Completely irresponsible
   E. Somewhat responsible
   F. Very responsible

10.) What is your family’s physical activity level?
    D. We are a couch potato family
    E. We are a moderately active family
    F. We believe an active life is the only way to go

11.) How does your child score in their science classes at school
    H. A student
    I. A-B student
    J. B-C student
    K. C student
    L. C-D student
    M. D-F student
    N. F student
Participant Interview Questions (During Intervention)

How long do you think you spend each day with your phone, video games, TV, Ipad, etc.?

How does this activity or camping experience change how you feel about the environment?

How do think that humans have impacted the environment?

How do you care for the environment?
Parent Interview Questions

How does your child perform in their science coursework at school?

How has this club affected your child’s level of responsibility, problem solving skills, etc.?
APPENDIX B

YOUTH WETLANDS CURRICULUM
Watersheds
Teacher Instructions

Focus/Overview
This lesson introduces the student to the features of a watershed. Students will learn to use topographic maps and identify how the shapes and contours of their community affect the path of their local watershed.

Learning Objectives
The students will:
• Become familiar with the geography of their community using a topographic map
• Locate and mark their homes, school, waterways, sewage treatment plant and any industrial plant on the map
• Determine how local shapes and contours of land features affects water watershed

Materials List
• Topographic (topo) maps covering your community (teacher provides – see instructions)
• Aerial photograph of your community/region (teacher provides – see instructions)
• Colored pencils or crayons
• Sample topo map of a hilly area

Grade Level Junior High High School

Duration
One class period

Setting
The classroom

Vocabulary Topography map Tributaries Watershed
Aerial photograph

See G.L.E. table in the index.
• Photograph showing flat wetland topography and a photograph of a hilly area
**Background Information**

Water is the most powerful force on the earth. It connects all things and touches all. Life would not exist without the presence of water. People are so used to having water easily available to them that most probably do not give any thought to where the water comes from. Every glass of water has its origin in the natural world, and the water molecules in the glass have been traveling around the planet through most of Earth's history. At different times these molecules may have been rain, water vapor, water in rivers or oceans, frozen in glaciers or inside a living organism.

To become a glass of drinking water, these water molecules came to a local area, were collected in local wells or reservoirs, and were pumped to a local faucet by a water utility company. The way this water traveled from rainwater along the ground to a reservoir is through a watershed. (See the Water REcycled Lesson for more information on the water cycle).

Each of us lives in a watershed. A watershed is all of the land that drains into a specific water body, which may include lakes, rivers, and streams. So no matter where someone may live, everyone is connected to the ocean via their local watershed. Watersheds can be as small as a few acres or as large as a subcontinent. It is important to know where your watershed is located because we rely on these areas for water and other natural resources. What we do on the land impacts the quality and quantity of water and our other natural resources.

Watersheds are a concern for many people because of issues of water quality and contamination. Healthy watersheds are vital for a healthy environment and economy. Our watersheds provide water for drinking, irrigation and industry. Many people also enjoy lakes and streams for their beauty and for boating, fishing and swimming. Wildlife also needs healthy watersheds for food and shelter. Contamination in rivers and streams not only affects human water supplies, but it has a major effect on the wildlife that depend on these watersheds for water and who do not have access to filters or water treatment plants. Because a river's watershed may extend across an entire state, or even more than one state, if there is a contamination problem in that watershed, it is necessary to look at the entire watershed to determine where the contamination might be coming from.

**Topographic Maps**

A topographic map is one that uses contour lines to portray the shape and elevation of the land. The lines represent the three-dimensional ups and downs of the terrain on a two-dimensional surface. Topographic maps usually show both natural and manmade features, including mountains, valleys, lakes, rivers, vegetation, roads, boundaries, and major buildings.

The U.S. Geological Survey (USGS) produced its first topographic map in 1879. The wide range of information provided by topographic maps make them extremely useful to professional and recreational map users alike. Topographic maps are used for engineering, energy exploration, natural resource conservation, environmental...
management, public works design, commercial and residential planning, and outdoor activities like hiking, camping, and fishing.

Topographic maps are also useful when trying to determine where a watershed is located. When contour lines are overlaid on a regular map, information about the landscape is revealed in the patterns among the swirls of the contour lines. The edges of a watershed are usually found in the highest areas and finding watershed boundaries can be as simple as finding the highest points around a waterbody and connecting the dots.

Definitions:

**Tributary** - of a stream; flowing into a larger stream

**Contour Lines** - lines on a topographic map that represent the shape and elevation of the land

**Watershed** - specific land area that drains water into a river system or other body of water.

**Aerial photograph** - image of Earth's surface taken from an aircraft.

**Advance Preparation**
- Download topographic map of the surrounding community the using the following instructions:
  - Go to [http://terraserver-usa.com/default.aspx](http://terraserver-usa.com/default.aspx)
  - Type in the physical address of the school (or another local address) in the cells on the top left corner of the page and click GO.
  - The Address Search Page will then come up where you will select what map you would like to view. *(See below for example of page)*
  - Click on the related Topo Map *(as shown by arrow above)*
  - This will bring up the selected Topo Map. You will need to zoom in and out to get the desired area.
  - When you have the desired area on screen, hit PRINT in the upper right corner.
• You will now have a topo map of your local area to use during this activity.
• If desired, instead of printing your local map, you can use the topographic maps provided of Alexandria, New Orleans, and Shreveport, Louisiana (found in Student Activity Sheets).
• Divide the class into groups of four or five.

