Fall 2017

Reducing Your Water Footprint: An Activity Packet On Water Conservation For Young Children

Mallory A. Colegrove
Hamline University

REDUCING YOUR WATER FOOTPRINT:

AN ACTIVITY PACKET ON WATER CONSERVATION FOR YOUNG CHILDREN

by

Mallory A. Colegrove

A capstone submitted in partial fulfillment of the requirements for the degree of Master of Arts in Education: Natural Science and Environmental Education.

Hamline University

Saint Paul, MN

December 2017

Primary Advisor: Patty Born Selly
Secondary Advisor: Sarah Cash
Peer Reviewer: Alan Colegrove

To my family, for cheering on curiosity, supporting science, and advocating for me to continue in academics,

To my friends, for understanding and still sticking around when schoolwork prevented me from going out and grabbing a cold one on frequent basis,

And last, but not least, to the Communication Marines of Combat Logistics Battalion 6 and Headquarters Battery, 11th Marines, of the United States Marine Corps, who gave me connectivity in every clime and place; I could not have accomplished my assignments, papers, and capstone, over a deployment and numerous field operations, without you.

“The single non-negotiable thing life requires is water.”
Dr. Sylvia A. Earle

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CHAPTER 1

INTRODUCTION

Overview

The world's oceans, rivers, and lakes - as vast and enduring as they may seem - are currently hinging on mankind's actions to stay healthy. Every action by every person in today's world is having a greater impact on our water resources, straining them further and further. Yet this important topic is often ignored, coming through only as media sound bites, such as the annual highlight of California being plagued by drought problems every year (Sherief, 2016, para. 3). The concern of water usage lingers only momentarily for the average citizen; this needs to change.

There are many avenues to be explored on the topic of water conservation. I have chosen to create a capstone that seeks to answer the question of how can young children reduce their water footprint? A footprint in connotation of the environment is defined as "the amount of the environment necessary to produce the goods and services necessary to support a particular lifestyle" (WWF Global, 2016, para. 1). By looking at my personal history with water, an analysis of where the issue of water conservation stands in today's times, and an in-depth look at a potential educational activity packet for young children focusing on water conservation, I can better share the purpose of this capstone.

My Personal Connection to Water

Water, for me, has always been a soothing presence. As a child, I was fortunate enough to snorkel waters in the Indian and Pacific Oceans, seeing colorful fishes, gliding stingrays, and dynamic sharks. I tried windsurfing, parasailing, and maneuvering on catamarans. I was fascinated by the animals that hid in the depths of water: any aquarium,

any pet store, any museum with remains of prehistoric ocean organisms - I begged my parents to let me go examine. I still possess a small rock I found at age six, with a small sea shelled organism fossilized on its surface that I found in a riverbed that I was exploring with my dad, who then explained to me what fossils were.

As a Captain in the United States Marine Corps, water was the one resource I depended on, for survival and reprieve. Out in the field on training exercises, I had countless times been grateful for water to pass through my dried lips, or water to splash onto my brow as we worked in the heat. Medically, water was applied to those in the field that were overheated, exhausted, or stricken with vomit and diarrhea, bringing a new breath of life. Water was also regularly applied as an alternate therapy to those suffering injuries, as its buoyant properties reduced the strain from other types of exercises, and allowed Marines to stay fit while recovering.

With water as a fond childhood memory of adventure, and a relevant component to my daily life, as I began my master's degree program, I found myself drawn to water-based courses. I took courses that focused on the biology of water organisms, water management across the world, and how ocean systems work and shape our earth. As I learned about these topics, I also learned about the complex issues that came with them. I learned about how my individual habits, good and bad, affected water as a resource. I learned about how my city was or was not addressing regional issues regarding water usage. I learned about global concerns on water. Everything tied back to water, and as I saw the connections, I wanted to keep learning more about the topic of water conservation in today's times, and, most importantly, how to reverse our negative actions that are wasting this precious resource.

Water Conservation Today

When I think of water, I think of always-flowing rivers cascading down from the tiptop of mountains into a wide mouth to be swallowed by the seemingly endless blue of the ocean. It is hard to envision water as a resource running low, drying up, with the life within it depths disappearing or dying. And yet, it is, if we continue down the path we are going. National Geographic's website has a focus section entitled *Freshwater Crisis* that shares, "while nearly 70 percent of the world is covered by water, only 2.5 perfect of it is fresh" (para. 3) and in turn, easily accessible, which means, "in essence, only 0.007 percent of the planet's water is available to fuel and feed its 6.8 billion people" (para. 3). Worse still, the stress we are currently putting on this small source of freshwater has predictions that "by 2025, an estimated 1.8 billion people will live in areas plagued by water scarcity, with two-thirds of the world's population living in water-stressed regions as a result of use, growth, and climate change" (National Geographic, 2016, para. 8).

Water conservation issues are found in a range of subjects: from how each individual in a cookie cutter suburbia neighborhood uses water, to mismanaged farming and agricultural techniques, to government adjustments to rivers' natural courses, such as the creation of dams, and to global conundrums, such as climate change and the effect the warming temperature has on water resources. Because of the wide variety, I chose to pick a topic I felt highly interested in, which was the focus on standard usage of water by citizens. Because I feel strongly that one's family, friends, community and childhood exposure structures one's outlook and actions in life, I wanted to examine in particular at how to influence children at an early age, so they are exposed to and value water conservation, changing their behaviors in their own day-to-day life.

The U. S. Geological Survey (2016) noted on the topic of average water usage that a single person could use from 80 to 100 gallons in a single day, which means that a family of four could easily use, on average, almost 11,000 gallons per month, or 130,000 gallons per year. The U.S. Geological Survey (2016) gave us a breakdown of the average amounts of usages with different household activities (see Table 1).

Table 1

Average Water Usage, Provided by U.S. Geographical Survey on 2 May 2016

Activity	Amount
Bath	36 gallons
Shower	5 gallons per minute
Teething brushing & Hands/Face Washing	Faucet: 1 gallon per minute
Dishwasher	Up to 16 gallons per cycle
Washing Dishes by Hand	Depends on efficiency; potentially 27 gallons
Clothes Washer	40 gallons per load
Toilet Flush	4 gallons
Outdoor Watering	2 gallons per minute; lawn size dependent

Someone might think, “But I need all of those activities in my life! What am I supposed to do, stop using my toilet? Never shower again?” That type of mentality misses the overall point of the data. Environmental educators should seek to emphasize that what this usage tells us is simply that people need to change their habits. Modern technology has allowed for a more sanitary, hygienic world that is beneficial to millions of people in quality of livelihood; it has also allowed for the development of green technology in supporting the environment. Rather than give up modern devices, people need to adjust how they use them, which means changing their habits. Habits occur when behaviors done repetitively become automatic, as “it gives us an advantage, because the brain does not have to use conscious thought to perform the activity” (Wein, 2012, p. 1).

Strategies to break habits include awareness of the habit, avoidance of stimulation that encourages the habit, and replacing the old habit with new ones (Wein, 2012, p. 2). In terms of water conservation, this means people need to be aware of their water habits, educated about alternate ways to use water in a more environmentally friendly manner, and seek to proactively change to adhere to these beneficial methods.

In order to communicate this message, I want to use an activity packet and I want to focus on young children. An activity packet can be tailored to fit a wide range of learners, may be engaging and fun while also being educational. I can promote water conservation through a variety of activities and these activities can promote awareness, habit breaking, and instilling of environmental values.

An Educational Activity Packet

My research question will be answered by the creation of a written curriculum guide in the form of an educational activity packet on the topic of water conservation. It may be utilized by individual households, specifically targeting young children in grades K-3. This packet can be distributed by schools, educational districts, or nonprofits to promote the topic of water conservation. The activity packet contains activities created from scientific topics; the activities are derived from effective educational methods that best support independent work and informal education mechanisms and result in long term effects. The end goal is make water conservation a continued practice by young children, even after completion of the activity packet.

An activity packet is a "unit [or] lesson plan…[that can] supplement existing curriculum in schools…[or] enhance education programming in nonformal settings…[and incorporates] STEM [Science, Technology, Engineering and Math],

reading, writing, and social studies" (PLT: About Us, 2016, para. 6). In addition to this, "the activities are practical, hands-on, and fun, and align with state and national academic standards" (PLT: About Us, 2016 para. 7). These packets can be extremely effective. Project Learning Tree (2016) is an educational outreach program that successfully develops activity packets. Students "who were exposed to PLT for two to three weeks…[showed] the equivalent of seven months of exposure" to environmental issues in terms of knowledge, as well as reported back a higher "interest in careers in STEM…, namely environmental sciences and engineering" (PLT: Why PLT Works: Research & Evaluation, 2016, para. 1-2). An activity packet for water conservation would see water conservation as the topic, and the activities would relate to specific water subjects, covering scientific and environmental knowledge. Additionally, the activity packet would also include a multitude of educational practices, such as reading, writing, and mathematic and scientific skillsets, to ensure that the children are being introduced to and practicing differing educational areas.

Part of the success of an activity packet depends on the educational theories used to shape it. Several different educational methods must be analyzed to see which would have the most valuable impact on an activity packet. The selection of educational methods is important as "a variety of teaching methodologies….[allows] for the range of learning needs and requirements that are present within most class environments" and each have "various advantages and disadvantages" (Campbell, Farrows, & Riley, 2004, para. 1). Different methods are appropriate for different environments and students and this must be taken into account when creating an informal, at-home activity packet for young children to utilize.

Conclusion

Water is something that I encounter daily in my life. It is a necessity that everyone needs, as our modern day crisis has shown us. Despite this, people are unaware of how much they are overusing the water at their fingertips, that they are taking for granted. In order to help bring awareness, I intend to make this capstone into a curriculum based guide, in the form of an activity packet, that young children can use to learn about the water footprint they are making. There are many avenues that can be explored in the effort to change our water usage, and I want to explore the path of educating children early on in relation to environmental values and water conservation. In Chapter 2 I conduct a literature review of the history of environmental education (EE), the important issue of water conservation, evaluate three childhood development theories in their effectiveness, examine the role of habits and environmental behavior, and address the topic of parental involvement in an activity packet. These subjects will ensure the activity packet is an effective tool for ensuring young children learn and, in turn, practice water conservation.

CHAPTER 2

LITERATURE REVIEW

Introduction

The goal of this capstone is to create a water conservation activity packet for use by young children, resulting in long term, positive water habits as an ingrained value. The question is how to get young children to reduce their water footprint? In order to have an activity packet where this outcome occurs, there are several areas that must be examined. A history of environmental education (EE) within schools, and water conservation as an issue today, should be looked at, in order to understand the modern views towards the subject, as well as why it is important to us as a society. Because the packet is targeted towards the early primary age group, it is also important to research how children learn at that age and to figure out what educational theories are most successful, and then to subsequently intertwine them into the activities. Examining the science behind habits is also an important topic to review in relation to environmental values. Finally, a note will be made on the importance of parental involvement as well as a caution that this activity packet will not be able analyze the individual impact of a parent. Understanding the above areas will provide the reader the appropriate understanding being the activity packet itself in Chapters 3 and 4 and Appendix A.

1970 to Today: Changes in Environmental Education in Schools

The first Earth Day on April 22, 1970 can be seen as a symbol for the modern EE movement, a national event that had slowly been brought to fruition by events such as Rachel Carson's novel *Silent Spring*, published in 1962 with a damning account of pesticides poisoning our foods, or Ansel Adams, who over several decades took

breathtaking photographic works of our vast nation's lands which brought about a public urge to preserve our lands (Switchback Travel, 2016, para. 40, 42, 64-65). With the public eye focused on ever-growing environmental concerns, the modern environmental movement slowly trickled down into the nation's school systems into the form of EE.

The 1970s saw unorganized efforts to incorporate EE within schools. In 1970, President Nixon signed the National Environmental Education Act, the first national effort to enforce the teaching of it as a subject, establishing the Office of Environmental Education, providing grants, curriculums, and teacher training (Baker, 2000, para. 1). Sporadic, but well intended, no one really knew how different programs or methods were developing. President Schoenfeld of the North American Association for Environmental Education (NAAEE) recognized the irregular development and "in May 1980,...invited a large group of interested NAAEE members to meet with him to...discuss the need for...compiling a document...containing abstracts and/or summaries of the increasing body of environmental education research" (Iozzi, 1981, p. 5). Entitled *Research in Environmental Education 1971-1980*, it compiled works that spanned across the past decade, and provided illuminating results as to how EE was slowing developing across the nation. The different bodies of works examined were found to vary greatly.

The compilation of works found that school systems were gradually turning EE into a topic of substance, but struggling as to how to present it. One study examined 33 states and their EE programs for grades K-12 (Iozzi, 1981, p. 29). Interviews were done, questions were provided, and a variety of curriculums were analyzed. The outcome of this study, done in 1975, found that, "environmental education programs are very slowly growing in the 'right' direction" (Iozzi, 1981, p. 30). In a similar vein, a 1978 study

contacted 24 state specialists and asked them to “rank order the most commonly used textbook series”, of which “the top five…were analyzed for environmental generalization” (Iozzi, 1981, pp. 37-38). In relation to content of the textbooks, “it was concluded that the treatment of environmental topics is extremely uneven within any given series as well as among series” and that only students “who used most of the series received considerable exposure to environmental ideas” (Iozzi, 1981, p. 38). This assessment shows that the information in the 1970s was slowly being included in classrooms but, similar to the first study, standardization of EE material was varied.

With interested educators taking time to examine how EE was being executed, the eventual outcome was, over time, more solidified focuses in EE by schools. While the early period of modern EE (1970-1980) was reflected as a question of how were people teaching it, and the questions of, Is it being implemented? Is it even working?, by the 1990s, a shift could be seen. It was being implemented and it was working; the focus now was a creation of theories in regards to how to effectively teach EE. For instance, a study in 1996 on EE felt that there were two key concepts that needed to be addressed, which were that, one, “children must develop a sense of respect and caring for the natural environment during their first few years of life or be at risk for never developing such attitudes” and two, “positive interactions with the natural environment is an important part of healthy child development...and that such interactions enhance learning and quality of life” (Wilson, 1996, p. 6). The same study emphasized that all the outdoor experiences should be simple and positive, an actual experience (versus a lecture), and be tied into personal enjoyment, with an overarching theme of caring for the environment (Wilson, 1996, p. 4). This theory was grounded in the concept that young children could

only focus so much and their multiple senses needed to be stimulated in a positive environment. For instance, by going out to the park on a sunny day and being encouraged to turn over rocks (touch), look closely at the worms (sight), and smell the fresh dirt (smell), all the while being encouraged to explore (positive connotations), a child would then have a positive response to the environment and would develop a strong internal interest in it as a value (Wilson, 1996, pp. 3-4).

Another study from the 1990s parroted this type of theory behind how children should best learn to value the environment through classroom EE curriculums. In the second study, the author found that "children need to be in the position where they are the explorers, the innovators, and the teachers" (Webb, 1997, p. 3). He noted that children need and "want to experience things first-hand --- theory means little or nothing to them;" children do best when an experience is "touchable" and "fun" (Webb, 1997, p. 1). He elaborated that ways to expose children to nature vary greatly, but the study found that numerous different efforts, such as recording nature journals in quiet time, produced from berry ink with a stick serving as a pen, or sitting outside in a circle and sharing the nature they had seen that day, can serve to intertwine children into nature (Webb, 1997, pp. 5-7). Both studies found that interactive sessions for children where they were allowed to explore and be in control, all within a positive environment, were arguably more effective means than others methods.

The 1990s were a time period of schools actively implementing EE and trying to find ways to impart EE values into children. While this progress was being made, the 2000s revealed an interesting shift in new goals of EE. A textbook from 2005 noted that EE methods "changed from a 'nature study'...of the 1960s and early 1970s to an action

research and social sciences-oriented perspective of the 1990s" to where we are today (Palmer & Birch, 2005, p. 114). Palmer and Birch found that over the decades, the EE field split into many different areas, which helped spread the subject in numerous ways to numerous people, "however, the existence of so many related yet distinct elements of the evolving field has led to fragmentation, conflict, and number instances of needless reinventing of wheels" (2005, p. 116).

This is important to take note of, because spread too thin in too many ways, means a weakening of EE's effectiveness overall. Areas that Palmer and Birch found lacking were examples such as, "only 12 percent of respondents cite teachers and peers as important influences" or that "science classes account for only 5 percent of the adolescent sample's interest in wildlife" (2005, p. 123). This reveals that while EE is being taught regularly, it has not been delivered in a method to make it a value as the 1990s hoped to see happen. Schools implementing EE were supposed to be a catch-all, if families, communities, and society were failing to teaching children environmental values but instead, it is questionable as to how well this dream is playing out.

Palmer and Birch found that while EE was being taught, there was a lack of "knowledge of *courses of action*" being included, with curriculums lacking as to "how and why certain environmental knowledge...is relevant to them" (2005, p. 126). In tandem with this, they found conflicting results as to whether global topics are highlighted too much over local topics, resulting in students not connecting their immediate actions in their immediate environment; Palmer and Birch advise that, "this evidence provides the same message: environmental education...should include exploration of local issues and personally relevant...matters for learners" (2005, p. 126).

A study by Blumstein and Saylan from 2007 corroborated this, finding that when it comes to EE, the goal is to teach people to improve Earth, and yet most efforts have "been wasted, because outside of the classroom, people have failed to make the link between their individual actions and the environmental condition" (2007, para. 7), using examples of fuel consumption, car sizes, and recycling not always being done in a green manner. A focus on tipping points in environmental balance, over-consumption, conservation legislation, and "teaching where and how resources come from - that food, clean water, and energy do not originate from supermarkets, taps, and powerpoints" are critical topics that need to be added to curriculums (Blumstein & Saylan, 2007, para. 19).

After more than four decades since the modern EE movement began in schools, the modern critique as viewed by Blumstein and Saylan is that EE needs to continue to shift from being concerned for the environment to having curriculums that utilize critical thinking, using the example of how singular topics within EE can be extremely complex. With this in mind, this capstone will focus on the singular topic of water conservation.

Water Conservation, a Topic of Growing Importance

Water is a resource that people use every single day; a resource that humans depend on to survive. Drinking, bathing, growing food; the uses are many. What people are only starting to realize is how much of strain we have put on the resource in modern times. Plagued by pollution, over-usage, and waste, and we need to reverse this before we cause irreparable damage to the environment. Understanding how we got to where we are today in terms of usage and examining how schools are currently attempting to educate on this topic can help form a water conservation activity packet to be as effective as possible.

Fagan, a renowned British archaeologist, published the book *Elixir: A History of Water and Humankind* in 2011, exploring the history of humans and water. He wrote how the need for more water usage resulted in a change in water management over history, finding better ways to direct water flows and utilize water sources. Early farmers used "simple furrow irrigation, the diversion of stream and river water into nearby fields" (Fagan, 2011, p. xx) while ancient cultures, such as the Egyptians, took note of the annual "inundation flooded basins in the floodplain" (Fagan, 2011, p. xxi). Later water flow innovation continued to shift the paths of natural water flows. Irrigation systems utilized by Assyrians and Sassanians, and aqueducts, waterwheels, and mills used by Romans, transported water from far away, while Iran and Peru both created "groundwater-tapping" efforts that were "gravity-fed, human dug tunnels that tapped groundwater" (Fagan, 2011, p. xxii-xxiii). Perhaps the largest change to water flow was the Industrial Revolution, which "changed the entire water equation for humanity with pumps and earthmoving machinery that opened up hitherto-inaccessible water supplies" (Fagan, 2011, p. xxiii).

While impressive to witness the ability of humans to navigate water supply problems, all this technological advancement had an unintended effect: that today we have strained our resources. Currently, "more than half the world's population - and approximately half of the global grain production will be at risk due to water stress by 2050…[and] 45% of the GDP ($63 trillion) will be at risk" (Growing Blue, 2016, para. 7-8). In the United States alone, the Colorado River supports seven states along with the country of Mexico, and yet since 2000 "has been experiencing a historic, extended drought…[and] experienced its lowest 16-year period of inflow in over 100 years of record keeping" (U.S. Department of the Interior, 2016, para. 1-4).

While there are many reasons for why water strain is occurring globally, this capstone's focus is on the actions of individual people. In 2011, a poster by The Nature Conservancy shared that the average American's water usage is 751,777 gallons per year, per person (Mekonnen & Hoekstra, 2011, Poster). In 2014, the Los Angeles Times titled an article "*Americans use twice as much water as they think they do, study says,*" (Morin, 2014, Title). Clearly, people are using water, but in what ways? Morin found that people were oblivious to immediate factors, such as the fact that "28%…of water used within the average household is the result of toilet flushing" (2014, para. 6), but were also ignorant to what could be considered secondary or tertiary water usages, such as the amount of water needed to make consumer products, like the fact it takes "2,264 gallons for a pound of coffee" (Morin, 2014, para. 16, 18). Continued excerpts from the study by Mekonnen and Hoekstra as shared by Scientific American finds that the United States consumes "1,053 billion cubic meters" per year, and that within this, "meat consumption accounts for 30 percent of the American figure, and sugar consumption is responsible for another 15 percent" (Fischetti, 2012, para. 2). Imagine the difference our footprint would be with less meat and sugar consumption alone! The two scientists went on to share that while the average American is at 2,842 cubic meters for yearly water consumption, in India, "where few people consume much meat, the individual footprint is only 1,089 submit meters a year" (Fischetti, 2012, para. 2).

The Water Footprint Network helps explain how different types of water usage can be found from three different sources, categorized as blue water, green water, and gray water footprints. The footprints look "at both direct and indirect water use of a process, product, company or sector and includes water consumption and pollution

through the full production cycle from the supply chain to the end-user" (Water Footprint Network, 2016, para. 6). Green water encompasses what plants naturally store, blue water consists of agriculture, commercial business, and household use, and gray water is water needed to help absorb pollutants entering water so that water quality standards are met (Water Footprint Network, 2016, para. 8-10). These are important concepts when it comes to understanding our water footprint. For green water, certain plants and agriculture may naturally grow well in certain regions based on natural rainfalls and water sources - these are the crops should be grown, rather than attempting to force crops to grow in areas they would not naturally grow in by pumping large amounts of water in. When it come to blue water, understanding the behaviors and actions we take, along with the improvement of technology, can lead to more efficient water usage. Gray water is of particular importance because pollution can not be easily absorbed. The study of how to reduce pollutants in general, how to reduce pollutants and runoff into water in particular, and the study of natural ecosystems such as the ability of wetlands to absorb some pollutants, are all important areas to explore.

This increasingly important and complex topic of water usage, and the push of the modern EE movements, has seen schools becoming quick to embrace a thorough education on the topic. Texas, which is facing drought issues, has implemented several different programs, with success (Vigh, 2015, p. 18). Water4Otter, which attempts to teach children about how water is a limited resource and the importance of conservation, found that "78 percent of the 3,000 students who returned the surveys participated in water-related conservation activities with their families at home" (Vigh, 2015, p. 20) afterwards. The International Junior Master Gardener has a Texas area club, and within it

they support the philosophy that children learn by doing. They teach children topics many environmental and water conservation topics, such as "the appropriate selection and use of landscape plants and mulch and irrigation techniques that minimize water loss in gardens" (Vigh, 2015, p. 19); after the program, "research…indicated that children became more actively involved in the community and environment" (Vigh, 2015, p. 20).

California, amid its drought concerns (Sherief, 2016, para. 3), has also sought to expand education on the topic. In 2015, the State Water Resources Control Board gave over $30 million to 30 school districts "to educate students and create on-campus projects relating to...water conservation" (Barajas & Kostyrko, 2015, para. 1). With results due back by 2019, topics cover an array of water conservation issues and include projects by schools and students such as "vegetated swales; stormwater planters; pervious paving; rainwater harvesting and water-wise landscape" (Barajas & Kostyrko, 2015, para. 5).

Similar to Texas, California appears to be following two methods: getting the information out there and allowing students to act on it. This is an important take away for an activity packet. While the literature review will examine childhood developmental theories and early educational theories in the next subtopic, it is important to pause and identify the observation that not only must children be taught, but they must try out the information they have learned. Field trips, experiments and projects, and interactive engagements are all components of a successful activity packet.

