NARRATIVES OF NATURE: TELEVISION’S STORYLINE
AND PRESCHOOL VIEWERS’ ACCOUNTS

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Abstract

Preschool children grow up in a media-saturated environment, easily accessing a variety of technologies, including television. This study investigated the environmental content in both the television programming for preschool children and in the personal narratives of this viewing audience. Cultivation studies suggest the lack of environmental content on television, coupled with heavy viewing patterns, reduces individual concerns for the environment. This study explored the possible cultivation effect that television viewing enacts on preschool children’s conceptions of the environment. A content analysis coded environmental actions and environmental literacy benchmarks on preschool television. Interviews with preschoolers explored their conceptions of the environment through a play-based narrative. Findings include: environmental content exists on television but lacks frequency and context to enhance audience understanding; and preschool children utilize experiences from their daily lives and from television to explain “nature.”
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Chapter One: Introduction

By the time they hit the 4-6 year-old age group, children are living richly media-centric lives, often with their own media that they can take with them on the go, or use by themselves in their rooms, and with many youngsters eating and going to sleep to TV on a regular basis…. By this age, “new” media have become a regular part of children’s media diets. (Rideout & Hamel, 2006, p. 33)

Electronic media is a constant presence in the lives of North American preschool children and their families (Vandewater et al., 2007). Preschool children—infants and young children to six—spend an average of two hours per day with screen media in the form of television shows or videos (Rideout, Vandewater & Wartella, 2003). Many parents value the media for their educational benefits and positive effect on the social behaviours of their children (Rideout et al., 2003).

Yet, parents also feel that their young children are disconnected from the natural world (Clements, 2004). Author Richard Louv coined the phrase, Nature Deficit Disorder (Louv, 2005), to describe the possible effects that might be attributed to a reduction in a child’s connection with the natural world. He suggests that greater time spent outside in nature will improve many attention and behavioral conditions afflicting children today. For example, time spent in the natural world—or even the simple viewing of pictures of natural environments—can improve cognitive functioning (Berman, Jonides & Kaplan, 2008). Exposure to green space on a daily basis can also improve the attention of children diagnosed with attentional deficit disorder (Faber Taylor & Kuo, 2009; Faber Taylor, Kuo & Sullivan, 2001).
If the benefits of time spent in the natural world can be demonstrated, why are children disconnected from nature? Videophilia, the human tendency to focus on sedentary activities involving electronic media (Zaradic & Pergams, 2007); ecophobia, fear of harm from the natural world (Sobel, 1999); and stranger danger, fear of abduction by strangers (Valentine & McKendrick, 1997), may contribute to a reduction in the amount of time that children spend outside. Parents fear the potential harm that may come to their children either from the natural world, human structures such as roads, or from strangers that lurk in these outdoor spaces (Carver, Timperio & Crawford, 2008; Valentine & McKendrick, 1997).

According to Zaradic and Pergams (2007), children spend more time inside exploring video screens than outside in their local environment. One such screen is television. Does increased television viewing lead to less time spent outdoors? Some parents blame television for a reduction in outside play (Clements, 2004), but a causal connection between increased television viewing and decreased outdoor play cannot be substantiated by others (Rideout et al., 2003; Vandewater, Bickham & Lee, 2006; Vandewater et al., 2007).

**Research Opportunity and Questions**

Children readily access and interpret information in our increasingly mediated society, yet our knowledge of the impact of media on the development of children has not kept pace (Rideout et al., 2003). This study explored the environmental storylines presented by television that is designed for preschool children, looking at whether the programming offered environmental literacy benchmarks and pro-environmental behavioural role models. Social cognitive theory (Bandura, 1989) suggests that preschool
children, age three to six years, learn by emulating the models they observe. But preschool children are not just emulating models without thought; young children have the ability to understand and to recognize the importance of ecological issues (Cohen & Horm-Wingerd, 1993; Grodzinska-Jurczak, Stepska, Nieszporek, & Bryda, 2006). The ability of preschoolers to think about environmental issues has implications for curriculum design in classrooms, community and nature centres, and educational media.

Recognizing the need for further research into the mediated world of preschool children and the ability of preschool children to understand ecological issues, this study addressed the following research questions:

R1: What environmental content exists in television programming designed for preschool children?

R2: What conceptions of the environment do preschool children share in their stories?

R3: Does television viewing affect preschool children’s conceptions of the environment?

This research utilized a mixed methods approach: a content analysis to determine environmental content on preschool television programming and a play-based narrative inquiry to determine individual preschool participant’s conceptions of the environment.