Procedure
1. Review the background information on watersheds and topographic maps. Lead a class discussion using the following questions:
   a. Ask the students if they know what a watershed is?
   b. Ask them to describe a watershed. (*They may be able to describe one but not able define it*)
2. Define a watershed to the students.
3. Show a picture of the Mississippi River Drainage Basin and tell students that about 40% of the United States is within the Mississippi watershed. The basin covers more than 1,245,000 square miles, including all or parts of 31 states and two Canadian provinces. Review the General Wetlands Information at the front of the binder for more information.
4. Tell students that the small branches on the map of the Mississippi River watershed represent the small rivers and streams draining into the larger river. Then the larger rivers drain into the Mississippi River and these are known as tributaries to the Mississippi River. Smaller waterways that carry water out of the Mississippi River into the Gulf of Mexico would be known as distributaries of the Mississippi River.
   a. Tributaries bring water into a larger river and distributaries drain water out of a larger river into smaller streams and rivers.
5. Pass out the topographic (topo) maps of the local area, the hilly area (Brandon, Louisiana), and the mountainous area (Jackson Hole, Wyoming).
   a. Do not tell the students the location of the maps.
   • Ask student if anyone knows what these maps are and what they are showing?
   • Using the background information, lead a class discussion on topo maps.
   • Divide class into group of no more than 5 students.
   • Have the groups study the study the maps and come up with some differences that they notice between the maps.
   • After every group has come up with some differences, solicit answers from the class.
   • At the front of the class, hold up the local topo map.
   • Tell the students that this map is showing the area around their school (or somewhere nearby). Using what they know about the area, have them relate the landscape to what is on the map. Are there rivers on the map that they are familiar with? Roads? Buildings?
   "The contour lines are far apart on most of these local maps indicating a flat landscape. In most areas of Louisiana, we have very small differences in
elevation. In other areas they are huge difference which can be more readily seen on topo maps.

- Then hold up the topo map from the hilly area. Ask students to describe what they think this map is showing. How does this map differ from the local map? What do they think the landscape would look like in this area?
  - *The lines closer together indicate a change in elevation; the closer the lines, the steeper the hill.*

- Now hold up the map of the mountainous area. Ask students to describe what they think this map is showing. How does this map differ from the local map? What do they think the landscape would look like in this area?
  - *These lines will be very close together, indicating drastic changes in elevation that is seen in mountain ranges.*

- Now have the students discuss the differences between the three maps. You can now reveal the location that each map is showing.

- Looking at any of the maps ask students to identify some important features such as:
  - Waterways
  - Hills
  - Flat areas
  - Levees
  - On the local map, can they identify where their school is located?

- Now looking only at the local map, have the students try to find the high and low ground.
  - The students should look for contour lines running parallel to one another.
  - Then they should try to locate a number next to one of those lines. Have them raise their hands when they find it. This number tells us how many feet above sea level this area is located.
  - Now everyone should look for the largest of these numbers on the map – this would be the highest contour in this area.
  - Now everyone should look for the lowest number on the map – this would be the lowest contour.

- Ask students what do they think would happen when it rains in this area? *Students should reference how water will flow from the high to the low ground.*

- Now that they have identified the highest and lowest points on the map have them locate any waterbodies found in the area (*the map must be zoomed out enough to include a body of water to complete this part of the exercise*).

- Using the high and low contour numbers, have student determine which direction they think these waterbodies would flow. (*The water would flow downhill.*)

- Have students identify and color code major landmarks on their map. Color buildings in black, parks in green, major roads in red, and water features in blue.

- Draw blue arrows along the creek sowing the direction that water flows.

- Identify the elevation of several features that have been labeled. Write its elevation beside your label.
• Identify 10 hills or ridges on the map. Draw a green “X” on top of each of these hills or ridges.
• Imagine a drop of rain falls on each hilltop you just marked. Where will the raindrop go?
  • If water from that hilltop *could* find its way into your local creek, draw a circle around the “X” on that hilltop.
  • If water from that hilltop *cannot* find its way into your local creek, leave it blank. Remember, water will always run downhill. Help students recognize what is downhill and what is uphill.
• Look at the circled “X”s. Starting at the circled “X” nearest the mouth of our creek, connect the dots between the X’s until you have drawn a “U” shape all the way around the creek.
• Lightly shade the “U” shaped region in yellow. You have now mapped your watershed!
• When everyone has mapped their watershed, lead a class discussion on why they think it is important to know how to read topo maps. The following questions can be used:
  • What would happen if the water flowing from the high ground was polluted? Would that affect the communities lower than it?
  • How does the local landscape affect the path of a watershed?
  • How would the landscape affect the students personally? In their recreation time? In their job?
  • Does the local landscape play any roles in the community, tourist attractions, wildlife habitat, provide jobs, etc?

**Blackline Masters**
• Topographic map of your area (*teacher provides*)
• Topography map of a hilly area

**Resources**
Watersheds
LSU AgCenter and Barataria-Terrebonne National Estuary Program (BTNEP) Wetland Activities.

[http://www.scaquarium.org/curriculum/ixplore/sixth_eighth/units/watersheds/water_print.htm](http://www.scaquarium.org/curriculum/ixplore/sixth_eighth/units/watersheds/water_print.htm)

My Science Box Topo Tours Activity.
[http://www.mysciencebox.org/files/6topo_tour.doc](http://www.mysciencebox.org/files/6topo_tour.doc)