Three Child Development Theories and Their Effectiveness

With the importance of EE and water conservation understood, we arrive to the next question: how do we teach water conservation as a value in a child? Children undergo many developmental changes, mentally, emotionally, and physically, as they go

through early school years. “Child development experts indicate it is during these years that children develop linguistic, cognitive, social, emotional, and regulatory skills that predict their later functioning in many domains” (Bakken, Brown, & Downing, 2017, p. 255). This ties into the idea that establishing environmental values, as “the frequency, nature, and quality of child-environment interactions during the early years” (Wilson, 1996, p. 2) is key to ensuring such values become part of a child’s lifestyle. This capstone purposefully chose to cater towards this age group due to the above; by introducing the topic of water conservation during these developmental years, it stands a greater chance of becoming a value for the children that utilize this activity packet.

Three major child educational theories informed the development of my activity packet, serving as its foundation: the play-based learning theory, the whole child concept, and the multiple intelligences theory. These theories will be useful to utilize in the activity packet for two reasons: one, they are supported by research as being effective early childhood education methodologies and two, they have been found to be effective in shaping environmental values at a young age.

Play-based Learning. The first theory is play-based learning. Play-based learning accepts that “play is the natural activity of children” (Oltman, 2002, p. 20). Unfortunately, “play is often considered frivolous or ineffective” with the concern that “children are not learning if they are playing,” which is an erroneous assumption - when a child plays, “the mind, heart, and body are fully engaged and…learning happens!” (Oltman 2002, p. 20). Copple and Bredekamp originally presented the play-based theory in their work entitled *Developmentally Appropriate Practice in Early Childhood Programs* in 1997. They shared “the critically important role of play in young children’s

development…[and that] there are many different kinds of play --- constructive...pretend...games...rough-and-tumble --- offering different potentially benefits for children" (Copple & Bredekamp, 2009, p. 47). They go on to explain that it is critical to keep in mind "that higher-level play does not automatically unfold on its own [and] teachers have essential roles in ensuring that play meets its potential...to effectively use play to promote children's development and learning" (Copple & Bredekamp, 2009, p. 47). Their theory has been backed up by research. Recent studies of current school systems are finding that lack of play is resulting in students "drift[ing] into underachievement and disengagement and fail[ing] to make progress in their learning…[because while they] start in education with an enthusiasm for learning…learning is no longer a fun activity but a tedious means to an end" (Briggs & Hansen, 2012, p.4). The benefit of play is that it can be a medium to learn skills and educational concepts, through a variety of means that keeps the material engaging to students and, in turn, makes students successful. Play-based learning encompasses the "behavourial/physical domain…, affective/emotional domain…, cognitive/intellectual domain…,[and] social/cultural domain" (Briggs, & Hansen, 2012, p. 4).

Mary Rivkin conducted an analysis of play-based learning from the viewpoint of outdoor experiences and play and how it affects early childhood development and education. Playing outdoors provides "the broad experiential base provided by being outdoors [and] the knowledge they gain there is foundational to literacy and science learning" (Rivkin, 2000, p. 2). The venue of the outdoors as a source of learning is endless. "Toddlers require places and spaces for acting out prepositions...because their physical development is paramount and fuels their cognitive development...preschoolers

continue rapid physical development, and with increasing social and language skills, require a yard with many opportunities...primary children need much of what preschoolers need but also require places to sit, read, talk, draw, and do homework" (Rivkin, 2000, p. 4-5). What is frequently dismissed as play without any value towards a child's development is actually critical to the child. The ability to physically engage in the environment, be it climbing a tree or smelling and feeling fresh soil, combined with the ability to emotionally explore the environment, such as a child being curious about a bug, or kids interacting together to pick and blow dandelions in a field, contribute to their overall emotional, mental, and physical development.

A study by Allen Cooper reinforces Mary Rivkin's work's analysis and the play-based theory, but shows how environmental values can be instilled. Cooper did an experiment focusing on the best practices for improvement of outdoor spaces for children to play in, and the subsequent benefits from said improvement. Play in tandem with the outdoor "promotes cognitive development…[and] improves academic performance,…[with] nature-based experiential education show[ing] significant student gains in social studies, science, language, arts, and math" (Cooper, 2015, p. 87). Other benefits included "improves self-regulation and reduces stress and aggression….[and] lessens the symptoms of ADHD" (Cooper, 2015, p. 87), all of which would be important to educators and parents. The added benefit of playing outdoors included "builds environmental stewardship…[where] a number of studies indicate that childhood contact with nature contributes to shaping a lasting environmental ethic and an interest in environmental professions" (Cooper, 2015, p. 88). Cooper was citing the work of Wells

and Lekies, who conducted a 2006 study pertaining to environmental attitudes. They did so by arranging for,

> a large telephone survey, which interviewed about 2,000 individuals, 18-90 years of age, in over 100 urban areas in the United States…[and] found that childhood participation with wild nature (e.g., hiking camping, or playing the woods), had a significant, positive effect...[and] were more likely to have pro-environmental attitudes and behaviors as adults" (Wells & Lekies, 2006, para. 1).

This increased environmental interest is exactly what we seek to develop in children.

Whole Child Concept. Similar to play-based learning in the blend of mental, emotional, and physical ties is the whole child concept. The whole child concept addresses the idea "that the child includes…body, mind, and spirit" (Miller, 2010, p. 8) and requires "whole teaching [meaning teachers] need a broad range of teaching approaches that reach these different aspects of the child" (Miller, 2010, p. 9). For the mind, a child's natural curiosity can be capitalized on, and children should be encouraged "to think critically and creatively" (Miller, 2010, p. 8). With the spirit, it is important that a teacher be caring and present for their students because they can be the single role model that changes their lives (Miller, 2010, p. 9). As for the body, children should be encouraged to move and engage, participating in "games, music, and sports" and other activities (Miller, 2010, p. 9).

This embrace of the whole child concept manifests itself in a similar theory found in early childhood development called the Reggio-Emilia approach. Established in

Reggio Emilia, Italy, after World War II, it carries the mantra, “the hundred languages of children” (Kang, 2007, p. 45). In the Reggio-Emilia concept, teachers strive to create “appropriate learning environments where [they] could nurture strengths, potentials, and diverse needs of young children” (Kang, 2007, p. 65). The Reggio-Emilia schools do this by providing a combination of natural and recycled materials of all sorts of shapes, types, colors, and sizes, and, armed with a sense of openness and respect towards both children and creativity, the teachers “provide opportunities for [children] to collaborate to develop the relationships that enhance their social and emotional competencies” (Kang, 2007, p. 47-48). Teachers avoid providing direct teaching, instead attempting to encourage children to work with one another, with the end result being exponentially varied; collaborative work among students often saw children adding “their ideas, stories, and feelings to what their friends did before them” on projects, allowing “for children to extend and broaden each idea with different perspectives” (Kang, 2007, p. 48). The Reggio-Emilia approach in early childhood development allows for the individual child to go with where their interests are, exploring, creating, and inquiring in a way that appeals to their body, mind, and spirit, under the open-handed guidance of their teachers.

Like the play-based theory, not only is the whole child concept a solid early childhood education method, but it is also capable of instilling environmental values. The openness of the body, mind, and spirit concepts promotes this. Dr. Ruth Wilson states, “environmental education based on life experiences should begin during the very earliest years of life. Such experiences play a critical role in shaping life-long attitudes, values, and patterns of behavior toward natural environments” (Wilson, 1996, p. 1-2). This can be seen in tandem with the whole child concept, as in order for a child to develop an

affinity for the environment, they have to wholly care for it. Wilson tells us that children learn through personal, basic experiences that occur frequently and are immersive; the adults in their life should show their own interest and care for the environment for the child to see (Wilson, 1996, p. 3-4). By being allowed to freely explore and submerge themselves in an environmental setting, children connect to nature, physically, mentally, and spiritually, and value it as they grow older.

Multiple Intelligences Theory. More specified than the trifecta of the mind, spirit/emotion, and body as seen in play-based learning or the whole child concept is the multiple intelligences theory. Developed by Gardner, a Harvard psychologist, he broke down intelligence into eight categories: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist (Gardner, 2006, p. 49-50). Each of these are used by individuals, with the theory centering on "each intelligence-based activity has its own development trajectory; that is, each activity has its own time of arising in early childhood…peaking during one's lifetime, and its own pattern of either rapidly or gradually declining as one gets older" (Armstrong, 2010, p. 9). This is important to acknowledge in education as a singular lesson plan could effectively incorporate different intelligences, in turn allowing the lesson plan to reach a greater range of children. An example of using multiple intelligences can be seen in a lesson on birds where students are "listening to bird calls (musical), playing a bird identification lotto game (logical-mathematical),…making bird feeders (spatial)…[and] reading stories about birds (linguistic)" (Oltman, 2002, p. 15).

This idea that children have natural strengths and weaknesses in learning is not new. In 1996, Dr. Lilian Katz published a paper titled *Children as Learners: A*

Developmental Approach. When it came to effectively teaching children, Katz listed "22 principles of practice that serve[d] as criteria...to judge the developmental appropriateness of an early childhood curriculum" (Katz, 1996, p. 1). Katz called for "a developmental approach to education...that takes into account those aspects of learning that change with the age and experience of the learner" (Katz, 1996, p. 4). Each learner learns differently, to put it succinctly. This must be accounted for to provide a quality education. Katz notes that, "young children are natural anthropologists, linguists, and scientists" (Katz, 1996, p. 11-12), which can be seen in the way they explore and engage with the people and setting around them, and that "the younger the learners, the wider the variety of pedagogical approaches and methods must be used" (Katz, 1996, p. 14). Using differing pedagogical methods is akin to multiple intelligences, in that there is no one way to approach teaching a child and, in turn, children have no singular way that they approach learning. By ensuring curriculums and activities are varied in the methods used to communicate material, it allows for greater chances of young children to succeed because they are learning in so many ways. Katz (1996) acknowledges that there are normative and dynamic dimensions when it comes to early childhood development. If normative dimensions refer to the average status quo of a group of children in terms of shared abilities expected at that point in life, then dynamic dimensions are the child's own individual strengths and weaknesses over time, as they learn (Katz, 1996, p. 5-6). The dynamic dimensions could also be called intelligences, and children need to be able to try all of them in order to learn and grow.

In connection to EE values, a study tested the multiple intelligences theory in relation with a control group and an experimental group. The control group was taught

with traditional teaching methods, such as lectures and textbook reading, while the experiment group had eight activities - one for each intelligence - which included examples such as “logical-mathematical… [where] students investigated the environmental changes of their hometown during ten/twenty years via the internet” or “intrapersonal…[where] students were given pictures about the past and present conditions…and…asked to compare...and then empathize [with] the people and animals living” there or “bodily-kinesthetic…[where] students played a game...and...acted out a drama which reflected the problems” (Bas, 2010, pp. 63-64).

At the start, the researcher conducted a pre-test focusing on environmental awareness test and found that “both groups’ pre-learning levels on the environmental awareness knowledge levels are equal to one another” (Bas, 2010, p. 67). After the groups successfully completed all the activities, a post-test was done between the two groups. The scores revealed that “the students in the experiment group…showed significant environmental awareness knowledge levels compared to the students in the control group” (Bas, 2010, p. 67), helping to show that the multiple intelligence theory, when applied to EE, was beneficial. In addition to scores, the research also sought to see if attitudes had changed. Yet again, the data showed that the pre-attitude towards the environment were the same for both groups, but after the experimental group activities were completed, “the students in the experiment group…reached higher attitude scores…[showing] multiple intelligences…has enabled the students to develop positive attitudes towards the environment” (Bas, 2010, p. 68).

Summary. All three theories are similar because they insist on tapping into different aspects of how a child can learn. They seek to avoid a singular manner of

instruction, such as via lecture or reading only, or set, unbending math and writing activities, or anything that narrows how a child is exposed to a topic. By utilizing different methods, a single activity appeals to a more encompassing group of children, strengthening the odds that they connect, learn, process, and retain the activity better.

Many programs use the three theories as foundations. A cursory search of research products bring up numerous examples. Project WILD (Wildlife in Learning Design) (http://projectwild.org), Project WET (Water Education for Teachers) (http://www.projectwet.org), and Project Learning Tree (https://www.plt.org) are all examples of EE programs that provide curriculums, activity packets, and instructional workshops for educators, where educators can learn how to tie in EE to the classroom. These curriculums play on the theories in that they have both outdoor and indoor activities that "can be used with students in formal…[and] nonformal settings…[with] hands-on activities…[that] connect children to nature, engage students in learning, improve student achievement, and grow 21st century skills" (PLT: About Us, 2016, para. 4). Programs like these are important as they provide solid, prepackaged curriculums, as well as outreach assistance, to educators who seek to teach outside of traditional instructive methods but are not sure how to go about doing it.

Ingrid Chalufour and Karen Worth's *Exploring Water with Young Children* (2005) is an outstanding example of a guide that combines educational theories with early childhood development and environmental values. Chalufour and Worth repeatedly identify the differing ways children learn. The ultimate goal of the guide is "to provide experiences over time in which children can engage in multiple ways, depending on who they are and what they bring," noting that "children will have varying levels of

observation, language, and representational skills" (Chalufour & Worth, 2005, p. 5-6). They have a section dedicated entirely to the fact that children learn through play, with play varying wildly through "dramatic or symbolic play, exploratory play, and constructive play" (Chalufour & Worth, 2005, p. 7). Not only do they reinforce the concept that children learn in varying ways, but they also reinforce the need to teach environmental values at an early age. Chalufour and Worth discuss how modernity and electronics have removed children learning about how both the environment and world around them work, and by pausing to explore science and the outdoors, even as young as preschool, it "will encourage them to observe more closely, develop new ideas about the world, and build a found of experiences and ideas on which to construct later understanding" (Chalufour & Worth, 2005, p. 2).

Perhaps what is most unique about their guide is that they utilize two key concepts: open exploration and focused exploration. In open exploration, children get to approach a scenario with freedom, to play, build, read and try anything of interest to them as pertaining to the topic (in this case, a water center); after open exploration comes focused exploration where, now that the children have been able to freely follow their curiosity, a teacher steps in to help build a deeper connection and understanding of some of the topics relating to water that they already explored (Chalufour & Worth, 2005, p. 9). This approach seems most compelling as it does several things: it allows a child to fulfill the need of doing what they want to do, which in turn diminishes that urge later on and helps them stay focused later as they already got to do what they wanted to do and they are now interested in what the teachers or others have to do. Open exploration allows the child to explore naturally with their learning capacities that they most lean to, and during

focused exploration, it allows for learning to occur, when the teacher gently leans in and guides the topic to differing lessons that they hope to teach on the subject.

Exploring Water with Young Children is a strong example of how to create an activity packet that encompasses all the educational theories and early childhood development methodologies, while teaching children to value the environment. By adhering to the explored concepts in an activity packet, the activity packet will be a successful medium for children to engage with.

Environmental Education as a Habit

With the established child development theories selected for use as a basis for the activity packet, it is important to pause and examine the topic of habits. Why are habits important to consider when it comes to environmental actions, especially for an activity packet geared towards young children? The answer is that we must consider habits because the engagement of positive environmental behavior hinges on the breaking of old, bad habits that have a negative impact on the environment.

A quick search of the internet using keywords such as ‘positive’ ‘environment’ and ‘habits’ can bring up hundreds of results. Clicking any website can bring you to a myriad of ideas, such as a bin to always put your recycling in so you get used to it, learning to turn off the faucet, not buying more food than you need to prevent food waste, and opening windows for air and blinds for lighting as opposed to running the A/C system and turning on lights (Tara, 2013, para. 5, 6, 8, 15, 17). While these are all great thoughts and ideas, the question is, how do you get individuals into the habit of doing all these environmentally beneficial actions?

Habits are actions we do without thinking; they are a repetitive process that ingrain into our brain to the point that we do them automatically, without outside effort (Neal, Wood, & Quinn, 2006, p. 198). This means the more we do it, the less we have to think about it. We fall into patterns based on memories, such as when we get up in the morning, we might first use the toilet, then brush one's teeth, then comb one's hair, because we associate the routine in our minds with waking up. A study found that "approximately 45% of everyday behaviors tended to be repeated in the same location almost every day" (Neal et al., 2006, p. 198). The science behind habits is deeply complex and can be explored in many ways under many subjects. This capstone will not go in-depth into the science of habits, however, there is a purpose in bring up the subject. In order to design an effective activity packet that will instill water conservation values in children, it will have to in some way aim to make water conservation values a habit in their day-to-day lives!

A good example of EE and the power of habits is a case study on a school garden. The study focused on the overall change on the environmental mindset of the students from the beginning to the end. While the actions within the garden varied, the time spent in the garden was a regular habit as it was a repeat scheduled activity, and, in turn, it shifted the environmental mindset of the students. The researcher's focus group consisted of sustainability projects that lasted a trimester, and had a "designated 45-minute block on Friday mornings and at other times, if their project warranted more attention" (Sullivan, 2012, p. 1-2). The researcher asked questions on "their effort and participation at the end of the first week of the project and again at the end of the twelve-week project" (Sullivan, 2012, p. 13), and the outcome was fascinating.

At the start of the course, “only 15% of students reported that they were performing at maximum effort….[but] 50% of students reported performing at this level at the end…[and] at the beginning of the project, 9% of students reported that they were participating at the highest level…this level rose to 65%…by the end” (Sullivan, 2012, p. 13-14). Additionally, again at the start, only “59% were actively involved in what the entire group was supposed to be doing and 44% of students did not remain on task…[but] over the course of the 12 weeks, this pattern began to shift, ultimately ending with 100% of students being involved in the group’s task and 88% being on task for the project period” (Sullivan, 2012, p. 14). Other changes included an increased vested interest in the overall project. The educator took notes on if “students were completing extra work beyond the project guidelines…while only 6% of students completed extra work during the first week…76% did so by the 12th week” (Sullivan, 2012, p. 15). Finally, perhaps most importantly, “at the beginning of the project, 65% reported that they were indifferent when asked if working in the garden was important to them. At the end of the project, 85%…agreed or strongly agreed with this statement” (Sullivan, 2012, p. 16).

Dr. Christine Manning, author of the titled work, *The Psychology of Sustainable Behavior*, explored habits and environmental actions. Dr. Manning (2009) stated:

> The goal of the psychology of sustainable behavior is to create the conditions that make sustainable action the most appealing or natural choice” and examines why it is that “most people want to live in a way that treats the ecosystems...with care…[and] yet we...find ourselves engaging in unsustainable daily behaviors that have negative environmental impacts (p. 3).

Dr. Manning goes on to argue for seven major changes to make sustainability a habit: we must "make sustainable behavior the social default…, emphasize personal relevance…, make hidden information visible…, foster mindfulness…, create opportunities for competence, skills and knowledge…, make change a byproduct of other events…, [and] balance urgency with realistic hope" (Manning, 2009, p. 1). Habits come into play in several of these areas. Different examples of this are how Dr. Manning discusses opportunities need to be provided to practice sustainability (such as distribution of reusable travel mugs by companies), providing a loop of feedback to an individual based on their positive or negative environmental actions (placing a plastic bottle in the proper recycling bin), or even providing familiarization opportunities for people to practice behaviors and gain both confidence and a desire to continue it (such as regular neighborhood gatherings where you let your neighbors explore how your compost works) (Manning, 2009, p. 9, 17, 22).

The topic of habits and environmental actions could be a research topic in its own right. Both the school garden study and Dr. Manning's work provide many avenues to be explored. The takeaway in relation to this activity packet is that an introduction to, and subsequent repetition of, an environmental habit will better help aid people in learning new environmental habits. Because of this, I intend to shape my activity packet to last fifteen days, with each day having one to three daily activities. The goal behind this is to habitually bring the child back to the topic of water conservation on a daily basis which in turn will create the habit of them actively thinking about and executing water conserving activities.

A Note on Parental Involvement in a Child's Activity Packet

Knowledge of the best educational methods for a child is important, but equally so is the involvement of the parent. An educational activity packet done at home by a child involves direct guidance and assistance from a parent. Parents are not to be underestimated; in a child's upbringing, they "have two main educators in their lives — their parents and their teachers" (Caka & Murati, 2016, p. 62). Parents are the main influencers, as children "always adopt parent's values and types of behavior" and "when parents involve themselves in the education process of their children, usually the outcome can be qualified as a positive and encouraging one (Caka & Murati, 2016, pp. 61-62).

However, this packet will not factor in considerations for parental involvement. I acknowledge the importance of parental involvement in the success of activity packets, as well as a child's overall education and personal growth. A parent for terms of this discussion may be substituted for any primary caretaker to a child, such as, but not limited to, two parents, single mother, single father, older sibling, grandparent, adopted parents, babysitter or nanny, or any other type of guardian that would have predominate oversight of the child executing the activity packet. Individual personalities and values, cultural backgrounds, an individual's own upbringing, societal status, economic status, and many other factors all define how a person would interface and guide a child as they accomplish the packet. This topic is a good topic with many avenues to be analyzed in another study.

Conclusion

Creating a water conservation activity packet aimed at young children and resulting in long term environmental values is a complex process. A good activity packet

must take into account today's modern perspectives on environmental efforts. It must also be grounded in strong child development theories and include the issue of habits. An effective activity packet will take advantage of these areas and, in development, every section and its activities should be reflected upon and questioned to see if it is utilizing the foundations established by the Chapter 2 Literature Review. By doing so, a worthwhile and useful water conservation activity packet can be created and used. This will be reflected in the description of the methodology behind how specifically the activity packet will be created, as explained in Chapter 3. Chapter 3 will show how EE, the importance of water conservation, and childhood development theories and habits are translated into a logically ordered and designed activity packet for children on water conservation.

CHAPTER 3

METHODOLOGY

Purpose

The goal of this educational activity packet is to nurture long term behaviors involving water conservation practices by young children. In today's world, this is a critically important topic. The World Business Council for Sustainable Development has found that many irrigation practices are unsustainable, urban city dwellers are overusing groundwater supplies, and the world's population is only on the rise (Fry, 2006, p. 3-8). A vested interest in water conservation is important. By introducing children to the subject at a young age, the goal is to foster a generation of humans to care about this subject.

The question is: how can young children reduce their water footprint? My focus will be by creating an activity packet on water conservation for a child to use. This is done through developing a methodology. This chapter will look at the participants and settings for the activity packet, as well as theories that support effective child development education and the value of activity packets in relation to learning. This chapter will examine the structure of an ideal activity packet in detail, as well as provide a glance at how outside organizations could potentially use this activity packet for environmentalism. With all of these components, a quality activity packet on water conservation for young children can then be created.

Participants & Setting

The intended audience that this activity packet is directed towards are for early primary school age children. The topic of water conservation allows for a wide variety of

activities inside and outside the home, and out within the community. The setting of this activity packet is meant to be applicable to a wide range of household settings, so that urban, suburban, or rural placement of where participants live is a non-issue. Commonly found public areas, ranging from coastline beaches to manmade ponds, or large national parks to small back yards, will all be viable options for usage when it comes to the activities. The goal is that any respective household, in any type of community, would potentially be able to successfully use this activity packet. Additionally, there is no set time of year meant for this activity packet to be used, meaning it could be done during a child's free time on summer vacation or after school during the school year. This allows for the freedom of families, schools, and/or other organizations to use it as they deem fit in relation to the education of the child and the child's schedule.

Educational Theory Supporting the Activity Packet Design

A strong activity packet must tie into known successful methods of engaging children. This activity packet is created so as to contain activities supported by three childhood development theories (play-based learning, the whole child concept, and the multiple intelligences theory), alongside an awareness of the science of habits.

Play-based learning promotes the idea that a child's inclination towards play is actually a valid learning method that is just as effective as other types of educational methods. Play has been found to serve as "the chief vehicle for the development of imagination and intelligence, language, social skills, and perceptual-motor abilities" (Fox, 1996, para. 5). When children play, they are learning as they are practicing developing their mental, emotional, and physical skills, to include, "fine and gross motor skills...react[ing] to each other socially, think[ing] about what they are doing or going to

do...they use language to talk to each other...and they very often respond emotionally to the play activity" (Fox, 1996, para.8). The whole child concept is similar to play-based learning in that it focuses on the idea that the physical, emotional, and mental component of a child are considered a necessary mix to the entire child as "all areas of human growth and development are integrated" and that this unique growth means that "individual natures and learning styles affect the way teachers will teach any two children of the same age in the same class" (Gordon & Browne, 2010, p. 77). Similar both theories is the multiple intelligences theory. The multiple intelligences theory focuses on the concept that humans have different intelligences that are "sets of abilities, talents, or mental skills…[and] differ in the degree of skill and the nature of their combination" (Gordon & Browne, 2010, p. 126). These intelligences consist of the areas of: musical, bodily-kinesthetic, logical-mathematical, linguistic, spatial, interpersonal, intrapersonal, and naturalist (Gordon & Brown, 2010, p. 127).