Research Significance

Decades of research clearly demonstrate that children’s educational television programs—programs designed to teach an education goal—enact a positive, long-term impact on preschoolers’ academic and social skills (Schmidt & Anderson, 2007). Environmental literacy can be deemed a necessary academic skill and pro-environmental
actions can be classified as necessary social skills in our society (Orr, 2004). However, there exists little research regarding the environmental content in television programming designed for preschoolers and its potential impact on the viewing audience.

Preschool television—programming specifically designed for children under six years of age and generally aired on weekday mornings—can successfully teach long-term academic and social skills. Can preschool television also provide environmental learning to enhance preschooler connections with, and understanding of, the natural world? “Because social and intellectual development are more malleable in these early years, media use at this age could have an especially significant impact” (Rideout et al., 2003, p.3). Alternately, the prolonged viewing of television programming that lacks environmental storylines at this stage of development could also be understood as a cultivation effect, reducing environmental content or concern in the stories of preschool children. A full discussion of cultivation theory and cultivation effects can be found in subsequent chapters.

Findings will provide valuable information for the development of guidelines for the improvement of environmental content on television. This research will also suggest ways to utilize the narratives that preschoolers share about the environment to guide the planning of environmental education and communication in classrooms, communities, and in the media.

*Structure of Manuscript*

Chapter One has provided an introduction to my research, identified the significance of this research, and outlined the research questions I explored. The remainder of this section will describe my perspective on preschool television and
environmental education for preschoolers and my interest in expanding the field of research into preschool children’s abilities to share their conceptions and opinions.

Chapter Two explains the literature and research that influenced this study. The discussion describes the increasingly mediated world of preschool children and outlines social cognitive theory (Bandura, 1989) and cultivation theory (Gerbner, 1998) as the theoretical foundations for this research. This chapter also reviews the definitions of environmental literacy and explores the developmental abilities of preschool children to recognize and to explain their understanding of environmental connections and concerns.

Chapter Three identifies and explains the research methodologies utilized to answer my three research questions. Chapter Four presents and discusses the findings of the content analysis and outlines the environmental content found on television designed for preschool children. Excerpts from children’s play-based narratives and my interpretation of their stories are also presented and discussed. The chapter closes with a discussion of the possible effects of television viewing on the stories and symbol recognition of preschool children in this study. Chapter Five explains the contributions my findings can offer to various fields of study, explores this study’s limitations and delimitations, and suggests future areas of research.

Study Limitations and Delimitations

A complete discussion of limitations and delimitations of this study can be found in Chapter 5: Conclusions.
Researcher's Perspective

I am a grade school teacher and sustainability educator with a passion for environmental education within traditional classrooms and in non-formal settings. As an educator, I believe that every encounter and conversation that one partakes in—with other humans and with the non-human world—is a learning experience that can have a formative effect not only on knowledge, but also on beliefs and values. This includes encounters that are transmitted via mediated forms of communication such as radio, computer technology, and, important to this study, television. I have grown up with television, and continue to watch a variety of programs, so I am not immune to television’s message of consumption and materialism. However, I believe that television’s messaging system can also be used to influence environmental concern and action, particularly in the genre of preschool television. These beliefs may have influenced my interpretation of the environmental actions and literacy benchmarks on the preschool programming in this study; my expectations for quality environmental content are high.

I am also the mother of two young children, just beyond the age range of this study. I feel that preschool voices have been underrepresented in most discussions regarding environmental education. Programs have been designed for preschoolers but have not been designed with preschoolers, choosing instead to view this age group as developmentally unable to reflect upon their learning. Fortunately, researchers are beginning to recognize preschool children’s abilities to share their conceptions and opinions. I am interested in following this path, choosing to believe that preschool
children are capable of explaining what they know and capable of assisting adults in creating meaningful and relevant learning experiences.
Chapter Two: Literature Review

Growing Up in a Mediated World

Young children in North America are growing up in a wired world—a world where mediated communication is a constant presence that is integrated into their daily lives (Fisch, 2007; Meszaros, 2004; Rideout & Hamel, 2006). According to a study commissioned by the Kaiser Family Foundation in 2006, *The media family: Electronic media in the lives of infants, toddlers, preschoolers and their parents*, 99% of American children six months of age to six years have a television in their household and 84% have more than one television. Ninety-three percent of children in this study have a VCR or DVD player in their home; 33% have a portable DVD player. Fifty percent of these households have a video game player, 78% have a personal computer, and 69% have internet access (Rideout & Hamel, 2006).