All three of these theories mean that a successful activity packet will have activities that involve a multitude of senses to ensure that each lesson reaches all children. For example, the simple act of having a child care for a plant involves all theories. Children could grow plants - (naturalist intelligence, or an emotional act) - and in the process could be asked to count the seeds they need to grow five plants (logical-mathematical, or mental acts), to perform the act of adding dirt and water (bodily-kinesthetic, or physical acts), and asked questions about how they feel as they see their plants grow over the next several days (linguistic, interpersonal intelligences, or emotional acts).

In addition to the three theories, the consideration of habits can help guide the creation of the activity packet. Habits are formed when we do actions or behaviors repeatedly and it eventually becomes automatic; in order to break habits, we have to actively change our ways, which can be hard (Neal, Wood, & Quinn, 2006, pp. 198-201). This basic synopsis of what habits are, and how to change them, must be kept in mind in the creation of an activity packet. An activity packet for changing water behaviors must be long enough, and cause enough disruption of behavior, to help aid in the change of previous set habits regarding water conservation.

Structure of the Activity Packet

Details of the activity packet structure as a whole are described in the below sections (Overall Synopsis, Objectives). The specifics' of the three main educational topics and each daily activity (Main Educational Topics, Today's Topic, Length, Materials Required, Activity Procedures) are also addressed.

Overall Synopsis. The packet will have a table of contents, introduction, address learning outcomes based on a national philosophy, and will last a total of fifteen days, divided into a series of three overarching educational topics on water conservation ('Let's Talk About Water!,' 'Water in Your Daily Life!,' 'The Big Blue Picture!'). Each of these sets lasts five days, with material relating in those five days to the overarching educational topic. Days 1, 2, 3, and 4, will each have one to three activities. The total time of activities together will last a minimum of 30 minutes to no more than 1 hour. Day 5 will be a community outreach activity that relates to water conservation that can be selected at the discretion of parent and child.

Objectives. There is an understandable acceptance and need for educational standards and learning objectives. By establishing standards, educators, students, and their parents understand what will be taught, in what manner, when, and are also given an ability to assess a student's achievements in learning material. However, this activity packet will avoid the strict adherence to set standards primarily due to its focus being geared towards young children. It will embrace the philosophy of the National Science Teachers Association (NSTA), as provided in its position statement on Early Childhood Science Education. The NSTA states that "many adults, including educators, tend to underestimate children's capacity to learn science core ideas and practices in the early years and fail to provide the opportunities and experiences for them to foster science skills" (NSTA, 2017, p.1). Young children can flourish in the topic of science, particularly when provided "multiple and varied opportunities to engage in science exploration and discovery...in both formal and informal settings...over time...and by engaging in experiential learning" (NSTA, 2017, p. 2-3). Young children can successfully learn science in many differing ways, so long as educators and parents alike "provide numerous opportunities every day for young children to engage in science inquiry and learning by intentionally designing a rich, positive, and safe environment for exploration and discovery" (NSTA, 2017, p. 3). This activity packet on water conservation will adhere to the NSTA's philosophy by creating safe, differing activities on water conservation that nurture a curiosity of science in children, and encourages them to engage and explore through a variety of methods.

Main Educational Topics. The fifteen days are divided into three main educational topics. The first set of five days is called 'Let's Talk About Water!' and

focuses on an introduction to water, its properties, where it is found globally, and a beginning introduction to how we as people use water. This sets the child up for a basic foundation on what water is. The second set of five days is called 'Water in Your Daily Life!' and lets the child explore the different ways they use water in and out of their household, in the food they consume, and in their community. The final set of five days is called 'The Big Blue Picture!' and shows the child a global perspective on water usage by humanity overall, in terms regarding agriculture, urbanization, and the environment.

Today's topic. Each daily activity will have a one-two sentence introduction to the topic that will be explored. The importance will be stated.

Length. A specified length will be listed in order to allow the parent to know how long the activity will take and to allow for execution of it accordingly.

Materials required. Any necessary materials will be listed for the activity.

Activity procedures. A list of all necessary steps, activity questions, and any other information pertaining to the successful execution and completion of the activity will be listed.

Assessment. The activity packet contains a wide variety activities that can only be successfully completed by the child. While there is no required testing material, the activities contain active participation necessary from the child both verbally and physically and a subsequent completion of a variety of worksheets, projects, and other items. All activities require children to critically think and respond before, during, and after activities. Each activity does have a correct theory or word(s)/phrase(s) to be used, and the guiding parent can ensure that the child concludes each activity with a proper understanding of what occurred and why.

Outside Agency Usage

It is important to note that while this activity packet has been made as a standalone resource for singular child use, this packet can be used by local environmental organizations or educational systems. While parents may use their own methods to engage their children in completion of this, non-profits or schools could distribute the activity packet and, to ensure it is completed, offer simple awards for partial or full completion. Examples of this could include the child's name being published in the local community newspaper for completion, or the school bulletin board placing a certificate with the child's name on it at the start of the school year. While not explored in this activity packet, there is the potential for survey use by organizations to see if attitudes and behaviors towards water conservation changed from before the start of the activity packet to afterwards. Surveys at 3-, 6, and 9- months could be sent out during the length of the school year to see if there were changes within the household, either in water conservation or towards environmental values and actions as a whole. The overall goal of this activity packet is to be versatile and easily used in a variety of settings.

Conclusion

By creating an educational water conservation activity packet geared towards primary school aged children, there is an opportunity to instill water conservation as a value. The activity packet will have activities based on play-based learning, the whole child concept, the multiple intelligences theory, and habit science, which will ensure that the packet is made effectively to engage the child. This methodology chapter has set the foundation of the creation of Chapter 4, which will be the activity packet, in full under Appendix A. The activity packet will use the educational theories as a foundation and be

made from the outline of the activity packet as listed in the pages of Chapter 3. Chapter 4 will discuss how a Texas curriculum was used as inspiration for the curriculum model selection and will discuss the activity packet design and the types of activities within the activity packet.

CHAPTER 4

DISCUSSION

Purpose

The purpose of this chapter is to discuss the design behind creating an activity packet (found in Appendix A) to instill water conservation values in young children as the question of this capstone seeks to answer how can young children reduce their water footprint? The activity packet was modeled off a Texas water conservation curriculum to ensure it adhered to sound educational practices that have actually worked. The activities within the packet are set in a logical sequence so as to build upon the information learned by the child in previous lessons. When selecting and designing activities for the packet, they were chosen by keeping the premise of three childhood education theories (play-based, whole child, and multiple intelligences) and the concept of habits in mind. By utilizing these components, an activity packet promoting water conservation in children is created, allowing for children to participate in water conservation and to continue to do so after completion of the activity packet.

Curriculum Model Selection

In order to shape an effective activity packet, I utilized an established curriculum on the topic of water conversation from the state of Texas. The reason I utilized Texas is because, as discussed in Chapter 2, Texas had previously implemented several water conservation programs in the state with success, with one program finding "that 78 percent of the 3,000 students who returned the surveys participated in water-related conservation activities with their families at home" (Vigh, 2015, p. 20). I wanted my activity packet to be successful so I followed in the steps of a successful program. The

Texas Water Development Board (TWDB) was created in 1957 and exists "to provide leadership, information, education, and support for planning, financial assistance, and outreach for the conservation and responsible development of water for Texas" (TWDB, 2017, para. 1). One of the many things they do is provide educational materials for usage by the general public. The model I based my curriculum off of was by the TWDB, called *Raising Your Water IQ: A Water Conservation Curriculum.*

The overview of the TWDB curriculum consisted of a table of contents, introduction, a water conservation glossary, and main topics (labeled as chapters) with subtopics underneath (TWDB, 2016, p. 3). In my curriculum, I included a table of contents, an introduction, and then listed the main topics with their subtopics underneath. I opted not to include a water conservation glossary because I felt due to the younger age of the intended participants, it would be better for them to encounter new words while in the middle of doing the activities, where they could ask questions and discuss the words with the activity helping to frame the context of the word, vice reading them beforehand.

Within the main topics and subtopics, the TWDB's *Raising Your Water IQ: A Water Conservation Curriculum* was somewhat, but not completely uniform. I aspired to make mine more uniform. The TWDB's curriculums either had overviews, backgrounds, or introductions at the start of activities; these seemed inter-changable. Because of the variety, my compromise was after the title of an activity to make a Today's Topic followed by one to two sentences describing the purpose of the activity. All activities in the TWDB's curriculum had a time length for the activity and materials, so I ensured I had time length and materials for all my individual activities. Additionally, like TWDB's *Raising Your Water IQ: A Water Conservation Curriculum*, I listed out activity

procedures in full. Finally, the TWDB curriculum made sure that "water conservation messages and concepts stem from core academic standards detailed in the Texas Essential Knowledge and Skills" state educational criteria (TWDB, 2016, p. 5). I utilized the National Science Teachers Association's (NSTA) philosophy on early childhood education for my academic criteria, as I did not want a state-specific learning standard; I described the NSTA's philosophy at the start of my activity packet.

Activity Packet Design

The fifteen days of activity are divided into three parts, with each part having five days of activities, and each day having one to three activities. The three parts are entitled "Let's Talk About Water!," "Water in Your Daily Life!," and "The Big Blue Picture!" The three parts go from the most basic concepts to the most complex in regards to the topic of water conversation. The first set of five days, "Let's Talk About Water!," introduces the child to the basic properties of water, the location of water globally in its various forms, a basic introduction to the water cycle, and an initial examination for the child and their own interactions with water. It arms the child with rudimentary information on a topic they will learn in-depth, giving introductory features to important aspects of water, to understand what water is and why it is a limited resource. "Water in Your Daily Life!" focuses on water usage by the child, inside their home, outside their home, in their neighborhood, and in the food they consume. This secondary set of five days is a more focused section on the many, many ways the child uses this limited resource in their day-to-day life and develops their awareness of how much water they use. The final set of five days, entitled "The Big Blue Picture," takes the child from focusing on only themselves and their water usage, to the impact of water usage on a

global scale by everyone everywhere, providing awareness of the bigger picture. This set examines agriculture, construction and technology, nature, and concludes with an overview of why this limited resource is important and why we must practice water conservation.

Contents of the Activity Packet

The three childhood development theories of whole child, play-based, and multiple intelligences call for education that occurs in differing mental, emotional, and physical forms in order to ensure all children are aided by engaging in lessons that appeal to their natural learning abilities. The activity packet consists of a total of 32 main activities. Some activities are divided into several parts, such as reading an informational paragraph out loud and then coloring in a picture, or building and executing an activity and then writing down the results. The activities are varied and include, but are not limited to: reading, writing, speaking, listening, artistic freedom, engineering and construction, abstract thinking, and emotional expression of thought or opinions. The activity packet itself was made to be fifteen total days, with one to three main activities per day, to enforce the concept of habitual development of practicing water conservation.

Conclusion

A successful activity packet has many layers that join together to make it a sound product. The design must go from the most basic information to the most complex information. This serves as a stepping stone for the child as he or she goes from a beginner's level of knowledge on water conservation to slowly learning more complex concepts. Additionally, the activity packet must be varied, using all sorts of activities. This variation is the foundation in the whole child, play-based, and multiple intelligences

childhood development theories, that state that every child learns best by varying methodologies and, therefore, lessons that vary will reach a great number of children. The activity packet must also be several days long, in order to develop habits in children. By selecting fifteen days, more than two weeks of a child's daily life involves discussion on water conservation and helps to solidify it as a value within them. Chapter 5 looks at the reflection of this capstone in its entirety, the foundation of educational theory that this activity packet was built on, the limitations of this activity packet, and possible future versions of an activity packet that could be created to share the issue of water conservation.

CHAPTER 5

CONCLUSION

Reflection

This capstone seeks to answer the question of how to get young children to reduce their water footprint. The answer to this is to create an activity packet for a child to use based on solid theories. By examining the foundation of the activity packet, we can reflect upon the three childhood development theories used (whole child, play-based, and multiple intelligences), alongside a discussion of the role of habits in behavior. While the literature review supports the foundation utilized, it is also important to look at the limitations of this activity packet; some areas could not be addressed or could be improved upon in a different activity packet. Considering future activity packets options in the environmental education field should also be examined.

The Essential Foundation

The activity packet was developed out of a growing need for more environmental values in society. Of these many issues, I felt most drawn to the topic of water usage and I wanted to contribute to raising concern for the topic. In order to do this, I decided to make an activity packet on water conservation for young children. A history of environmental education, alongside the ‘why’ behind the importance of water conservation, had to examined first to understand how to best shape the activity packet to fit best practices, as well as what areas of water conservation were important to highlight. For the activity packet to be successful, it had to be grounded in educational methodologies that were successful for early childhood development learning and promoting environmental values.

I utilized three childhood development theories: play-based learning, the whole child concept, and multiple intelligences. All three of these seek to embrace differing mental, emotional, and physical components of the individual child. The supporting evidence of each theory is the confirmation that each child is a unique learner, having differing needs and ways of learning information; by ensuring that lessons are varied and utilizing several different methods of instruction, an educator is better guaranteed that the child is engaging and successfully learning.

The activity packet also acknowledged the complex role of habits in our daily behaviors. The length of the activity packet and the continued daily promotion of water conversation was done on purpose, to better increase efforts at instilling participants with new environmental values. Together with the educational theories, these all came together to form the basis that my activity packet was successfully built off of.

Limitations of Activity Packet

This activity packet has several limitations. The first limitation is that it has not yet been practiced in the real world. The feasibility and execution of the activity packet has yet to be tested by actual children. Ideally, this activity packet would be tested and revised several times before release into the general education world. Critiques and feedback by children, parents, and other educators would be of benefit. Additionally, the variance of the activities were not assigned to a uniform set requirement. For example, there are not exactly five reading activities, or exactly five writing activities, or exactly five mathematical activities. This activity packet was made with the broader intention of incorporating generic physical, mental, and emotional activities that centered around the topic of water conservation to promote a healthy, rounded view of environmentalism.

However, there is the potential for someone to create a more uniform activity packet to ensure even growth in all developmental areas.

As stated in Chapter 2, the full role of parents as influencers in a child's life was not able to be fully examined due to research focus constraints. There is possibility that adults could skip activities, let the child lose interest, or modify lessons in some manner that might lessen the full potential of the activity packet. Parents hold sway over a child and if this activity packet is done outside an educational system or a non-profit, the success lies heavily in the parent and how they execute the activity packet.

This activity packet is also unable to take into account the numerous outside factors that might affect a child doing this activity packet. The activity packet was designed in mind with accessibility in terms of broad socio-economic and geographic location differences. However, this activity packet was not created in a manner that may specifically be beneficial to those with learning disabilities or to someone whom English is a second language for, as examples. These are all issues that might be able to be better addressed in a differing type of activity packet.

Future Activity Packets

An activity packet on water conservation for young children can go in many different directions. Water conservation can address a myriad of topics, such as agriculture, urbanization, natural resources, consumption of goods, and environmental activism. These open many avenues for exploration when it comes to the topic. As a springboard off some of the concepts in my activity packet alone, you could have an activity packet focus exclusively on the resource of water itself, on household water

usage only, on a water-friendly food diet for a family, or on differing global water usage issues.

In attention to subject focus, a water conservation activity packet can be used and/or modified by nonprofits, schools, and summer camps. Any of these organizations could potentially utilize water conservation activity packets to supplement or align with other outreach efforts, curriculums, or daily activities.

Conclusion

Environmental education has been a movement slowly developing over the past several decades and awareness over many environmental issues have arisen in tandem with it. National Geographic has an entire section of its website devoted to the topic of the environment; on 17 September 2017, a quick glance of articles showed the variance of environmental topics: “Striking Photos Show the People v. Climate Change” is a headlining photo competition to show the effect of climate change, another article is called “We’re Killing the Oldest Fish in the Sea,” a second titled, “Electric Cars May Rule the World’s Roads by 2040,” and a third called, “See the Extreme Cost of Extreme Weather.”

To say the environment is important is an understatement. Creating a water conservation activity packet for young children was a way to share my love of the Earth and the necessary resource of water in a way that was fun and exciting, and promoted creativity and love in children on this topic. This capstone has helped me see how crucial it is that the individuals be aware of their own actions, and how environmental values need to be a societal value. People have to care and oftentimes the only way they care is if they can be involved in the message. By communicating science and real-world facts,

alongside a creative, adventurous environment, children can be better drawn into caring for our world. Being engaged, having the freedom to think, and the ability to discuss and participate in a manner that suits them allows all children develop and communicate environmental values in a way that works best for them.

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APPENDIX A

The following content is the activity packet for young children on water conservation.

A Note on Citations and References. All activities refer to the original source documents that they were adapted from. These original source documents are fully referenced in the References of this capstone, starting on page 59.

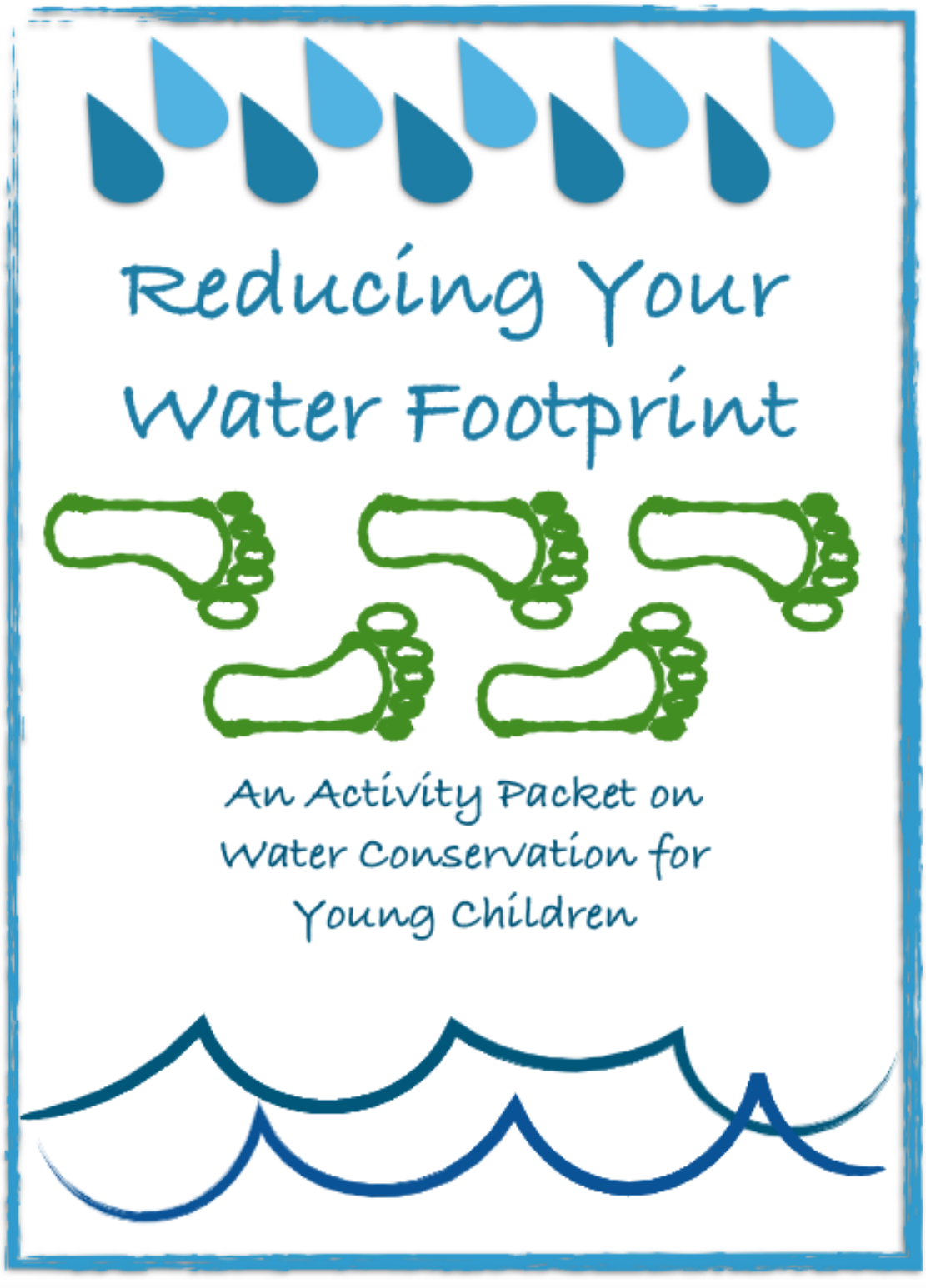
Reducing Your
Water Footprint
An Activity Packet on
Water Conservation for
Young Children

Table of Contents

Welcome to Water Conservation!

Let's start with this question - what does *conservation* mean?

Conservation is "the protection of plants, animals, and natural areas."[1] Sometimes, people use more than they need to! When we practice conservation, this means we try not to use more than we need to, or that we might try to not use plants or animals from a certain area at all. Conservation in action might include the act of stopping to cut down trees in a certain area, so we can save a forest and the animals that live there! Or maybe we prevent stop hunters from hunting animals like tigers or elephants, so that these animals can live in the wild!

But did you know you could conserve something like water?

What does this mean?

Water conservation is "using water efficiently and avoiding waste."[2] Another way to say this sentence is that water conservation is using water in a smart way and not using more than you need!

There are many ways you use water in your day-to-day life! Did you know the average U.S. person usages 2,500 cubic meters —- 2,500 cubic meters means that you alone use as much water that it takes to fill an Olympic-sized swimming pool in one year![3] But how is this possible? I'm sure you thought about how you brush your teeth with water, take a bathes, and drink water and that's all, so how could you possibly use *that* much? Remember, that you use water inside your home and water outside of it! As you move about your neighborhood, what you do during the school day, the types of food you chose to eat, can all affect water usage!

In this packet you will learn just how much you use water, sometimes without even knowing it! By the end of it, you'll be able to reduce how much water you use and help save the Earth!

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2. Access Washington. (2017). Water conservation: It all starts with you. Department of Ecology: State of Washington. Retrieved from: http://www.ecy.wa.gov/programs/wr/ws/wtrcnsv.html
3. Streeter, A. K. (2009). We Use How Much Water? Scary Water Footprints, Country by Country. Treehugger. Retrieved from: http://www.treehugger.com/clean-water/we-use-how-much-water-scary-water-footprints-country-by-country.html

A Note on the National Science Teachers Association (NSTA)

In order to ensure children are utilizing a packet that will benefit them in school, this packet has been created using the philosophy of the National Science Teachers Association (NSTA) on the topic of early childhood and education in science. While exposure to all sorts of topics and events is important, it is understood that parents worry about the academic success of their child, and want their child to engage in educational activities that will benefit them during the school year. By adhering to NSTA's philosophy, this can be accomplished.

The NSTA supports six principles in relation to early childhood development and science. These principles are repeated below, verbatim, from the NSTA's *NSTA Position Statement: Early Childhood Science Education* essay, pages 2 through 3:

1. "Children have the capacity to engage in scientific practices and develop understanding at a conceptual level."

2. "Adults play a central and important role in helping young children learn science."

3. "Young children need multiple and varied opportunities to engage in science exploration and discovery."

4. "Young children develop science skills and knowledge in both formal and informal settings."

5. "Young children develop science skills and knowledge over time."

6. "Young children develop science skills and learning by engaging in experiential learning."

All activities in this activity packet require the guiding hand of an adult. The numerous activities vary greatly in form and content, in order to provide a unique range of exposure to differing topics on water conservation. Additionally, the activities and their variation also allows for children to gain personal experience in learning; the activity allows for practice of many differing learning mechanisms that children execute in the school classroom.

By adhering to the NSTA's principles, a child will both develop a love for science while also developing themselves as a learner!

Let's Talk About Water!

What is water? Where is it found? How does water work in nature? And what is a water footprint?

Asking these types of questions about water let's us better understand how we use this natural resource. A natural resource is, "any of the materials such as water, coal, and wood that exist in nature can be used by people."[4] This means we find water naturally and can use it. How do we use water? For drinking, cooking, bathing, growing food, and in many other ways!

How do you use water?

Water is a very interesting natural resource! It can come in different forms, be found everywhere across the world, and be used in a lot of different ways! This week we will examine what exactly is water, where can it be found, and the amazing water cycle. We will also learn about the phrase 'water footprint' and talk about how we use and save water. We will also talk about what water means to you, especially after you have learned all these new facts!

4. Cambridge University Press. (2017). Natural Resource. Retrieved from: http://dictionary.cambridge.org/dictionary/english/natural-resource

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: What is Water?

Activity #1: A Solid, A Liquid, and A Gas[7]

(This activity was adapted from: Jamie, 2017, Science Experiment: Ice, Water, Vapor)

Synopsis: This activity will introduce a child to the properties of water. They will be able to see the ice remain in a solid form, see it melt into a liquid form, and see it bubble and steam away into a gaseous form!

Activity Length: 10 minutes

Materials: Tray of ice cubes, two pans, one bowl, cooking utensil, stove top

Steps:

1. Let the child place the bowl on the counter and two pans on the stove top.

2. Let the child place an even amount of ice cubes in the bowl and two pans.

3. Place one pan on low heat and one on medium heat.

4. Observe. Ask the child the following questions:

- *What form is the ice remaining in the unheated bowl?*
  (Answer: Solid)
- *What form is the ice becoming in the low- and medium- heat pans?*
  (Answer: Liquid)
- *As the medium- boil begins to bowl, ask what form the water is becoming?*
  (Answer: Gas)

How Does This Happen?

(Quoted information from Ducksters, 2017, Solids, Liquids, and Gases)

Water is able to change it shape because of atoms and molecules! These make up matter, and "matter usually exists in one of the states or phases: solid, liquid, or gas... The atoms and molecules don't change, but the way they move about does. Water...can take the state of liquid, solid (ice), and gas (steam). Matter changes state when more energy gets added to it…[such as] in the form of heat….Solid water is called ice. This is water with the lowest energy and temperature. When solid, the molecules in water are held tightly together and don't move easily. Liquid water is just called water. As ice heats up it will change phases to liquid water. Liquid molecules are looser and can move about easily. Gas water is called steam or vapor. When water boils it will turn to vapor. These molecules are hotter, looser, and moving faster than the liquid molecules. They are more spread apart and can be compressed or squished."

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: What is Water?

Activity #2: Buoyancy

(This activity was adapted from: Stephanie, 2013, Water density and floating egg experiment)

Synopsis: This activity will show the child the buoyant properties of water!

Activity Length: 10 minutes.

Materials: Two raw eggs, two drinking glasses, a container of salt, a spoon, tap water

Steps:

1. The child can fill one glass with tap water.

2. The child can fill the second glass with water and then add three big tablespoons of salt and stir.

3. Ask: *What do you think will happen when the eggs are put into each glass?*

4. Have the child place an egg into both glasses. The egg should sink in the tap water glass, and float in the salt water glass. If it is near the bottom, or in the middle, ask the child what they think would happen if more salt is added.

How Does This Happen?

(Quoted information from Explorable.com, 2011, Salt Water Egg Experiment)

The egg is able to float because of density! "Density refers to the amount of matter contained in a given space or volume...The egg's density remains the same no matter where you bring it...because the egg is denser than tap water, it pushes away water particles so it can make space for itself hence the sinking motion. But in the case of the salt water, since it is heavier than ordinary tap water, it is more capable of holding the egg up - hence the egg floating....Now you must be wondering what's in the salt that makes water denser when mixed with it? When salt is added and dissolved in water, it breaks down into ions that are then attracted to the water molecules. This attraction causes them to bind tightly." Think of the salt and water molecules as if they were holding hands; by holding hands, they help keep the egg up! Fresh water - or just water molecules - has no other hands to hold and the egg sinks!

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: What is Water?
Activity #3: Surface Tension

Synopsis: This activity will let a child see the properties of water molecules.

Activity Length: 10 minutes

Materials: a clear plastic cup, a plate, 25 pennies, a squirt bottle or a plastic eye dropper, tap water

The Cup Test
(This activity was adapted from: Smith, D., 2012, Kid Science Water Experiment: Displacement)

Steps:
1. Before doing the experiment, ask:
- *What do you think will happen when we put the pennies in?*
- *How many pennies do you think it'll take to make the water overflow?*

2. Have the child carefully fill the cup to the brim and place it on the plate.

3. The child can begin to count pennies, dropping in one gently at a time.

4. Have the child observe what is happening. (At eye-level, as more pennies are added, a visible dome should begin to shape).
- Ask: *What is happening to the water as we added pennies?*

5. Have the child keep adding pennies until the water overflows.

- *What happened to the water as we added pennies?*
- *How many pennies did it take to make the water overflow?*

How Does This Happen?
(Content information derived from Eather, J., 2014, Displacement)

When the pennies are put in the water, they slowly displace their own volume! This means each time you place a penny in water, the penny pushes a water-penny-sized worth of space upward. If a penny was 1 centicube, it would displace 1 millilitre of water. Eventually, enough pennies in water takes up too much volume, with the end result being water spilling over the cup brim!

Water Topic of the Week: *Let's Talk About Water!*

The Penny Test

(This activity was adapted from: Kim, 2012, What is Surface Tension?)

Steps:

1. Before doing the experiment, ask:
- *How many drops of water could you fit on a penny?*

2. The child then uses the eyedropper, counting as they go. Have the child observe what is happening. (They should see a dome appear).
- Ask: *What is happening to the water as we added more drops of water?*

3. Have the child keep adding drops until the water overflows.
- Ask: *How many drops did it take to make the water overflow?*

How Does This Happen?

(Content information derived from: Kim, 2012, What is Surface Tension?)

This effect is from something called surface tension! Surface tension is seen in the water molecules ability to hold together against outside forces. In this case, the outside force is the addition of more and more water droplets against the limited space of the penny top. Eventually, one too many water droplets breaks the surface tension the water molecules has with the surface of the penny and it breaks. But surface tension is why we can see a building dome of water before that happens!

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: Where is Water?

Activity #1: All Over the World!

(All three coloring pages taken from Bulk Coloring, 2015)

Synopsis: This activity allows a child to explore how water differs from all over the world.

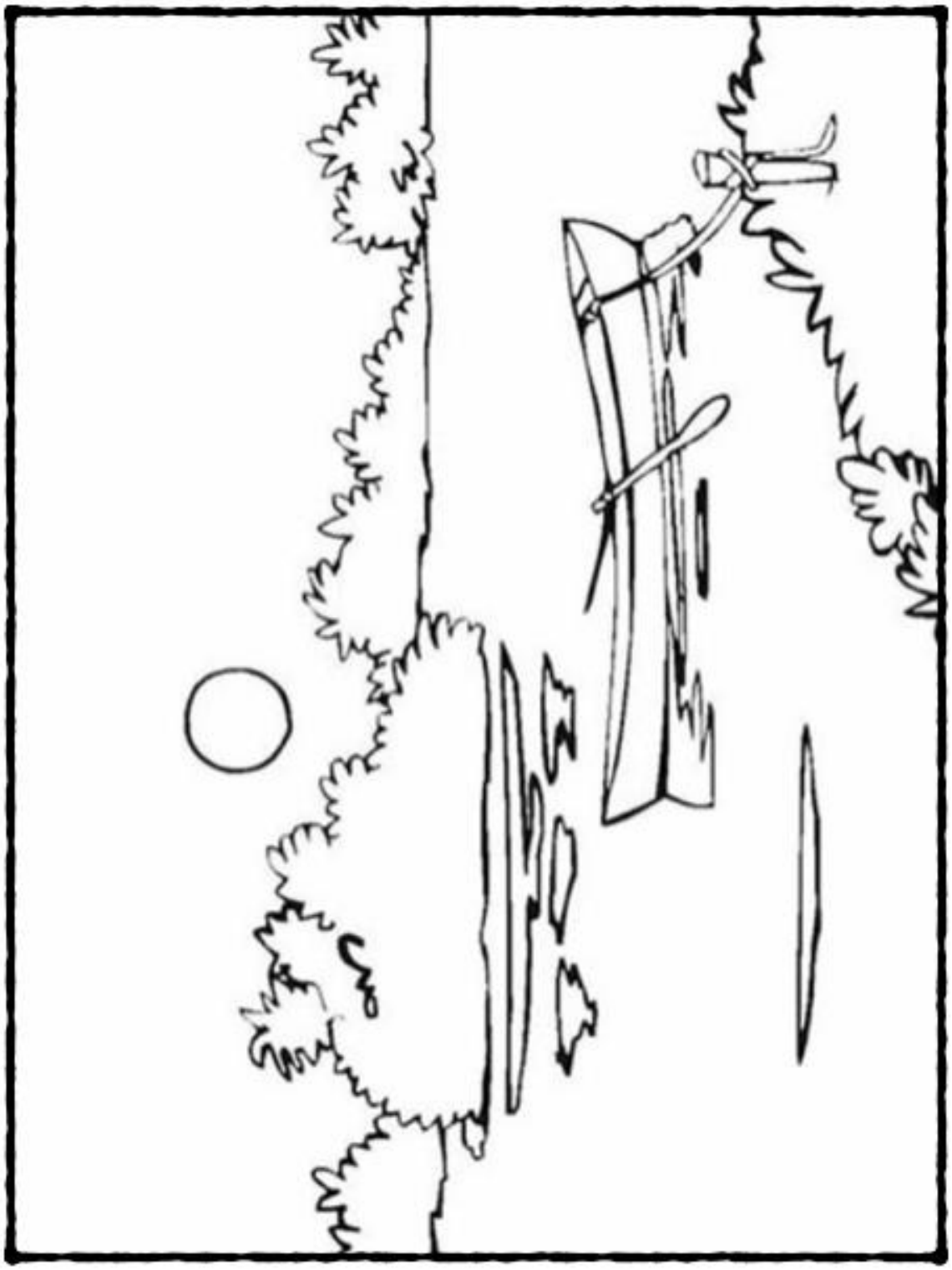
Activity Length: 10 minutes.

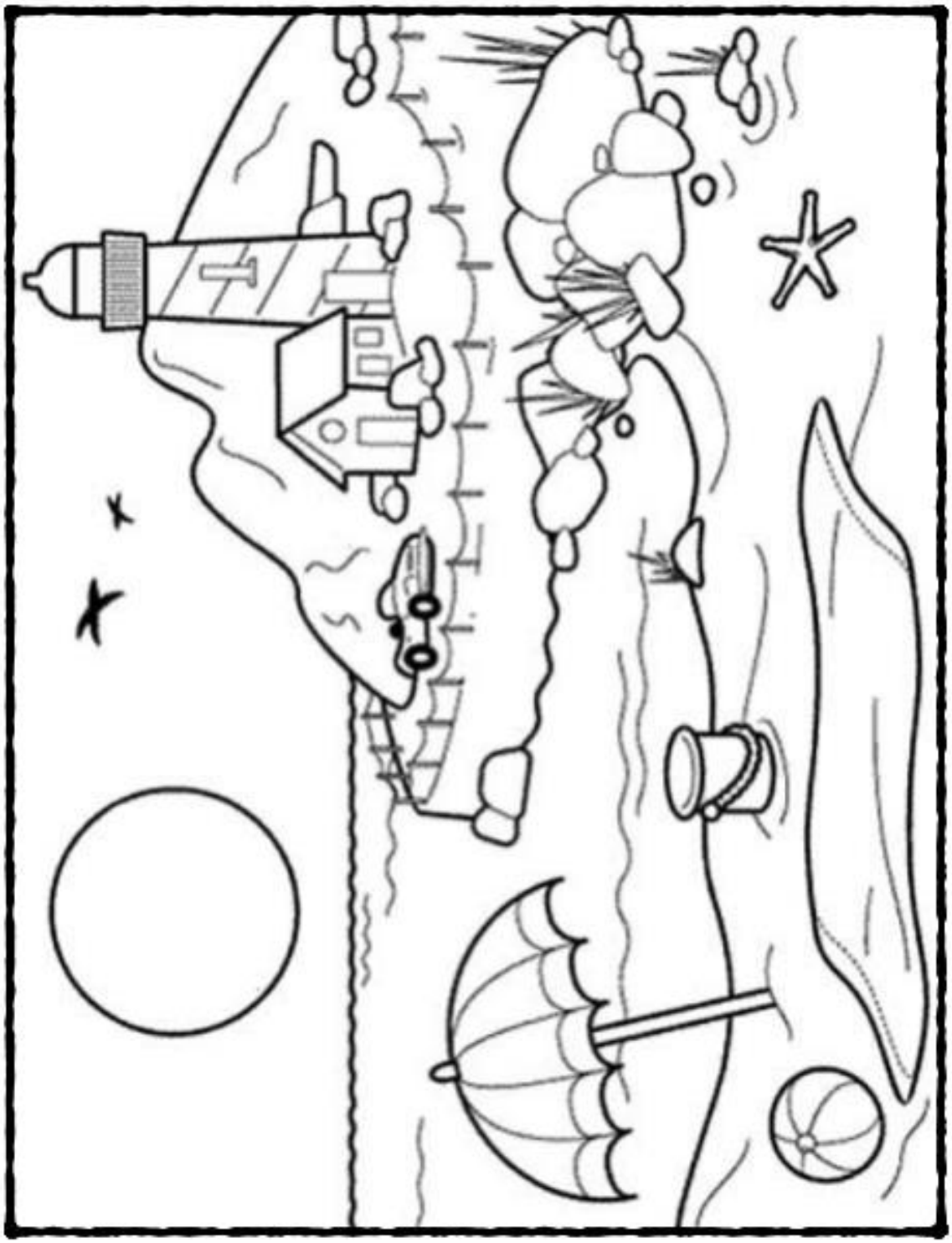
Materials: Any sort of coloring utensil (crayons, pencils, markers, etc).

Steps:

1. Allow the child to pick a drawing of their choice. Pick a drawing to do with them! Encourage them to talk about:
- Why they selected the drawing?
- What they think about the water in the drawing?
- What activities people could do in that body of water
- What types of animals and plants do they think need that body of water to survive?

2. Do the Word Search and share facts to learn more about bodies of water





Bodies of Water Around the World!

(Word Search created by using A to Z Teacher Stuff, 2017, Word Search Maker)

Fun Facts

(Facts retrived from three sources: Science Kids, 2016, Fun Ocean Facts, and, Tobin, D., 2017, Top 10 Longest Rivers Fun Facts, and., Yenisei, 2014, Little Travel Bug Ltd., and, Continents of the World, 2017, Lakes of the World, and, Roach, J. 2007, World's Longest Underground River)

1. Amelia Earhart in 1932 became the first female pilot to fly solo over the Atlantic Ocean!
2. The Pacific Ocean covers 30% of the world's surface and means 'peaceful sea.'
3. The Indian Ocean is the third largest ocean, covering 14% of the world's surface.
4. During winter seasons, the Arctic Ocean is almost completed covered by ice!
5. The Antarctic Ocean is also known as the Southern Ocean.
6. The Nile River is 4,132 miles and provides water to 11 different African countries.
7. The Amazon River in South America can be subject to tidal waves! These are called 'pororoca' and can travel as par as 13 kilometers up the river.
8. The Yangtze River, located in China, is so large and deep, giant ships that normal travel on the ocean are able to go as far as a thousand miles up it.
9. The Yenisei River forms from mountain streams in Mongolia and runs northward into to Russia, emptying out into the Arctic Ocean!
10. The Mississippi River in the United States was originally used as a natural landmark to define borders of states.
11. The Caspian Sea covers 143,000 square miles of space and is bordered by five countries.
12. Lake Superior has more than 200 rivers pouring into it and contains several islands!
13. Lake Victoria is only 276 feet deep but covers 26,600 square miles and is the largest tropical lake in the world.
14. Sac Actun River is the world's longest underground river, located in Mexico and stretching 95 miles.

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: Where is Water?

Activity #2: Water Out of Sight

(This activity was adapted from: The Groundwater Foundation, 2017, Edible Aquifers)

Synopsis: This activity introduces children to water that is hidden in the ground and its limited use.

Activity Length: 15-20 minutes

Materials: "Clear plastic cups,…spoons, drinking straws, blue/red food coloring, vanilla ice cream or fruity sorbet, clear soda pop, small gummy bears, chocolate chips, crushed cookies, breakfast cereal, or crushed ice, [and] variety of colored cake decoration sprinkles and sugars

Steps:

"1. Begin to construct your edible aquifer by filling a clear plastic cup 1/3 full with gummy bears, chocolate chips, or crushed ice (represents sand/gravel)
2. Add enough soda (represents water) to just cover the candy/ice.
3. Add a layer of ice cream to serve as a "confining layer" over the water-filled aquifer.
4. Then add more "sand/gravel" on top of the confining layer.
5. Colored sugars and sprinkles represent soils and should be sprinkled over the top to create the porous top layer.
6. Now add the food coloring to the soda. The food coloring represents contamination.
7. Watch what happens when it is poured on the top of the aquifer. Point out that the same thing happens when contaminants are spilled on the earth ís surface.
8. Using a drinking straw, drill a well into the center of your aquifer.
9. Slowly begin to pump the well by sucking on the straw. Watch the decline in the water table.
10. Notice how the contaminants can get sucked into the well area and end up in the groundwater by leaking through the confining layer.
11. Now recharge your aquifer by adding more soda which represents a rain shower.
12. Review what you have learned as you enjoy eating your edible aquifer"

The child should also be asked about the limited availability of water in the ground for our use:

1. How fast do you think it refills? (When it rains, as a generic answer)
2. What happens when there's no rain? (ie. a drought and its effects)
3. What effect would this have on us and nature? (Harms Earth if we have no water)

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: The Water Cycle

Activity #1: The Water Cycle in Action

(Explanation of the water cycle quoted from: Science Kids, 2016, Weather Facts: The Water Cycle)
(Activity adapted from Currin, M., 2015, Water is Water: 3 Experiments for Kids)

Synopsis: This activity will let the child see the stages of the water cycle in action.

Activity Length: 30 minutes to 1 hour

Materials: 4 plastic clear cups, water, marker, ice cubes, shaving cream, food coloring

Steps:

1. Begin with an explanation to the child of the water cycle:

- The water cycle at it's most basic has 4 steps: "evaporation, condensation, precipitation, and collection… **Evaporation [**is when]…heat from the Sun causes water on Earth…to evaporate (turn from liquid into gas) and rest into the sky. This water vapor collects in the sky in the form of clouds. **Condensation** [is the process of] water vapor in the clouds cool[ing] and becom[ing] water again. **Precipitation** [is when] water falls form the sky in the form of rain, snow, hail, or sleet…**Collection** [is when] oceans and lakes collect water that has fallen. Water evaporates into the sky again and the cycle continues."

2. Do the initial set up for the the Evaporation step.

- "Place a full cup of water in front of a sunny window. Use a marker to make a line at the beginning water level…As the sun heats the water, it should begin to evaporate. This experiment requires some patience.

Due to the length of the Evaporation step, *move on to complete Activity #2 and Activity #3 before returning back to Activity #1.*

4. Conduct the Condensation step:

- Fill a cup approximately two-thirds full of hot water. Take another cup, flip it upside down, and place it on top of the cup with hot water. Then place an ice cube on top of the upside down cup. Condensation will begin to form at the top of the upside down cup, just like a cloud.

5. Conduct the Precipitation step:

- Fill a cup almost full with water. On top spray shaving cream as clouds. Then, squirt several drops of food coloring on top of the shaving cream. As the "cloud" becomes heavy, the food coloring will "rain" into the cup."

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: The Water Cycle
Activity #2: Draw the Water Cycle

Synopsis: This activity will introduce the child to the components of the water cycle.

Activity Length: 10 minutes

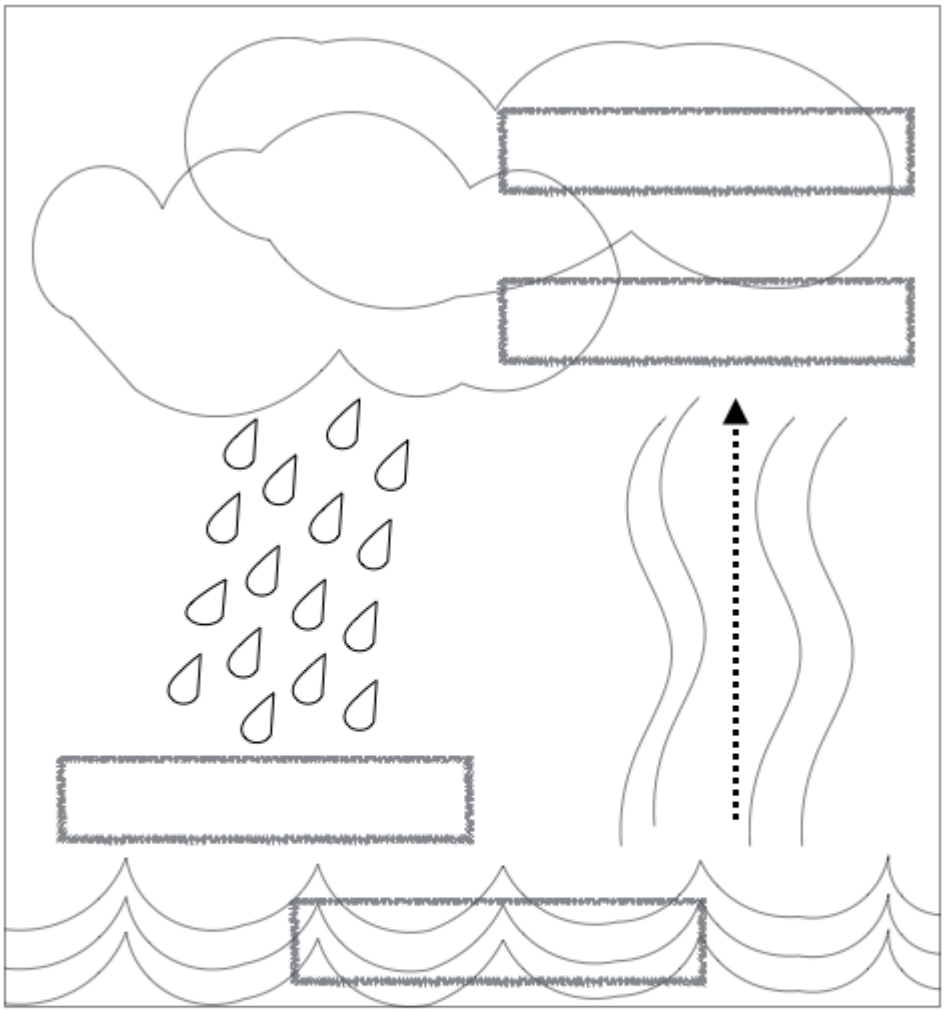
Materials: Any sort of coloring utensil (crayons, pencils, markers, etc).

Steps:
1. The child needs to write in the correct word to the correct part of the water cycle.

2. Make sure the child puts the appropriate words into the appropriate blocks
- *The block in the clouds is 'Condensation'*
- *The block below the raindrops is 'Precipitation'*
- *The block on the waves is 'Collection'*
- *The block above the arrow is 'Evaporation'*

3. The child can color in the drawing!

Water Topic of the Week: *Let's Talk About Water!*



EVAPORATION CONDENSATION

PRECIPITATION COLLECTION

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: The Water Cycle
Activity #3: Sing the Water Cycle Song

Synopsis: This activity will reinforce the stages of the water cycle through song.

Activity Length: 5-10 minutes.

Materials: None.

Steps:
1. The child should now be familiar with the terms for the water cycle.

2. Look at the drawings (from Activity #2) and suggest singing the following song about it. The execution of the song depends on the parent:
- The parent could encourage the child to make up gestures to go with the activity
- The parent could have the child sing the main course and chime in with the 'Yes, it does!' parts
- If more than one child is participating, a round could be done on the song, with each person starting at different times

"**Water Travels in a Cycle**
(Tune: She'll be Comin' Round the Mountain)
(Song lyrics from Science for Ohio, 2000, Water Travels in a Cycle)

Water travels in a cycle. Yes, it does!
Water travels in a cycle. Yes, it does!
It goes up as evaporation,
forms clouds as condensation,
and comes down as precipitation. Yes, it does!"

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: Water and You!
Activity #1: What is a Water Footprint?

Synopsis: This activity introduces children to self-awareness on how much water they use.

Activity Length: 5-10 minutes

Materials: Any sort of coloring utensil (crayons, pencils, markers, etc).

Steps:
1. Provided is a list of different ways an individual uses water. As you read through it, let the child discuss whether they do or do not use water for that. Be sure to talk about connections (example: they do not own or drive a car, but their parents do and they ride in it!). The child should write down the words of the activities they use in the water footprint.

2. After all the ways they use water are written into the footprint, the child should then be asked how they feel about the different ways they use water, and what ideas they have on how they could use less water in the activities they listed.

3. As a bonus, if there is internet connectivity available from a personal device or at a public library, a fun online version can be taken here: http://www.watercalculator.org

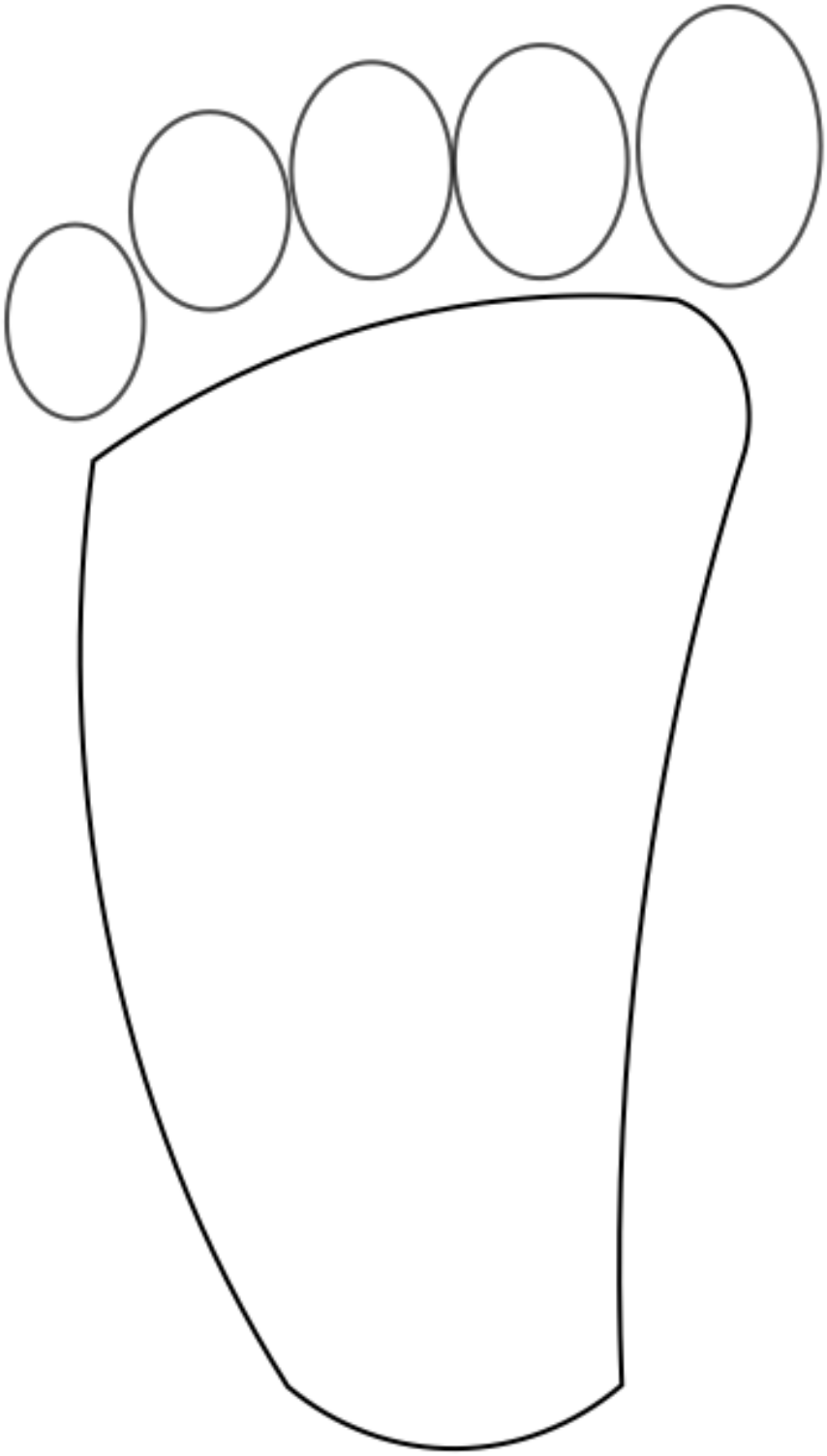
What Water-Using Activities Do You Use?

(Content adapted from Water Footprint Calculator, 2016, What's your water footprint?)

Do you take a shower?
Do you take a bath?
Do you use the bathroom faucet?
Do you flush the toilet daily?
Do you use the kitchen faucet?
Do you wash dishes (either in the sink or with a dishwasher)?
Do you do laundry?
Do you water a lawn or garden?
Do you go to the swimming pool?
Do you have a car?

Do you wash your car?
Do you drive in the car?
Does your house use electricity?
Do you go shopping?
Do you recycle paper?
Do you recycle plastic?
Do you recycle bottles and cans?
Do you donate or re-use old clothing?
Do you eat meat?
Do you own pets & buy pet food?

Water Topic of the Week: *Let's Talk About Water!*



Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: Water and You!
Activity #2: 'Water' You Feeling?

Synopsis: This activity is designed to emotional involve the child on the topic of water.

Activity Length: 10-20 minutes

Materials: watercolor palette, cup of water, paper towel, brush, paper, writing utensil

Steps:
1. Have the child right down 10 words that tie to their thoughts and emotions on water. Discuss.
- *Is water fun? Refreshing? Scary? Calm? Happy? Sad? Alive? Still? How does the child perceive water? They may have experiences with water that help shape this.*

2. Have the child do a watercolor painting that reflects their stated emotions on water.

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: Water Outreach in Your Community

Educating yourself, volunteering, and experiencing your community around you is important! By better participating in your community, you can help come together and make a difference.

Water is such a big topic, that a new appreciation for it can be found in many ways! By viewing, visiting, and volunteering, you learn to value water more!

Here are some suggested ideas of places to go and activities to do that revolve around the topic of water. Any of these - or maybe another one that you think of on your own! - can be used for the 'Experience Water in Your Community' activity that occurs at the end of every week

There are many places, foundations, programs that specialize in the outdoors and its importance. The activity questions are answerable for all these various activities:

Go to the...	**View a...**	**Volunteer with...**	**Try going...**
Aquarium	Lake or Pond	Trash Clean-Up	Walking or Hiking
Zoo	River	Habitat Restoration	Swimming or Snorkeling
Museum	Beach	Plant a Tree	Tide-pool Searching
Park or Garden	Wetland	Help with a Local Garden	Canoeing or Kayaking

Synopsis: The child will do some sort of activity in their local community that ties to water in order to continue to develop the appreciation of water as a value.

Activity Length: Dependent on selected activity.

Materials: Depends on selected activity.

Other Links: It is recommended that people use their personal devices or their local library's computer to search the internet and learn about the area they live in! If further volunteering is interest in, www.volunteermatch.org is highly recommended.

Water Topic of the Week: *Let's Talk About Water!*

Today's Topic: Water Outreach in Your Community

1. What was the activity?

_____
_____
_____

2. How long were you there for?

_____
_____
_____

3. What did you see?

_____
_____
_____

4. What did you hear?

_____
_____
_____

5. What did you smell?

_____
_____
_____

6. What did you touch?

_____
_____
_____

Water Topic of the Week: *Let's Talk About Water!*

7. What did you taste?

_____

_____

_____

8. List at least 3 positive things you felt about the activity?

1. _____
2. _____
3. _____

9. Was there any part you didn't enjoy? Why?

_____

_____

_____

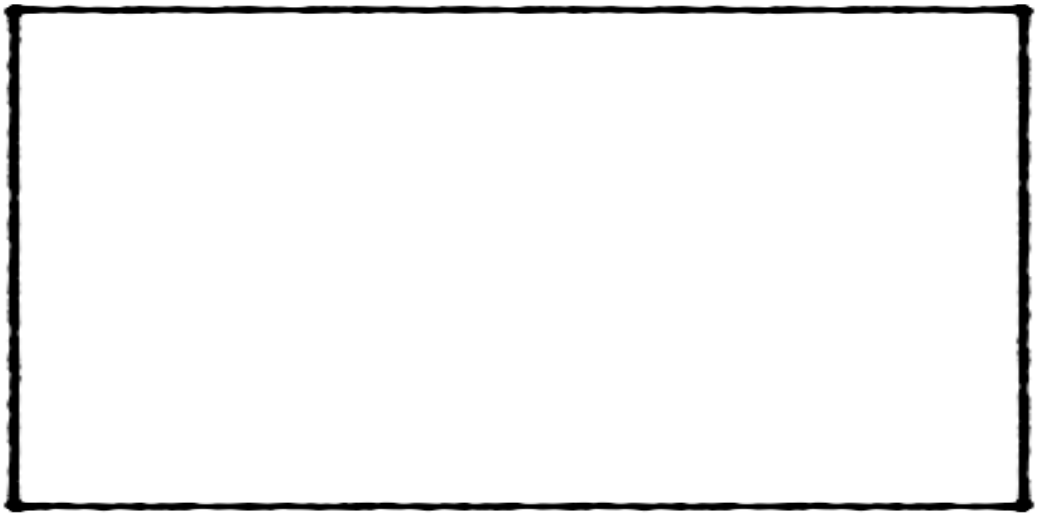
10. How does it make you feel about the importance of water?

_____

_____

_____

Draw a picture of your day!



Water in Your Daily Life!

Last week we learned about how water is everywhere in different forms! This week, we are going to look a bit closer to home. How do you use water in your daily life? Can you think of some ways right now?

When we talk about practicing water conservation, there are several different areas we can look at. We can look at how water is used inside your home and outside of it. This might include brushing your teeth, taking a bath, or really interestingly: water in the foods you eat! We can also look at how water is used around your neighborhood! This might include your how all your neighbors use water or how a local park or playground uses water!

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Exploring Inside
Activity #1: Mark Reminders

Synopsis: This activity encourages mindfulness in the child to save water around the house.

Activity Length: 10-15 minutes

Materials: scissors, tape or other adhesive material

Steps:
1. Have the child color in and cut out the "reminder" labels

2. Go around the house and label "reminders" labels to save water; let the child choose the spots. Gently suggest areas if the child is skipping over items.

3. At each spot the child wants to label, ask them how they can better save water.

4. Recommended areas include:
    - The Kitchen
        - on the dishwasher, as a reminder to use minimally
        - on a glass, as a reminder to reuse glasses instead of getting a new one!
        - on the faucet, as a reminder to not let it run
        - on the vegetable drawer, as a reminder to eat more veggies as they have a lower water requirement to grow than meat
    - The Laundry Room
        - on the washer, as a reminder to minimize as many loads as possible
        - on the dryer, as a reminder to minimize as many loads as possible
    - The Bathroom
        - on the faucet, as a reminder to not let it run
        - on the toilet, to minimize flushing
        - on the bathtub/shower, as a reminder to take shorter showers or fewer baths
    - Other
        - on lightswitches, to be turned off when not needed
        - on TVs, computers, and other electronics, to be turned off when not needed

Water Topic of the Week: *Water in Your Daily Life!*

Water Reminders

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Exploring Inside

Activity #2: Designated Glass Coaster Activity

(Activity adapted from Rebecca, 2015, DiY: Kid's cup saver coaster)

Synopsis: This activity focuses in on one specified example to focus the child on the concept of reuse and minimizing water usage based on their actions and changed behavior.

Activity Length: 10-15 minutes

Materials: cheap wood squares, non-water soluble paint, paintbrushes, cup of water to rinse paint, something to protect clothing and the table top

Alternate painting materials may be chosen if desired but the non-water soluable paint is recommended so that water/condensation from the glass on the coaster does not bleed and cause the coaster to stain.

Steps:

1. Lay out the materials.

2. Let the child paint their coaster as desire.

3. Leave in safe place to dry.

4. Use! Tell the child how actions like this are important in reducing waste (this example is one less dish in the dishwasher, meaning the dishwasher does not get fuller quicker and is not run faster).

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Exploring Inside
Activity #3: The Shower Song

Synopsis: This activity exposes a child to taken actions to change and conserve water.

Activity Length: 10 minutes

Materials: A shower, timer, a selected song to verbally sing or a music system to play a selected song.

Steps:
1. When the child goes to take their evening path, they will have five minutes to take a shower! The goal is to be able to showery thoroughly and hygienically in that amount of time.

2. The child, or parent, can start a time and verbally sing a song (perhaps several) that help the child know how much longer they have left to finish up, or they can listen to songs from a music system that do not extend past five minutes.

3. Afterwards, they can be asked:
- Did they shower thoroughly in five minutes?
- Did they feel rushed?
- Was it a challenge?
- Is there another way to extend time in the shower, without wasting water (the answer is turning off the shower when lathering up with soap!)

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Outdoor Time!

Activity #1: Water Bomb Hopscotch

(Activity inspired by Valerie, 2011, How to Make Sponge Bombs)

Synopsis: This activity introduces children to face about outdoor water usage.

Activity Length: 15-20 minutes

Materials: Water balloons, sink, container, chalk, paved surface, a container of any sort, scissors, the cut out facts from the activity booklet.

Steps:

1. Draw a hopscotch chart of ten squares (see image below).

2. In order to play hopscotch, a child throws an item into the first numerical square. The goal is not to touch the lines or go outside the boundary*.

3. The child then hops down the squares with one foot or both feet accordingly being sure to skip the square that has the item in it.

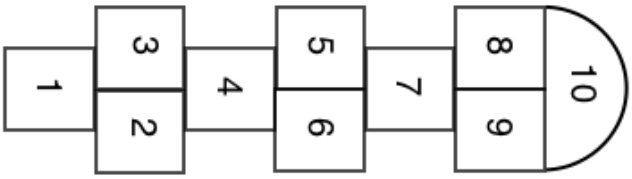
4. They hop all the way down and back the length of the hopscotch drawing.

5. *To make this more fun and tie in water, the child will throw a water balloon into the square - if the balloon exploded on the right square, they get to move forward. If not, they have to try again! The 'right square' is the next in the numerical sequence.

Example: *the first square they aim at is square 1; after hitting square one, they hop all the way down and back, being sure to avoid square 1. The next square is square 2; they aim at square 2; after hitting square two, they all hop all the way down and back.*

6. Once they make it back, they reach into the container and pull out a water fact and read it out loud! The adult can discuss consequences and ideas as pertaining to that water fact.

Hopscotch Diagram



Water Topic of the Week: *Water in Your Daily Life!*

Hopscotch Questions

(Facts quoted from GRACE Communications Foundation, 2017, Water Saving Trips: Outdoors)

"If you must, water your lawn when it's cooler - in the early morning or late evening - to reduce water loss from evaporation"	Use "plant native species that don't require additional watering"
"Set up a rain barrel under a gutter outside your house. On average, you can catch 4 gallons of water a day…to use for watering the lawn, washing the car, etc."	If you own a pool, "use a pool cover. Uncovered pools can lose up to a thousand gallons of water from evaporation each month"
"Use self-service car washes. They use the least amount of water because they use high-pressure hoses that have a pistol grip and can be turned on and off easily."	"Turn your sprinklers off when rain is expected, and set up a system with rain/moisture sensors if you have automatic sprinklers."
"Use a drip irrigation system instead of a hose or sprinkler to water your garden, and hand-water your lawn or garden instead of using sprinklers when possible - you could cut your water use in half."	"Direct gutter downspouts and the water drain line from your air conditioner to a flowerbed, tree base or your lawn."
"Don't let the hose run!"	"Set lawn mower blades one notch higher because longer grass = less evaporation."

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Outdoor Time!
Activity #2: Water Friendly Plants

Synopsis: This activity introduces children to facts about water usage by plants.

Activity Length: 15-20 minutes

Materials: Library book or other informational channeling device (i.e. webpage on a smart phone) on regional plants, any sort of coloring utensil (crayons, pencils, markers, etc).

Steps:
1. Go to your backyard or your local park to look at plants.

2. Read the below definition of: 'xeriscape'

3. Let the child pick four plants of their choice. Encourage variety.

4. Have them draw pictures of each plant.

5. Have them write down three facts about the plant.

6. Discuss whether the plant is from the local area, and how much water it uses.

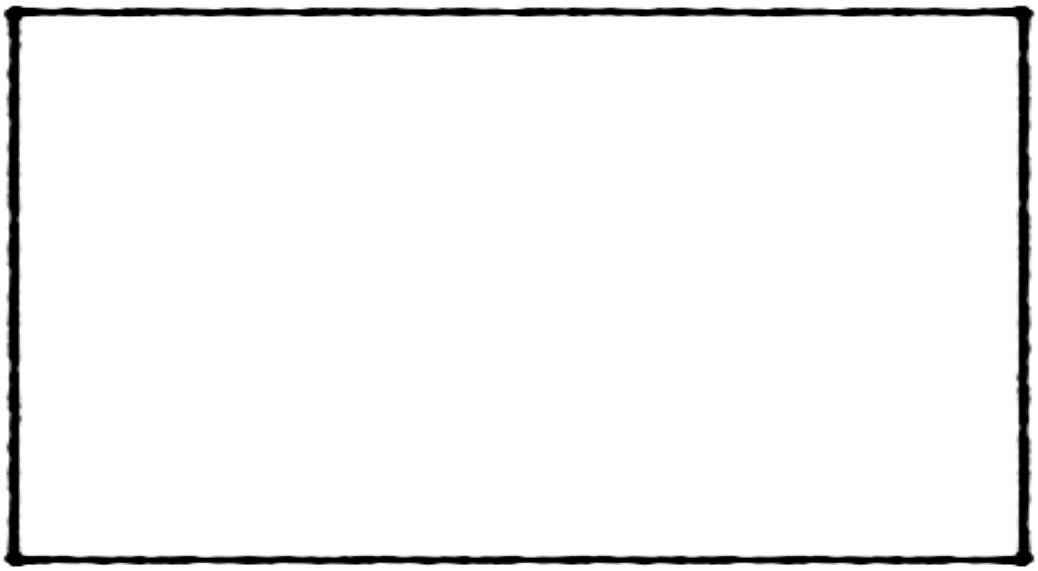
Xeriscape

(Content quoted from National Geographic, 2011, Xeriscaping)

"Xeriscaping is the practice of designing landscapes to reduce or eliminate the need for irrigation. This means xeriscaped landscapes need little or no water beyond what the natural climate provides…the most important environmental aspect of xeriscaping is choosing vegetation that is appropriate for the climate. Vegetation that thrives with little added irrigation is called drought-tolerant vegetation. Xeriscaping often means replacing grassy lawns with soil, rocks, mulch, and drought-tolerant native plant species."

Water Topic of the Week: *Water in Your Daily Life!*

Plant 1



This plant is a: _____

Fact 1.

_____

_____

Fact 2.

_____

_____

Fact 3.

_____

_____

Is it native? YES or NO

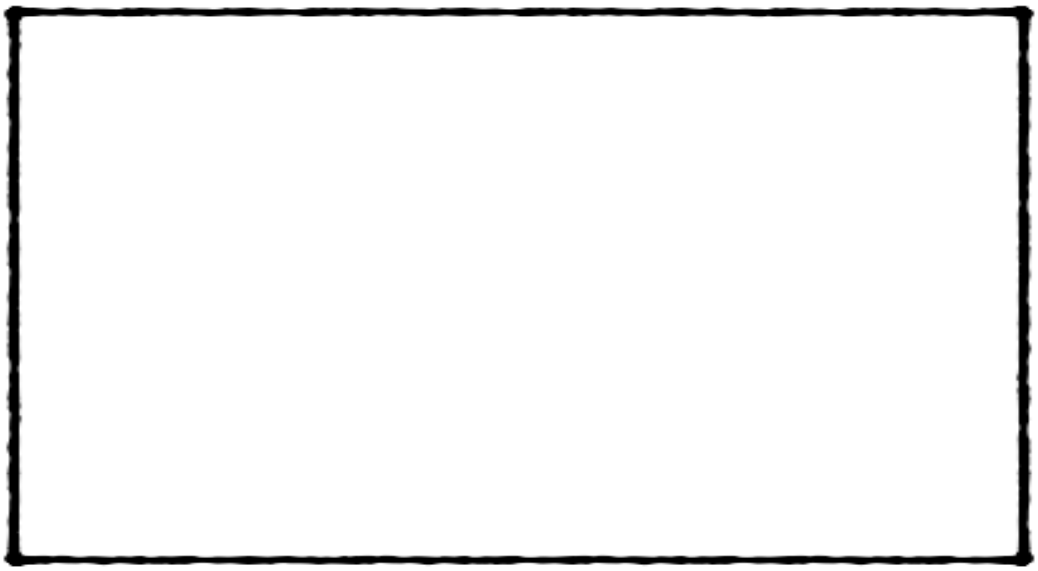
Does it use a lot of water?

_____

_____

Water Topic of the Week: *Water in Your Daily Life!*

Plant 2



This plant is a: _____

Fact 1.

_____

_____

Fact 2.

_____

_____

Fact 3.

_____

_____

Is it native? YES or NO

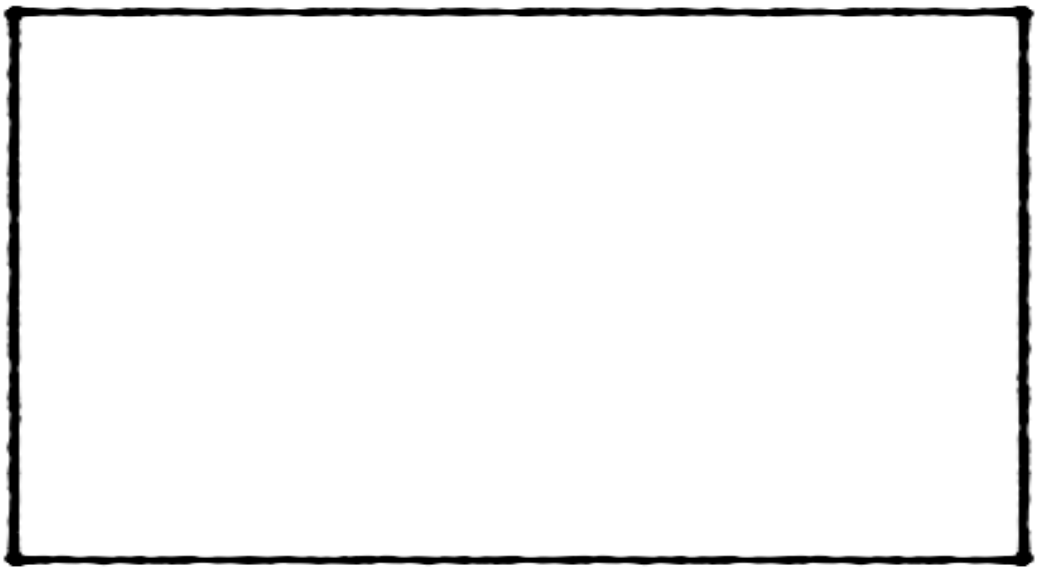
Does it use a lot of water?

_____

_____

Water Topic of the Week: *Water in Your Daily Life!*

Plant 3



This plant is a: _____

Fact 1.

_____

_____

Fact 2.

_____

_____

Fact 3.

_____

_____

Is it native? YES or NO

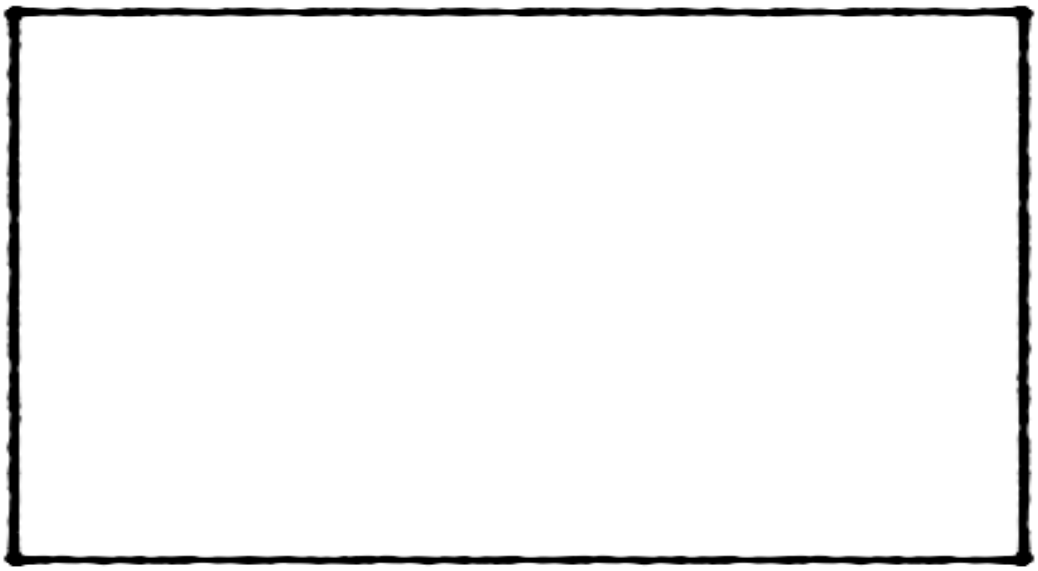
Does it use a lot of water?

_____

_____

Water Topic of the Week: *Water in Your Daily Life!*

Plant 4



This plant is a: _____

Fact 1.

_____

_____

Fact 2.

_____

_____

Fact 3.

_____

_____

Is it native? YES or NO

Does it use a lot of water?

_____

_____

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Around the Neighborhood!
Activity #1: I Spy

Synopsis: This activity encourages awareness of just how many items in our daily life around us use water.

Activity Length: Dependent on length of trip to grocery store or farmer's market.

Materials: Ability to walk or drive to a nearby grocery store or farmer's market; a writing utensil.

Steps:
1. Depart to the grocery store or farmer's market.

2. Let the child fill in the worksheet of everything they see.

3. When departing the grocery store or farmer's market, let the child continue to fill in the worksheet, if it wasn't already full.

4. Once you get home, ask the child if they were surprised by the amount of items that were connected to water.

I Spy!

Water is Tied to All of These Items!			
Cars	Hoses	Water Towers	Grass/Lawns
Motorcycles	Sprinklers	Dams	Flowers
Buses	Swimming Pools	Wells	Trees
Trains	Water Fountains	Rain Barrels	Shrubs
Boats	Bird Baths	Gutters	Gardens

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Around the Neighborhood!
Activity #2: Grocery Store Visit

Synopsis: This activity introduces the child to the wide range of plant-based meals they can eat to occasionally (or fully) offset eating meat and heavy-water using foods

Activity Length: 20 minutes

Materials: N/A (purchase ingredients off selected recipe)

Steps:
1. Let the child review a list of meals and select however many for preparation tomorrow night.

2 Let them go through the grocery store and pick out the appropriate ingredients.

3. Discuss taste, costs, and other uses (outside of the specified meal) that the ingredient can be used for. Let them select other vegetables and compare and explain why they would or would not be good additions to the meal.

Water Topic of the Week: *Water in Your Daily Life!*

Sara's Lentil Bean Wraps
(Ingredients and instructions provided by personal friend, Sara Manno)

Ingredients:

1 pack of burrito wraps (flour or corn)	1 pack of dry lentil beans
1 pack of taco seasoning/seasoning of choice	Butter, unsalted

Suggested Toppings of Choice:

Tomato, diced	Carrots, diced	Leafy greens, shredded
Sour Cream	Guacamole	Cheese, shredded

Instructions:
1. You will need a small sauce pan, measuring cup, measuring spoons, and spatula.

2. Melt 1 tablespoon of unsalted butter in a small sauce pan.

3. Add in ½ packet of seasoning mix package to small sauce pan and stir until evenly distributed.

4. Add in ½ cup of dried lentils and stir until evenly coated.

5. Add 1 cup of water, cover, bring to a boil, and then reduce to a low heat.

6. Allow lentils to simmer on low for about 20 minutes while covered; stir occasionally.

7. At 20 minutes uncover and stir.
Note: If lentils are too watery, allow them to simmer with the lid off for an additional 5-10 minutes, stirring them every 2 minutes to avoid sticking to the pan.

8. Remove pan from heat (be sure to turn off your stove!)

9. Add lentils to the burrito wraps.

10. Add toppings of your choice. Roll wrap and enjoy!

Water Topic of the Week: *Water in Your Daily Life!*

Tasty Southwest Vegetarian Chili
(Ingredients and instructions provided by McCormick Chili Original Seasoning packet and Lightlife Gimme Lean Beef)

Ingredients:

1 pack of chili powder mix (suggested: McCormick's - Original, Mild, or Hot)		
1 ground tofu or soy mix	Ear of corn	1 14 ½ oz. can of diced tomatoes
Green jalapeno, sliced	White or red onion	1 16 oz. can of black beans

Suggested toppings of choice:

Cheese, shredded	Small saltine oyster soup crackers

1. You will need a large skillet, cutting board, knife, and spatula.

2. Brown soy in a large skillet on medium-high heat.
Recommended brand is Lightlife's Gimme Lean Beef.
The ground soy takes around 5 minutes to 'brown'.
Because soy is firm, recommend utilizing the cutting board and "cutting" the soy into pieces and then adding to the skillet. This makes it easier to 'brown' and to divide it further within the skillet using the spatula.

3. Drain the excess fluid from the skillet.

4. Stir in Seasoning Mix, tomatoes (undrained) and beans (undrained).

5. Bring to a boil.

6. Cover. Reduce heat, and simmer 10 minutes, stirring occasionally.

7. Serve with toppings, if desired. Enjoy!

Water Topic of the Week: *Water in Your Daily Life!*

Easy Veggie Stir-Fry
(Meal and instructions by from Greatist)

Ingredients:

Brown rice or noodles (optional)	Chili paste
Sugar (or coconut palm sugar)	Soy sauce
Vegetable oil	Ginger
Vegetable medley of at least 3 vegetables: recommended: package of mushrooms, (2) bell peppers, 2 scallions, a head of broccoli, a handful of green beans Other options: yellow onion, zucchini, baby corn,, peas, water chestnuts	

Suggested Toppings:

Peanuts sprinkled, if desired

1. You will need a wok or large skillet, a small bowl, a spatula, a cutting board, knife, measuring spoons and measuring cups.

2. In a small bowl, whisk together 1 tablespoon of chili paste, 2 tablespoons of sugar, and ¼ cup of soy sauce. Set aside.

3. In a wok (or a large skillet) over medium-high heat, heat 1 tablespoon of vegetable oil.

4. Mince a 2-inch piece of ginger, add and let cook for 1 minute.

5. Add 1 cup of halved mushrooms, 2 chopped up bell peppers, 2 chopped up scallions, 1 cup of broccoli florets, and the handful of green beans chopped up.

6. Put a lid on wok/large skillet and let cook for 4 to 5 minutes. Toss and continue to cook and toss without a lid for another 2 minutes (tossing can be achieved using the spatula as a tool, if necessary, to turn the vegetables).

7. Add sauce from small bowl and toss (or turn) again. Cook for another 3 minutes until liquid has cooked off and vegetables are tender.

8. Enjoy!

Water Topic of the Week: *Water in Your Daily Life!*

California Veggie Sandwich
(Meal and instructions by Martha Stewart from 'martha stewart')

Ingredients:

1 bag of bread, multigrain	1 bottle, red-wine vinegar	1 carrot
1 red onion	1 pack alfalfa sprouts	1 avocado
1 radish	1 cucumber	1 pack, goat cheese

Suggested Toppings:

None

1. Sprinkle onion slices with a few dashes red-wine vinegar; let sit 10 minutes.

2. Lightly toast bread.

3. Spread 1 slice with goat cheese and layer with cucumber, alfalfa sprouts, onions, avocado, and grated carrot and radish.

4. Top with other slice of bread.

5. Enjoy!

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Try a Plant-Based Meal
Stand Alone Activity

Synopsis: This activity lets the child personally prepare and try a plant-based meal.

Activity Length: 30-45 minutes (estimate on prep, cooking, eating, clean up)

Materials: The grocery store items you bought last night; necessary cooking items for the meal chosen; necessary items to eat and clean up dinner.

Steps:
See directions included in the recipes from yesterday's activity.
Follow the directions in your selected recipe.
As your child enjoys their meal, ask them the following questions:
- What did they most enjoy about making the meal?
- Did they enjoy their meal? Did they not enjoy their meal?
- Do they think they'd be willing to try one of the other meals? Do they want to look for more vegetarian recipes?
- Do they think they could eat meals like these several times a week?

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Water Outreach in Your Community

Educating yourself, volunteering, and experiencing your community around you is important! By better participating in your community, you can help come together and make a difference.

Water is such a big topic, that a new appreciation for it can be found in many ways! By viewing, visiting, and volunteering, you learn to value water more!

Here are some suggested ideas of places to go and activities to do that revolve around the topic of water. Any of these - or maybe another one that you think of on your own! - can be used for the 'Experience Water in Your Community' activity that occurs at the end of every week

There are many places, foundations, programs that specialize in the outdoors and its importance. The activity questions are answerable for all these various activities:

Go to the...	**View a...**	**Volunteer with...**	**Try going...**
Aquarium	Lake or Pond	Trash Clean-Up	Walking or Hiking
Zoo	River	Habitat Restoration	Swimming or Snorkeling
Museum	Beach	Plant a Tree	Tide-pool Searching
Park or Garden	Wetland	Help with a Local Garden	Canoeing or Kayaking

Synopsis: The child will do some sort of activity in their local community that ties to water in order to continue to develop the appreciation of water as a value.

Activity Length: Dependent on selected activity.

Materials: Depends on selected activity.

Other Links: It is recommended that people use their personal devices or their local library's computer to search the internet and learn about the area they live in! If further volunteering is interest in, www.volunteermatch.org is highly recommended.

Water Topic of the Week: *Water in Your Daily Life!*

Today's Topic: Water Outreach in Your Community

1. What was the activity?

_____
_____
_____

2. How long were you there for?

_____
_____
_____

3. What did you see?

_____
_____
_____

4. What did you hear?

_____
_____
_____

5. What did you smell?

_____
_____
_____

6. What did you touch?

_____
_____
_____

Water Topic of the Week: *Water in Your Daily Life!*

7. What did you taste?

_____
_____
_____

8. List at least 3 positive things you felt about the activity?

1. _____
2. _____
3. _____

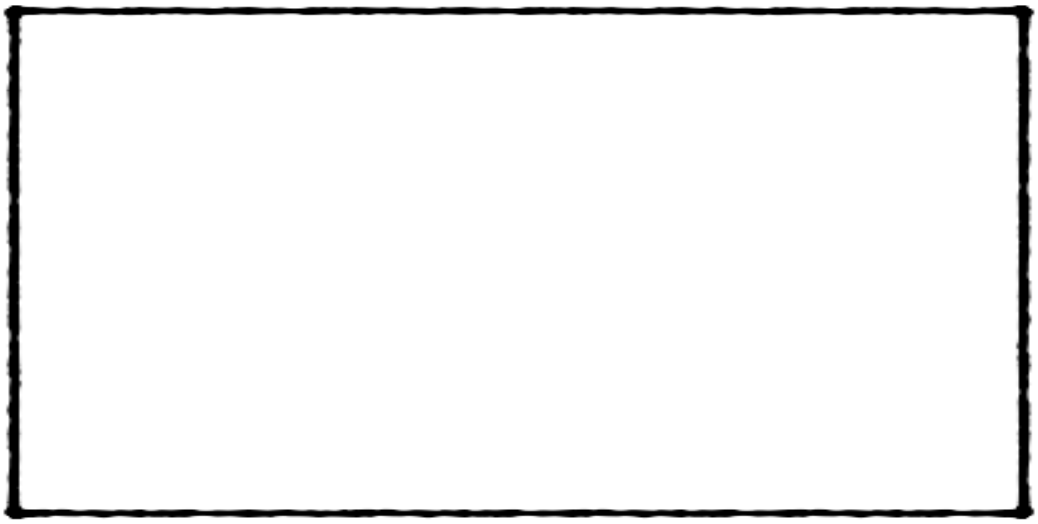
9. Was there any part you didn't enjoy? Why?

_____
_____
_____

10. How does it make you feel about the importance of water?

_____
_____
_____

Draw a picture of your day!



The Big Blue Picture!

We have learned about what water is, and we've learned about how we interact with it on a daily basis. But what about water usage when we look at the entire world? How does every human everywhere using water impact it as a resource? How does it help people in cities or in the countryside? How does water usage change nature around it and affect animals, birds, and fish?

Water usage on a large scale has a lot of far reaching effects! It is important to remember that your actions, and the actions of everyone around you, can really add up! If you know what an impact each human has, you have the knowledge to share with your friends and families why they should be more careful with how they use water! Remember that just because you cannot see anything happening around you, does not mean your water usage is not having an impact elsewhere!

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Farmer Farrah's Fields
Activity #1: Farming Facts!

Synopsis: This activity consists of a board game that will introduce children to the effects of farming on water usage.

Activity Length: 15 minutes-20 minutes

Materials: Scissors, the boardgames and pieces and cards provided in the activity boo

Steps:
1. Cut out following: the boardgame, the pieces for the boardgame, the two decks of playing cards (the "Fact" Cards and the "Movement" Cards)

2. Following the instructions of the game:

Instructions
The goal is to move the pieces from the tail of the caterpillar ("Start!") to the head of the caterpillar ("End!").

There are two decks of cards that will be used: "Fact" Cards and "Movement" Cards. These cards must be shuffled before starting the game.

How a Turn Works:

A. At the start of every turn, a player will draw "Movement" Card to find out how many spaces they will move.

B. They will move however many spaces the card lists. (A "space" is called a "water droplet")

C. After they land in their space (and follow any instructions on the space!), they will draw a "Fact" Card.

D. Every "Fact" Card must be read out loud to the group, so that everyone can learn about farming and water together!

E. This completes the player's turn and the next player begin's their turn.

* Cards should be discarded. If either card pile runs low, someone can reshuffle the cards and the new piles can be drawn from.

Water Topic of the Week: *The Big Blue Picture!*

Playing Pieces

Movement Cards

Move 3 Water Droplets forward!	Move 3 Water Droplets forward!	Move 3 Water Droplets forward!
Move 2 Water Droplets forward!	Move 2 Water Droplets forward!	Move 2 Water Droplets forward!
Move 1 Water Droplet forward!	Move 1 Water Droplet forward!	Move 1 Water Droplet forward!
Move 1 Water Droplet backward!	Move 1 Water Droplet backward!	Move 1 Water Droplet backward!

Water Topic of the Week: *The Big Blue Picture!*

Movement Cards

Move 3 Water Droplets forward!	Move 3 Water Droplets forward!	Move 3 Water Droplets forward!
Move 2 Water Droplets forward!	Move 2 Water Droplets forward!	Move 2 Water Droplets forward!
Move 1 Water Droplet forward!	Move 1 Water Droplet forward!	Move 1 Water Droplet forward!
Move 1 Water Droplet backward!	Move 1 Water Droplet backward!	Move 1 Water Droplet backward!
Move 3 Water Droplets forward!	Move 2 Water Droplets forward!	Move 1 Water Droplet forward!
Move 3 Water Droplets forward!	Move 2 Water Droplets forward!	Move 1 Water Droplet forward!

Water Topic of the Week: *The Big Blue Picture!*

Fact Cards 1-8

(Facts 1-8 quoted from Admin, 2012, Infographic: Interesting Facts About Farm Water Conservation)

#1: "70% of fresh water use globally is for agriculture"	#2: "Daily U.S. Agriculture Water use = 10 Billion Gallons."
#3: U.S. Agriculture uses "128 billion gallons" a year which "accounts for 40% of U.S. fresh water withdrawals"	#4: "85% of water withdrawals in developing countries is for agriculture"
#5: Only "4% of U.S. farms use drip or precision irrigation systems which are more efficient"	#6: "Most irrigated farms use 2-3 times more water than their crops need"
#7: "Between 50% & 80% of irrigation water [is wasted] through leaks, runoff, and evaporation"	#8: "Gallons of rainwater and irrigation used by global agriculture every year = 2 quadrillion"

Water Topic of the Week: *The Big Blue Picture!*

Fact Cards 9-16

(Facts 9-16 quoted from Admin, 2012, Infographic: Interesting Facts About Farm Water Conservation)

#9: Challenges to the Future include: "Global food production will need to increase 70%"	#10: Challenges to the Future include: "Global energy consumption will increase 36%"
#11: Challenge s to the Future include: "Water increase that will be needed for agriculture: 25%"	#12: By 2050 the global population will grow from 7 Billion to 9 Billion"
#13: "15% to 35% of agriculture irrigation withdrawals throughout the world are thought to be unsustainable"	#14: "Susceptible Regions" for overusing water include, "Western U.S., Northern India & Pakistan, Northern China, [and] Southeastern Australia."
#15: "Over 80% of freshwater from India, China, and Egypt is used for irrigation, as compared to nearly 1% in the U.K."	#16: 2 Quadrillion of water "is enough to cover the entire United States with 2 feet of water."

Water Topic of the Week: *The Big Blue Picture!*

Fact Cards 17-24

(Facts 17-21 quoted from Admin, 2012, Infographic: Interesting Facts About Farm Water Conservation)
(Facts 22-24 quoted from Shiozaki, J., 2014, 10 Ways Farmers are Saving Water)

#17: The concept of "indoor farming" means using "controlled rainfall."	#18: The concept of "indoor farming" means that excess water is recycled.
#19: The concept of "indoor farming" means we could "cut…plant growth from 12 to 6 weeks"	#20: "The concept of "indoor farming" means it could be done in "various types of locations"
#21: "The concept of "indoor farming" means farming could be "climate controlled"	#22: "Drip irrigation systems deliver water directly to a plant's roots, educing the evaporation that happens with spray watering systems."
#23: "Drip irrigation…can be used to schedule watering for cooler parts of the day, further reducing water loss."	#24: "Properly installed drip irrigation can save up to 80 percent more water than conventional irrigation."

Water Topic of the Week: *The Big Blue Picture!*

Fact Cards 25-32

(Facts 25-32 quoted from Shiozaki, J., 2014, 10 Ways Farmers are Saving Water)

#25: Some farmers "have built their own ponds to capture and store rainfall for use through the use…[which] minimizes… impact on the surrounding	#26: "Properly managed ponds can also create habitat for local wildlife."
#27: "Drought-tolerant crops" are "crops that are appropriate to the regions climate" and thus use less water.	#28: "Crop varieties" can be "Selected over time for their low water needs" such as "olives, Armenian cucumbers, teary beans, and orach."
#29: "Dry Farming" is when "farms don't irrigate" but "rely…on soil moisture to produce their crops during the dry season."	#30: "Rotational Grazing is a process in which livestock are moved between fields" which " increases the fields' water absorption and decreases
#31: "Compost and Mulch… has been found to improve soil structure, increasing its water-holding capacity."	#32: "Mulch made from organic materials such as raw or wood chips will break down into compost, further increasing the soil's ability to

Water Topic of the Week: *The Big Blue Picture!*

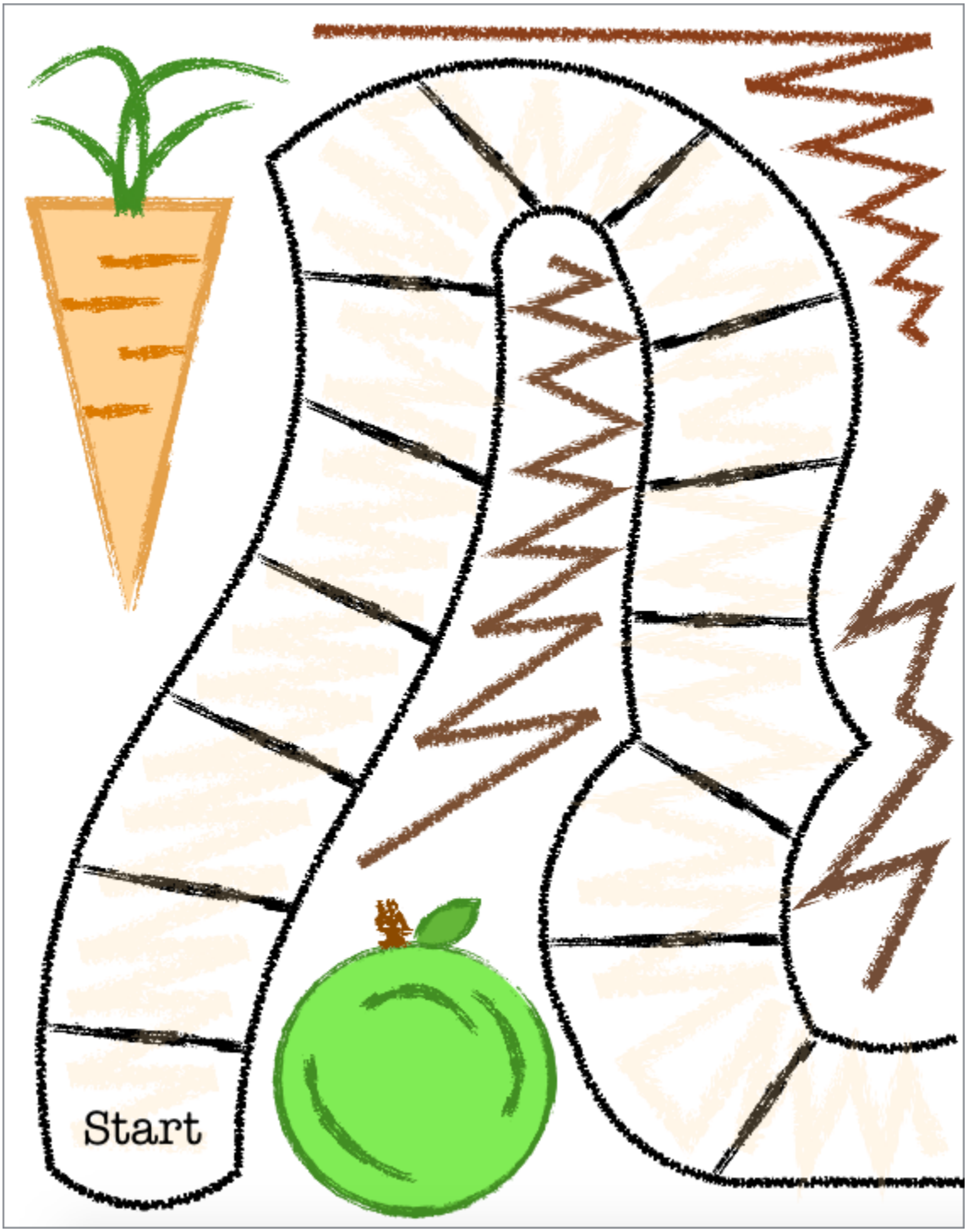
Fact Cards 33-40

(Facts 33-40 quoted from Shiozaki, J., 2014, 10 Ways Farmers are Saving Water)

#33: "Cover Crops…reduce weeds, increase soil fertility and organic matter, and help prevent erosion and compaction."	#34: "Cover Crops…allows water to more easily penetrate the soil and improves its water-holding capacity."
#35: "Fields planted with cover crops were 11 to 14 percent more productive than conventional fields during years of drought."	#36: " Conservation tillage uses…plows or other implements that partially till the soil but leave at least 30 percent of vegetative crop
#37: "Conservation tillage… helps increase water absorption and reduce evaporation, erosion,and compaction."	#38: "Going Organic" may have benefits; "corn grown in organic fields had 30 percent greater yields than conventional fields in years of
#39: "Going Organic" may have benefits; "organic fields can recharge groundwater supplies up to 20 percent."	#40: "Going Organic" may have benefits; "organic methods help retain moisture. Soil…serves as a sponge that delivers moisture to plants."

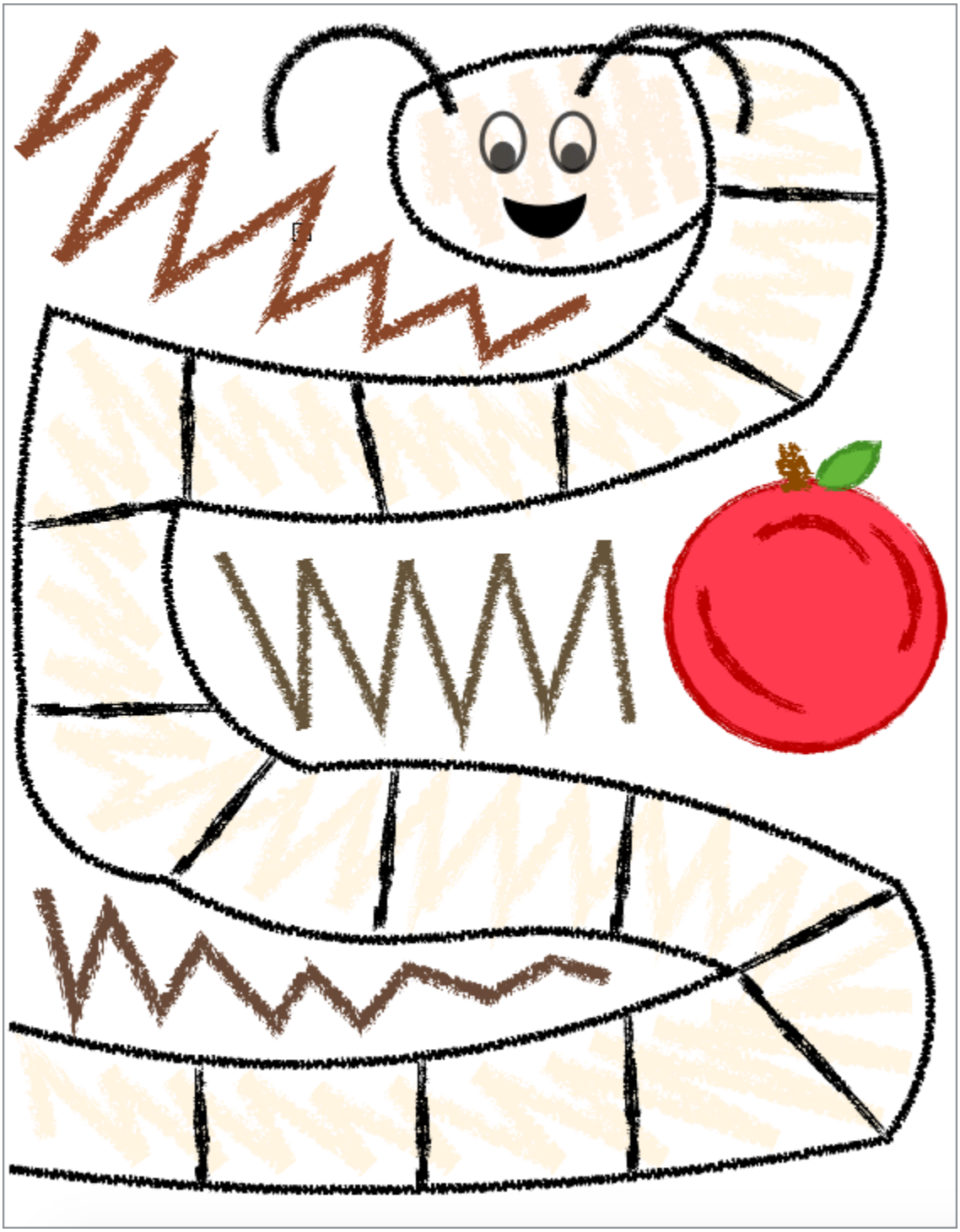
Water Topic of the Week: *The Big Blue Picture!*

Left Side of Boardgame



Water Topic of the Week: *The Big Blue Picture!*

Right Side of Boardgame



Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Farmer Farrah's Fields

Activity #2: Figuring Out Irrigation

(Activity adapted from Schock, J., 2010, Lesson: Way to Flow - Water Irrigation)

Synopsis: This activity introduces the child to the concept of different irrigation concepts and how to create one that uses the least amount of water.

Activity Length: 15 minutes

Materials: two plastic cups, a long and shallow container of some sort (to contain any water that spills); paper and pencil, a wide variation of construction materials (suggestions: straws, aluminum foil, Play-Doh, tape, toothpicks, paperclips, cardboard, rubber bands, glue, paper)

Steps:

1. The goal of the irrigation experiment displace water from one cup into the other cup. The more controlled the water gets to its destination, with the least spillage, is the best design.

2. Encourage the child to sketch out some ideas before constructing their paperwork.

3. Let the child then construct their first machine and test it out. Have them drawing their machine and the results on the activity sheet.

4. Have them either re-test the design, make improvements, or make an entirely new design! Have them draw their second, or modified, machine and the new results on the activity sheet.

There is no limit to creativity; a child could:

- tape straws together and pour water through, to mimic water pouring from sprinklers
- construct a tunnel with Play-Do to pour through, to mimic forced dams that guide water
- poke holes with the toothpicks in paper or aluminum foil, to mimic drip irrigation

Water Topic of the Week: *The Big Blue Picture!*

1. How did you construct your irrigation machine? Draw a picture below with an explanation next to it.

2. Did you make any changes? Did you make a completely new machine? Draw a picture below with an explanation next to it.

3. How did the goal of your irrigation experiment relate to real life irrigation done by farmers?

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Builder Ben's Blueprints

Activity #1: Urbanization

(All terms, definitions, informational flow pages and activity worksheet adapted from Department of Education and Skills, 2017, Water to and from our homes.)

Synopsis: This activity introduces the child the key words and phrases of how water gets from nature into their home.

Activity Length: 10 minutes

Materials: Writing utensil

Steps:

1. Have your child do the Word Search and learn about water works terminology!

2. Read the Water Works illustrations together.

3. Have your child fill in the appropriate terms on the worksheet to see the water works process!

Water Topic of the Week: *The Big Blue Picture!*

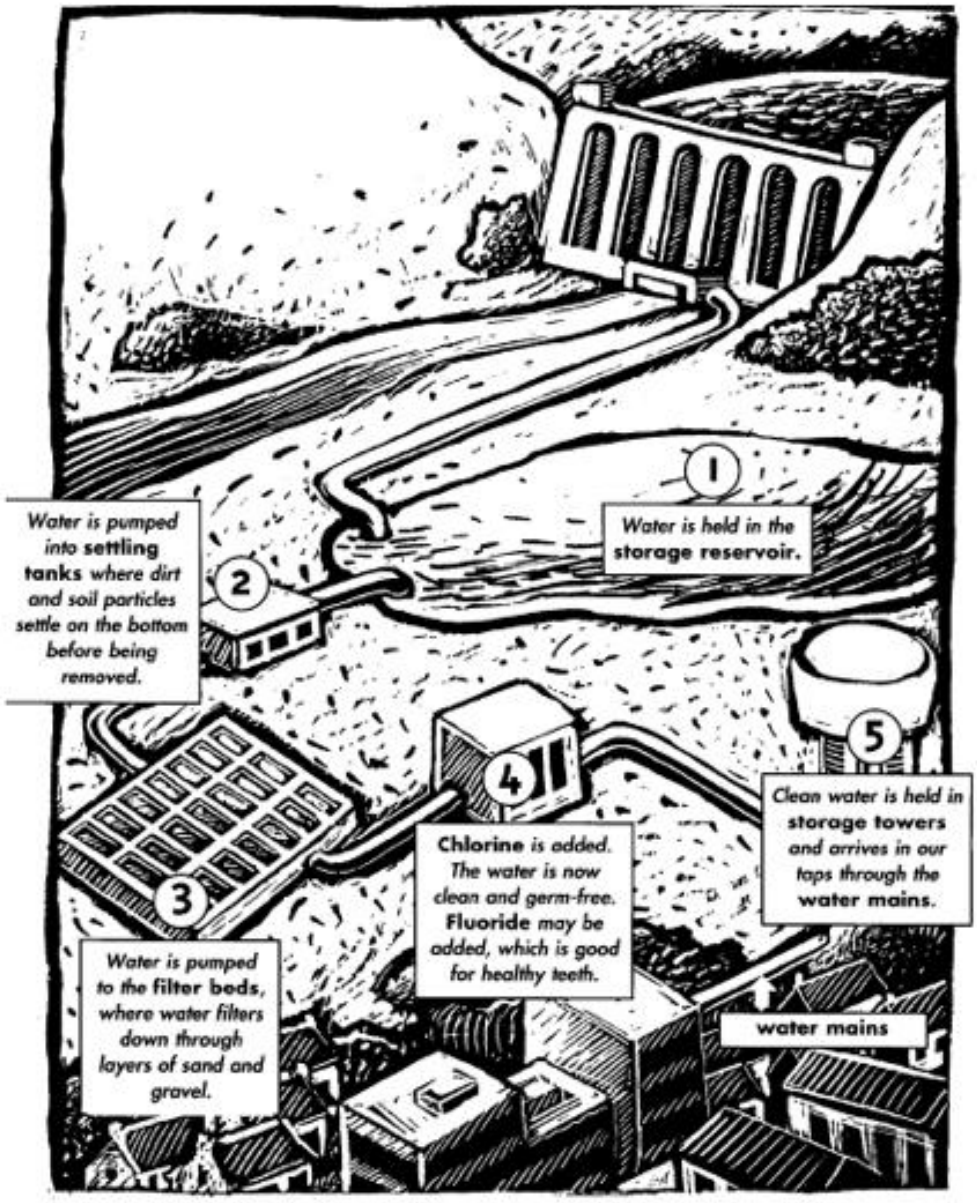
Water Works!

(Word Search created by using A to Z Teacher Stuff, 2017, Word Search Maker)

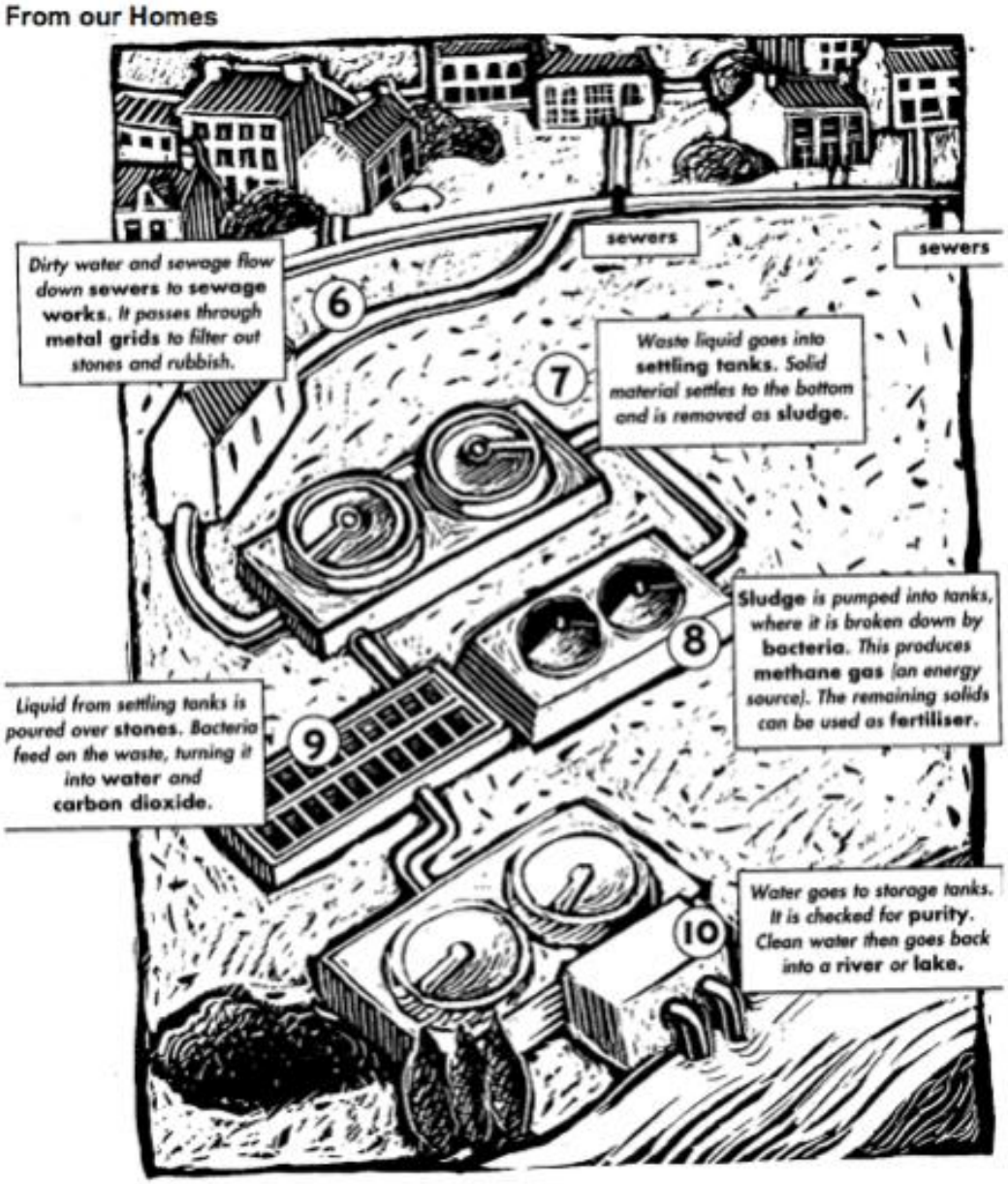
SETTLINGTANKS
FILTERBEDS
CHLORINE
STORAGETOWERS
SEWAGEWORKS
METALGRIDS
FLUORIDE
SLUDGE
STONES
WATER
CARBONDIOXIDE
METHANEGAS
FERTILISER
PURITY
RIVER
LAKE

Water Topic of the Week: *The Big Blue Picture!*

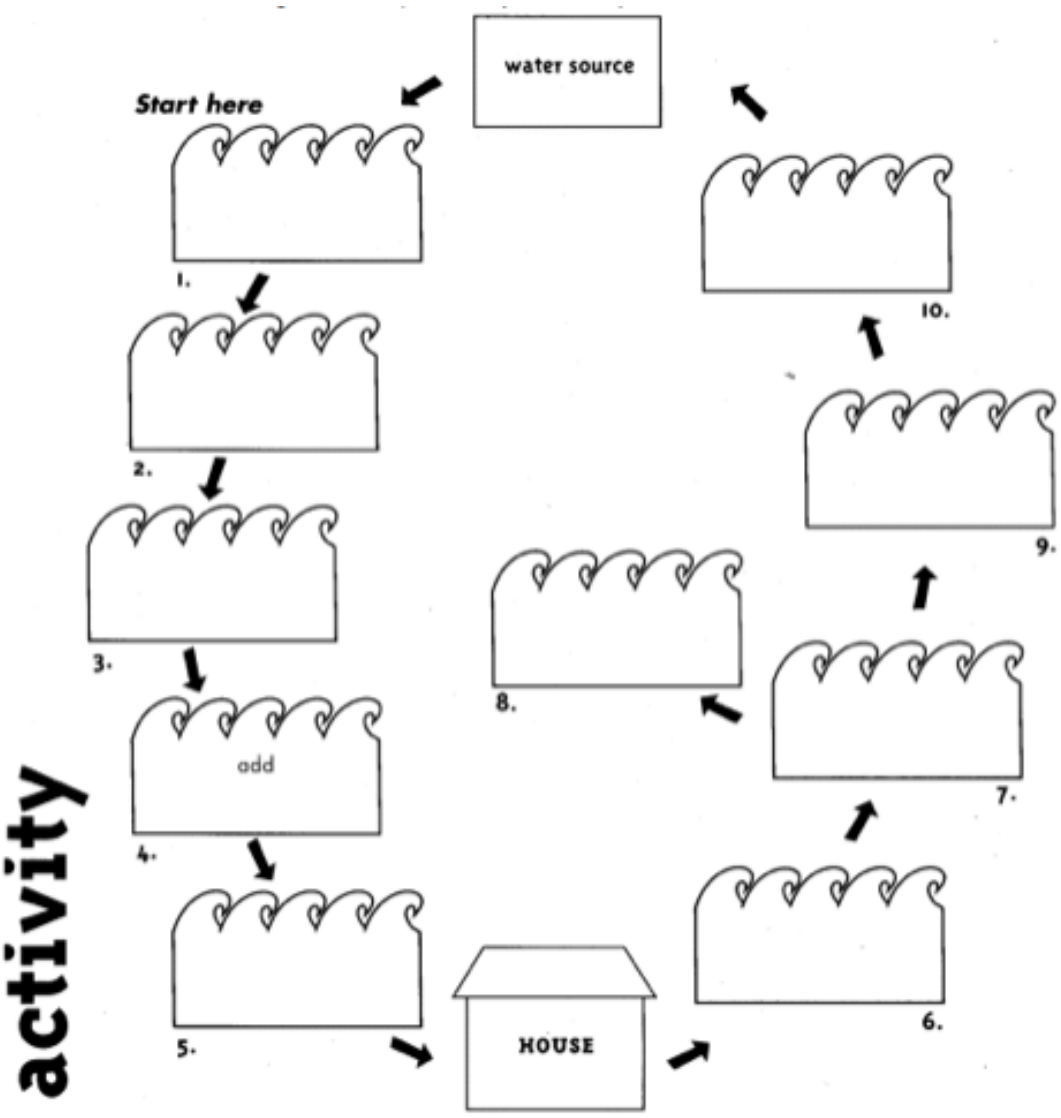
Water Treatment Works



Water Topic of the Week: *The Big Blue Picture!*



Water Topic of the Week: *The Big Blue Picture!*



Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Builder Ben's Blueprints

Activity #2: From Source to Home

(Activity and photo adapted from Lively, S., 2015, Water Pollution for Kids: Fun Science Activities)

Synopsis: This activity shows the child the process of how water gets from nature into their home.

Activity Length: 15 minutes

Materials: A plastic bin or box, garden soil or gravel or sand, straws and tape, multiple empty containers (milk cartons, water bottles, clear jars, plastic fruit boxes, etc.), coffee filter, scissors, tape, markers

Steps:

1. The child should use the worksheet from Activity #1: Urbanization to help aide in the process.

2. There will be no specific steps but a waterworks model should include::
   - a reservoir with natural barriers to prevent garbage from entering the water
   - a mixing and settling basin
   - a water storage tower
   - a gravel filter
   - a chlorine/flouride filter
   - a home
   - a toilet
   - a outbound of "dirty water" from the household toilet
   - tubing connecting the various structures
   - marked labels to annotate which structures are which

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Nature & Water

Activity #3: Down the Drain!

(Image for coloring adapted from Aqua2use, 2017, The Answer for Greywater Reuse)

Synopsis: Now that the child knows how water gets to their home, this activity exposes the child to the concept of greywater, a way to recycle water.

Activity Length: 10 minutes

Materials: Writing utensil

Steps:

1. Have the child read the paragraph out loud.

2. Have the child filling and color the greywater drawing

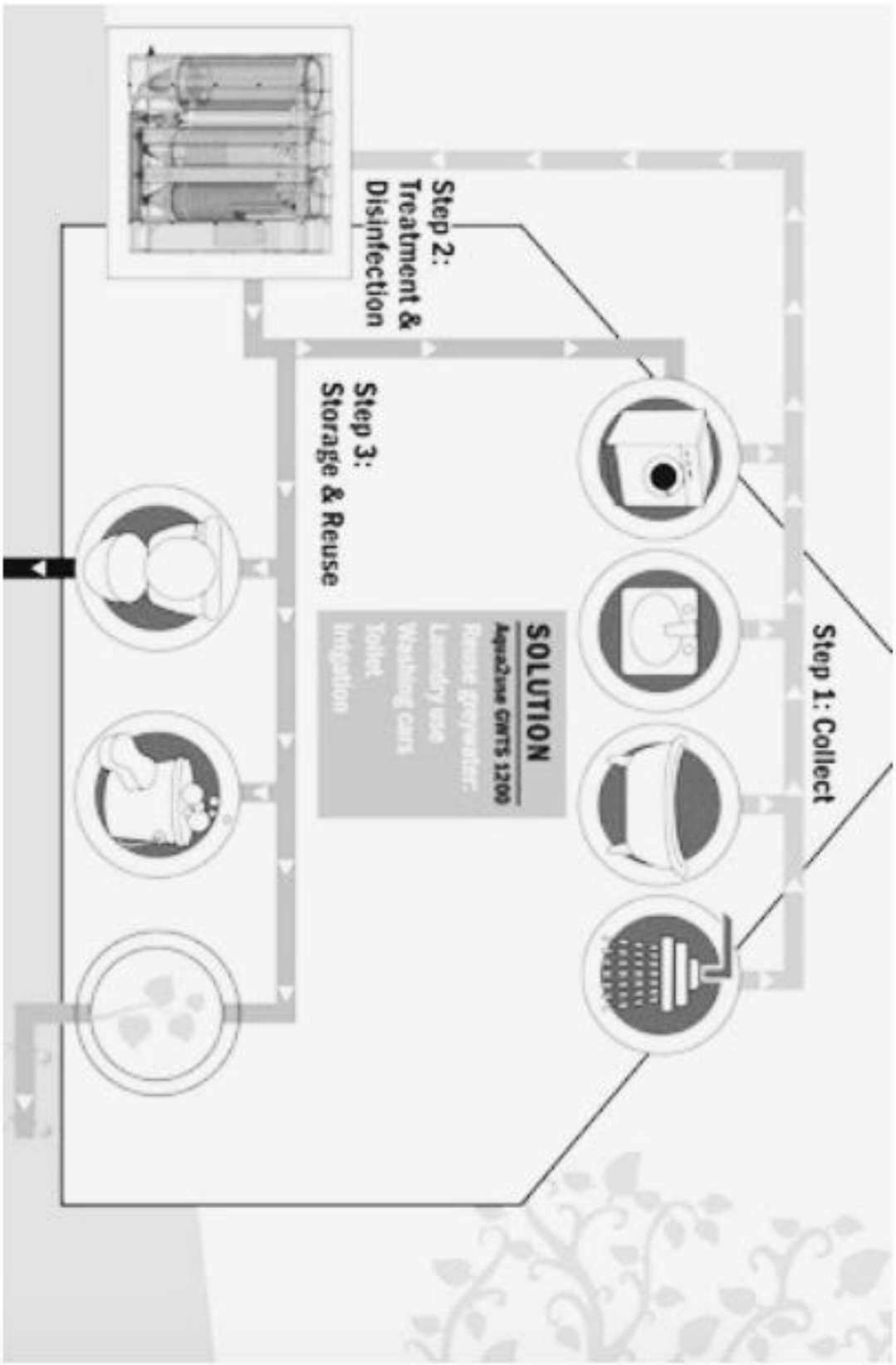
Greywater: Double Using Water!

(Content information derived from Tardiff, R., 2013, Greywater:What Is It and How Can It Make a Difference in Your Home?)

Did you know you can reuse some of the water that you use in your house?

Water that goes down the drain, like the shower or the dishwasher, is safe enough that - if filtered - it could be sent back through your house! Double-whammy! This type of water is called 'greywater.' Water from your sinks, your showers, your dishwasher, and your washing machines create this type of waste!

If a plumber installs a system for your family, it can be filtered and used to go provide toilet water, washing machine water, or even to water your lawn!


Step 1: Collect
Step 2:
Treatment &
Disinfection
Step 3:
Storage & Reuse
SOLUTION

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Nature & Water
Activity #1: Animals of All Kinds

Synopsis: The activity will introduce children to how animals depend on water and why it's important we preserve this resource.

Activity Length: 10-15 minutes

Materials: Scissors, tape, string, coloring utensils

Steps:
1. Have the child practice reading skills by reading out the below information on animals dependency on water.

2. Let the child pick a mask to color it in.

3. Once they're done, cut it out, cut a strand of string, and tape string to either side of the mask so the child can wear it.

Mask resources:
(Elephant mask from Template.net)
(Butterfly mask from Learn-Language)
(Frog mask from Woo! Jr)
(Monkey mask from Temploo)

Water Topic of the Week: *The Big Blue Picture!*

Animals of All Kinds!

All animals need water! Here are different examples of how animals need water! Share what you've learned by reading out loud!:

Elephants "drink water by using their long trunks to suck up about 14 litres of water at a time, then pouring into their mouths. They drink up to 200 litres of water a day, but can go up to four days without water and will use their tusks to dig wells if necessary. An elephant can smell water from 5 km away."

Butterflies "get the liquid they need from nectar. However, they need places to "puddle," as "puddling" provides the critical minerals that butterflies require." Also, "when butterflies get too hot, they may head for shade or for cool areas like puddles."

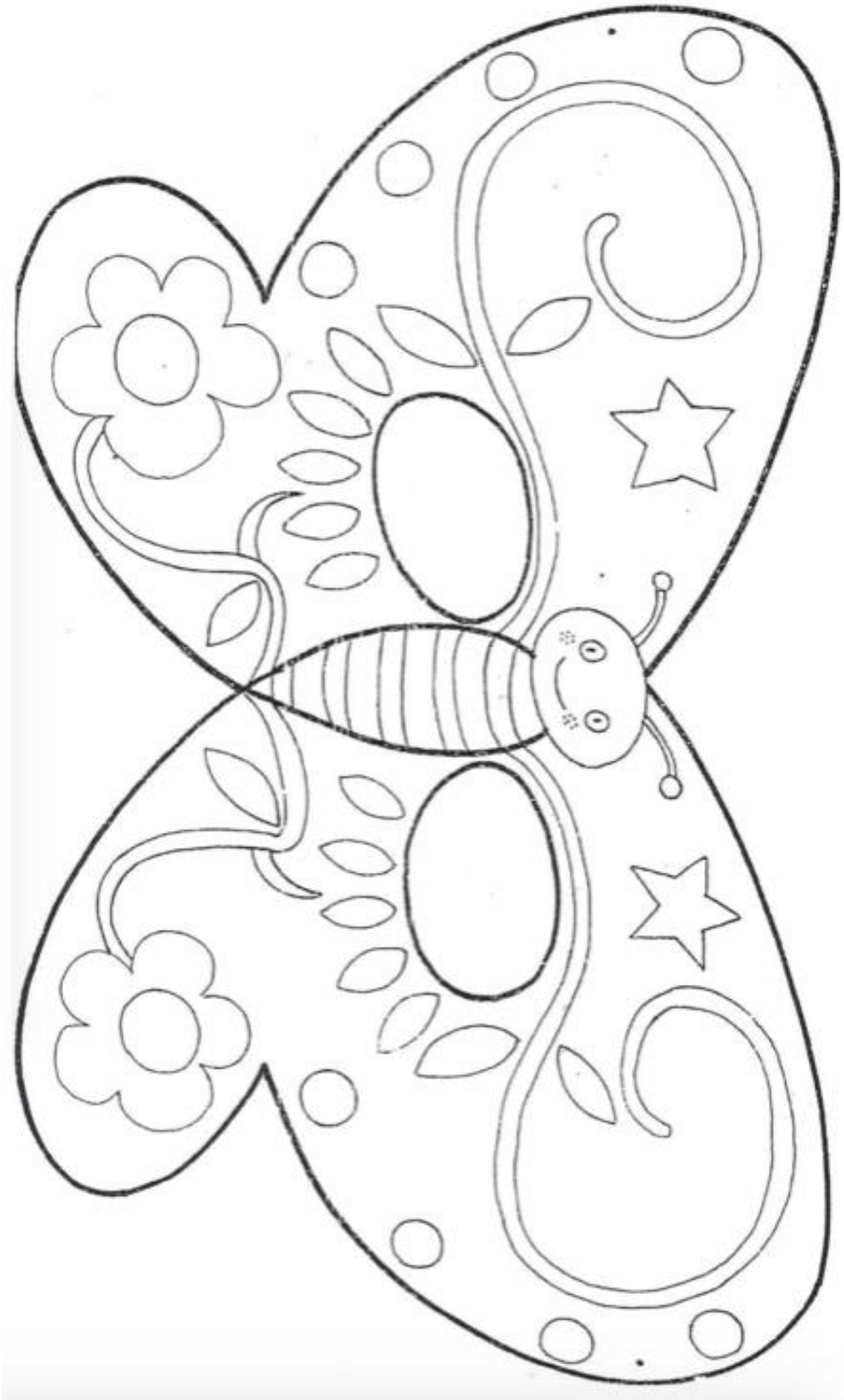
Frogs need water for a lot of reasons! They "lay their eggs in water [and] the eggs hatch into a tadpole which lives in water until it…[becomes] an adult frog. Although frogs live on hand, their habitat must be near swamps, ponds, or in a damp place…because they will die if their skin dries out. [And] instead of drink water, frogs soak it into their body through their skin!"

Monkeys: "The fruit sand the leaves that they eat in their natural environment contain lots of water…However, some species have been known to go drink water from rivers and streams. They don't drink it like most animals do though! Instead of using their tongue to lap it up they use their hand and make a cup. They may use large leaves too and fold them to create a cup that they can drink out of it!"

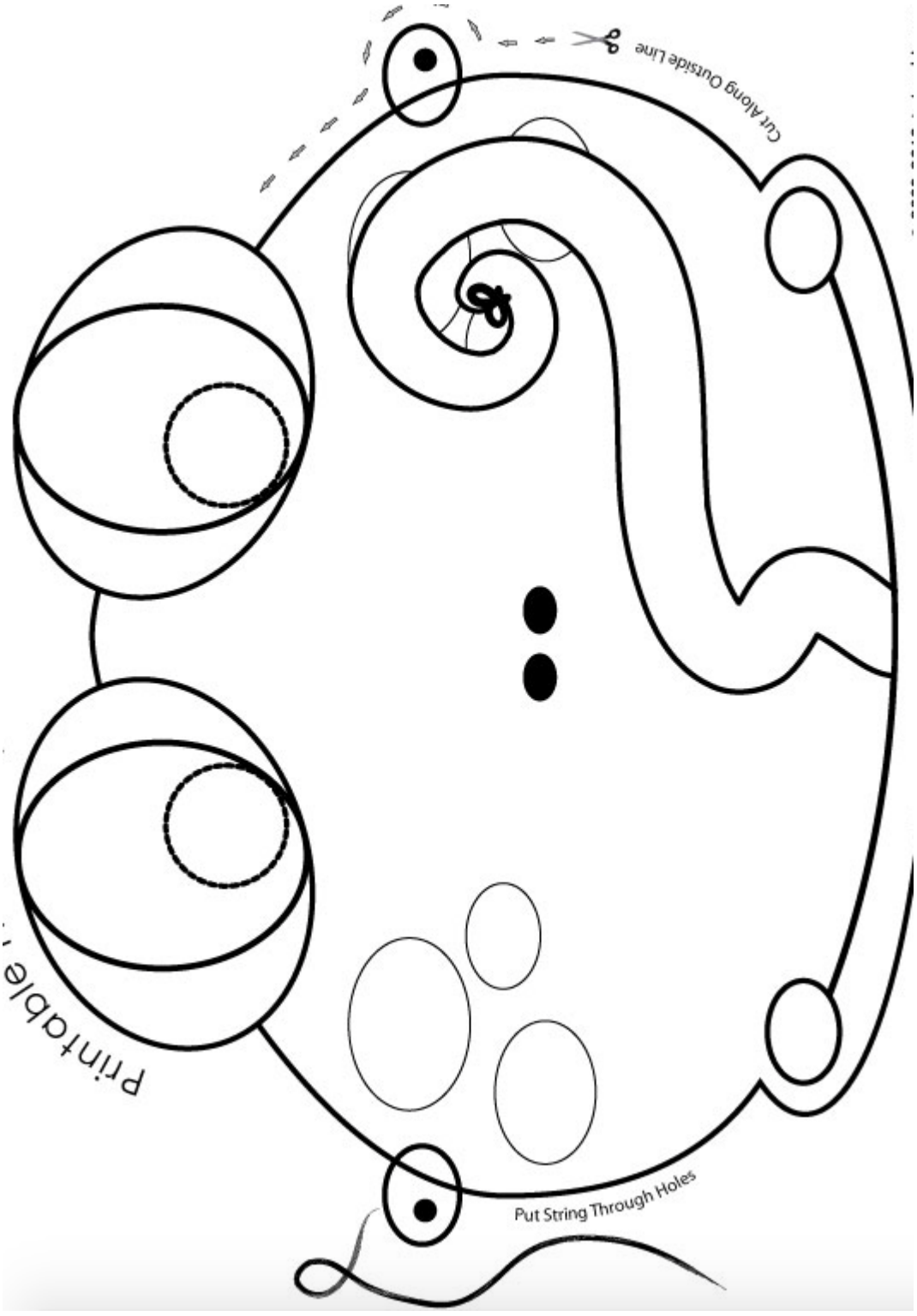
(Facts quoted from Elephants, 2017, Jumbo Foundation Elephant Orphanage)
(Facts quoted from Dyer, M. H., 2016, Butterfly Garden Feeding: How to Feed and Water Butterflies in Gardens)
(Facts quoted from All About Butterflies, 2017, University of Kentucky: College of Agriculture, Food, and Environment)
(Facts quoted from Fun Frog Facts for Kids, 2016, Animal Facts)
(Facts quoted from MonkeyWorlds, 2017, Monkey Feeding)

Water Topic of the Week: *The Big Blue Picture!*

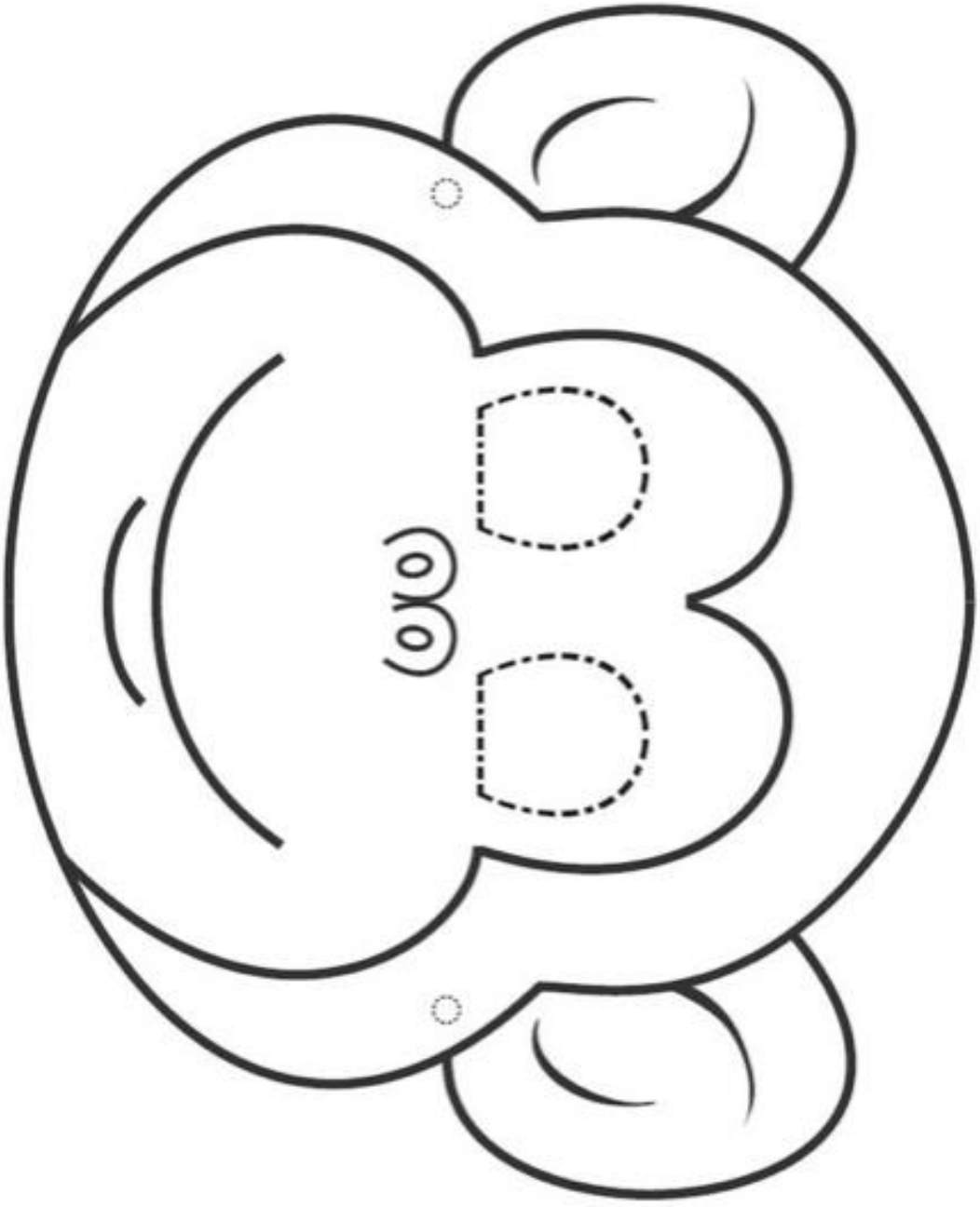
Water Topic of the Week: *The Big Blue Picture!*



Water Topic of the Week: *The Big Blue Picture!*


Cut Along Outside Line
Printable
Put String Through Holes

Water Topic of the Week: *The Big Blue Picture!*



Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Nature & Water
Activity #2: Mr. Fish's Home!

Synopsis: This activity will introduce children to facts about fish.

Activity Length: 10-15 minutes

Materials: Paper and scissors

Steps:
1. Have the child practice reading by reading out loud facts on fish. If you want to make it more interactive, you can alternate who reads out loud.

2. Make an origami fish! (Steps and pictures provided on the next page)

Mr. Fish Facts

(Facts quoted from Nelson, K., 2017, Fish for Kids: Learn all about aquatic and ocean marine life)

When people think of water, a lot of people think of fish splashing around! Let's learn more about Mr. Fish's life in his watery home!

~ "Fish are vertebrates, cold-blooded, and come in over 32,000 different species!

~ Fish come in different sizes (as small as a few millimeters to as big as forty feet!), can live in all kinds of water (saltwater, freshwater, from the surface of bodies of water down to the very bottom), and come in all kinds of colors and shapes!

~ Fish are able to breathe under water by using their gills, which filters in oxygen from the water (instead of how we use air!)

~ Fish eat many different things, from algae on rocks and sea plants like coral to other fish and animals!

~ The heaviest fish is a sunfish (it can weigh 5,000 pounds!)

~ The longest fish is a whale shark (it can grow to be longer than 40 feet!)

~ The fastest fish is a sailfish (it can swim up to 68 miles per hour!)

~ The smallest fish is a dwarf goby (9mm!)."[44]

Water Topic of the Week: *The Big Blue Picture!*

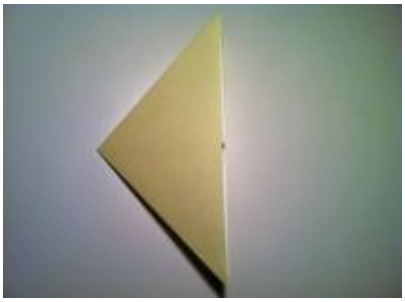
Origami Fish

(Photos and instructions adapted from Origami Way, 2017, Easy Origami Fish Instructions and Diagram)

Let's make your very own fish!

	"Step 1. Start with a square piece of origami paper. If you only have regular 8.5x11 paper, follow these instructions to make it into a square sheet.
 	Step 2: Fold the upper left corner to the lower right corner, then unfold.
 	Step 3: Fold the upper right corner to the lower left corner, then unfold.

 	Step 4: Fold the top half back, then unfold.
	Step 5: Poke the center with your finger so that the center pops in.
 	Step 6: Bring the left and right sides together so that the paper collapses into a triangle.

	Step 7: Rotate the triangle 90 degrees (counter-clockwise).
	Step 8: Fold the bottom corner up a little above the center as shown.
	Step 9: Fold the top flap over the bottom one as shown.
	Step 10: Turn the fish over and you're done. Draw the eye and some stripes to make it look nice!"

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Nature & Water
Activity #3: Birds In the Blue Sky

Synopsis: This activity will introduce children to information about birds and water.

Activity Length: 10-15 minutes

Materials: a milk or orange juice carton, scissors, string, a stick or popsicle stick, birdseed, and optional items for decorating the birdhouse (paint, markers, glue and paper, stickers, etc).

Steps:
1. Have the child practice reading by reading out loud facts on birds. If you want to make it more interactive, you can alternate who reads out loud.

2. Make a birdhouse! (Steps to activity provided on the next page)

Water Topic of the Week: *The Big Blue Picture!*

Birds in the Blue Sky

We always thinks of birds as having the sky as their domain, but many types of birds live in, depend on, and thrive around bodies of water!

Pelicans: A pelican "has many adaptations that help it catch the fish it eats. Air pockets in its bones help the bird float. Webbed feet are perfect for paddling along the surface of the water. And…[a] big pouch of skin under a pelican's beak is super for scooping up a meal! A pelican may eat up to 4 pounds of fish each day![45]"

Kingfishers: "To catch fish, they lazily fly over the water, swooping down to spear a fish with their sharp beaks….[They also] eat fish and crayfish…They live in burrows on the edges of streams, lakes, and ponds….A pair of kingfishers work together to build burrows…a burrow might be 3 to 8 feet long.[46]"

Flamingos: "Flamingos eat algae and tiny shellfish that are rich in carotenoids, which is why these birds are pink or orange! Flamingos have a funny way of eating. They place their bills upside down in the water and suck water into their mouths. Then they pump the water out the side of their mouths. Tiny plants and animals remain to make a tasty meal. Flamingos make nests from mud [and] usual lay only one egg.[47]"

Penguins: Penguins "live in Antarctica and the south hemisphere…Most penguins live near the sea, but migrate inland to have babies. Penguins eat krill or fish [and] are excellent swimmers, but they can't fly. Penguin populations have decreased by as much as 80 percent…Scientists believe climate changes have cause the decrease."[48]

Albatrosses: "Albatrosses have huge wings. Their wingspan can reach 11 feet…Their wings work like the wings of a glider. Albatrosses can glide for hours and hours above the ocean…when they get tired, they float on the ocean water. Albatrosses drink salty sea water…[and] eat fish and squid. Sometimes they follow boats to eat garbage.[49]"

(Facts quoted from San Diego Zoo, 2017, Bird: Pelican)
(Facts quoted from Tobin, D., 2017, Kingfisher Fun Facts for Kids)
(Facts quoted from Tobin, D., 2017, Flamingo Fun Facts for Kids)
(Facts quoted from Tobin, D., 2017, Penguin Fun Facts for Kids)
(Facts quoted from Tobin, D., 2017, Albatross Fun Facts for Kids)

Water Topic of the Week: *The Big Blue Picture!*

Make a Birdhouse

While you might not see any flamingos or penguins in your backyard, that are still many types of songbirds in your area that fly, drink, and eat! Get to know your backyard feathered neighbors by making a bird feeder and watching them up close!

Materials: a milk or orange juice carton, scissors, string, a stick or popsicle stick, birdseed, and optional items for decorating the birdhouse (paint, markers, stickers, etc.)

1. Rinse out the carton and make sure it's clean.

2. Take scissor and cut two circles on the lower half of the carton on opposite sides; these will be the "doors" for the birds!

3. Cut a slit at the base of each doorway and wiggle your stick from the outdoors or your popsicle stick down into it. This should stick out of each door way and is the perch for the birds to land on!

4. Have help making a hole at the top of the carton. Take a length of string and run it through this hole to the other side.

5. Decorate your birdhouse as you want!

6. Place bird seed into the base of the birdhouse, filling it to the base of the perch.

7. Find a place outside to hang your birdhouse and tie the string to let it hang.

8. Watch the birds come and visit!

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Our World
Activity #1: Catchphrase Conservation Poster

Synopsis: This activity will reinforce what the child has learned about the importance of water conservation over the course of the activity packet.

Activity Length: 10 minutes

Materials: A sheet of paper (optional: larger than a standard 8" by 10" sheet of paper, such as poster board), decoration and writing type materials (i.e., color pencils, markers, crayons, or stickers, glitter, and color glue).

Steps:
1. Let the child review the multiple provide water conservation phrases.

2. Have them design a poster where they include at least five phrases.

3. Let the child pick where to display their poster!

Water Conservation Catchphrases

(Catchphrases adapted from Gaille, B., 2013, 55 Examples of Catchy Water Conservation Slogans and Taglines)

A slogan on Water is a slogan on life.	Tap the Tap.	Want mental hydration? Think water conservation!
Be green like a pro, by conserving H20	Think outside the sink!	Waste water today, live in desert tomorrow!
Put a stop to the drop.	Today's rain water is tomorrow's life saver!	Water covers two-thirds of the surface of the Earth, but Fresh water is 0.002% on Earth.
Save water – every drop counts	Turning off the water while brushing your teeth, saves more water than you think.	Water is where the life comes from.
We never know the worth of water till the well is dry. Save Water!!	Water for the future generations….priceless.	Rainwater tank, won't break the bank.

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Our World
Activity #2: Conservation T-Shirt

Synopsis: This activity will reinforce what the child has learned about the importance of water conservation over the course of the activity packet.

Activity Length: 10-15 minutes.

Materials: An old t-shirt or a blank white t-shirt, permanent markers (optional: t-shirt specific design materials such as t-shirt paint or t-shirt glue.

Conservation T-Shirt

Let your child design a t-shirt however they want! It can be images, words, numbers or designs. It should promote water conservation!

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Our World
Activity #3: Your Very Own Plant

Synopsis: This activity will reinforce what the child has learned about the importance of water conservation over the course of the activity packet.

Activity Length: 10-15 minutes

Materials: potting soil, a plastic cup, a pack of seeds (type up to the child), water, a sunny place.

Steps:
1. Follow the instructions on the back of the seed packet for specifics to planting the seeds. The seeds must be covered in dirt, watered, and placed in a sunny spot.

2. Let the plant bloom!

Your Very Own Plant

We've learned so much about water conservation over the past few weeks! Grow a plant of your own and enjoy seeing the effects of water on nature! Remember that the health of nature is a responsibility that rests in your hands!

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Water Outreach in Your Community

Educating yourself, volunteering, and experiencing your community around you is important! By better participating in your community, you can help come together and make a difference.

Water is such a big topic, that a new appreciation for it can be found in many ways! By viewing, visiting, and volunteering, you learn to value water more!

Here are some suggested ideas of places to go and activities to do that revolve around the topic of water. Any of these - or maybe another one that you think of on your own! - can be used for the 'Experience Water in Your Community' activity that occurs at the end of every week

There are many places, foundations, programs that specialize in the outdoors and its importance. The activity questions are answerable for all these various activities:

Go to the...	**View a...**	**Volunteer with...**	**Try going...**
Aquarium	Lake or Pond	Trash Clean-Up	Walking or Hiking
Zoo	River	Habitat Restoration	Swimming or Snorkeling
Museum	Beach	Plant a Tree	Tide-pool Searching
Park or Garden	Wetland	Help with a Local Garden	Canoeing or Kayaking

Synopsis: The child will do some sort of activity in their local community that ties to water in order to continue to develop the appreciation of water as a value.

Activity Length: Dependent on selected activity.

Materials: Depends on selected activity.

Other Links: It is recommended that people use their personal devices or their local library's computer to search the internet and learn about the area they live in! If further volunteering is interest in, www.volunteermatch.org is highly recommended.

Water Topic of the Week: *The Big Blue Picture!*

Today's Topic: Water Outreach in Your Community

1. What was the activity?

_____
_____
_____

2. How long were you there for?

_____
_____
_____

3. What did you see?

_____
_____
_____

4. What did you hear?

_____
_____
_____

5. What did you smell?

_____
_____
_____

6. What did you touch?

_____
_____
_____

Water Topic of the Week: *The Big Blue Picture!*

7. What did you taste?

_____

_____

_____

8. List at least 3 positive things you felt about the activity?

1. _____
2. _____
3. _____

9. Was there any part you didn't enjoy? Why?

_____

_____

_____

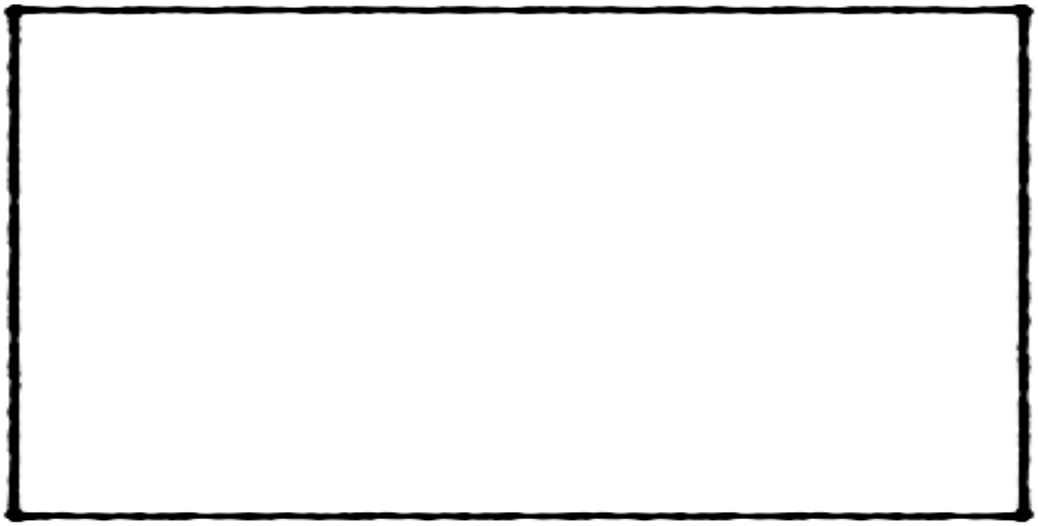
10. How does it make you feel about the importance of water?

_____

_____

_____

Draw a picture of your day!



Conclusion: The Wonder of Water

Wow, we really learned a lot about water! We learned about what is water is, where it is found and the form it comes in, and how we leave a water footprint! We also learned about how we use it in our daily lives, inside and outside of our home and in our community! Finally, we learned about water and its overall role in the world, with how plants, animals, and people all depend on it!

Water is a precious resource!

The world cannot go around without it! We must treat it with respect and care. Now you have learned a lot of different ways that you can better care for it! Remember what you have learned, and be sure to encourage your friends and family to join in on the effort to conserve water!