The pervasiveness of media can be attributed to the increased marketing of programs and products that are specifically designed for preschool children (Garrison & Christakis, 2005) and to the convergence of digital media capabilities—i.e. cell phones now have the capacity to take pictures, access the internet, play music, and show television programs and movies (Thorn, 2008). The expanded presence of media, including television, into the lives of preschool children offers possibilities and warnings. According to Fisch (2007), there are opportunities that come with the increased media:

The ubiquity of media in children’s lives not only points to its potential influence on children’s development (and, thus, the importance of studying children’s
interaction with media), but also presents a valuable opportunity for providing children with rich educational experiences through educational media. (p. 55)

Yet Anderson and Pempek (2005) warn that our society is “engaged in a vast and uncontrolled experiment with our infants and toddlers, plunging them into home environments that are saturated with electronic media. We should try to understand what we are doing and what are the consequences” (p. 519). Television is one part of children’s mediated life that has been heavily researched (Thorn, 2008). Christakis and Zimmerman (2006) acknowledge television as a powerful storyteller in today’s society but lament the transition of television from a medium that used to bring families together to an isolated, individual viewing platform. They suggest that one central television set, primarily in the living room, served as a family gathering place to watch the only fare offered: family-oriented shows. In households today, there are a greater number of television sets, in a variety of locations—often including children’s bedrooms, offering a myriad of programming choices that separate, rather than bring together, family members.

In The media family: Electronic media in the lives of infants, toddlers, preschoolers and their parents (2006), Rideout and Hamel report on specific patterns of television use among American preschool children and the attitude of parents towards this use. Seventy-five percent of these children watch television and 32% watch DVDs or videos, for an average of approximately one hour and 23 minutes per day. “The majority know how to turn on the TV by themselves (74%) and change the channels with a remote (58%), and nearly half (46%) can put in a video or DVD by themselves” (p.8). Parents note that the television has become a part of family life and routines; they frequently
allow their preschool children to watch television in order to get tasks completed around the house. Over 50% feel that television calms their children and almost 70% have seen their children imitate what they have viewed on television.

In 1997, the American Academy of Pediatrics (AAP) created *Media Matters*, “a national public education campaign… to help pediatricians, parents, and children become more aware of the influence that media… have on child and adolescent health” (American Academy of Pediatrics, 2009, Media Matters: A National Media Education Campaign, para. 1). In 1999, the AAP outlined the potential effects, both positive and negative, of exposure to our increasingly mediated society. With regards to television, the AAP acknowledged the benefits of educational television yet issued a recommendation that all children under the age of two avoid television viewing. The report suggested that brain development in the areas of cognition, social skills, and emotional skills prior to the age of two requires significant interaction with adults and caregivers that may be limited by television viewing (American Academy of Pediatrics, 1999).

Statistics in Canada do not provide the same detail for preschool children, offering no statistics for children less than two years of age. Older preschool children are grouped into one larger category of two to eleven year olds who, according to Statistics Canada (2004), watch an average of 14 hours of television per week. The Canadian Paediatric Society (CPS; 2003) utilized the AAP guidelines and issued a statement of their own regarding the positive and negative impacts of media on children in Canada. Additionally, they created *MediaPulse* in 2003 with the Media Awareness Network to “raise awareness among health-care professionals of the influence of media on the healthy development of children and youth” (Canadian Paediatric Society, 2009,
MediaPulse: Measuring the media in kids’ lives, para. 1). However, the CPS did not recommend the avoidance of television at any age, choosing instead to suggest that “by the end of the first year of a child’s life, there should be ground rules for television viewing and healthy viewing habits should be established in the second year of life” (Canadian Paediatric Society, 2003, p. 305).

The impact of television has not escaped the political arenas in Canada and the United States. Lisosky’s (2001) review of Canadian and American policies for children’s television explains the impetus behind federal policies that were implemented in both countries to regulate the broadcast industries. All information in the paragraph below comes from this source unless otherwise noted. Canadian policies are self-regulatory with input regularly received from the Canadian Alliance for Children and Television (a media watchdog) and the Canadian Broadcast Standards (the television networks) prior to the creation of or amendments to the Broadcast Act issued by the federal Canadian Radio-Television Telecommunications Commission (CRTC). The Broadcast Act requires children’s television programming to adhere to codes in ethical representations, violence, and stereotyping that are acceptable to Canadians. In the United States, the Federal Communications Commission (FCC) created the Children’s Television Act due to public pressure regarding content on children’s television and the impact of advertising. After some debate with the networks, the Children’s Television Act stipulated that commercial networks must air at least three hours per week of educational and informational (E/I) programming as a condition of license renewal. E/I programming is defined as "programming that furthers the positive development of children 16 years of age and
under in any respect, including the child's intellectual/cognitive or social/emotional
needs” (Federal Communications Commission, 1995, para. 1).

Although these acts may have minimal requirements and ambiguous definitions
for content, they have fostered dialogue among the broadcast industry, politicians, and
researchers regarding the influence of media in the lives of children. In the United States,
politicians put forth a bill in 2005—The Children and the Media Research Advancement
Act—proposing the establishment of a research program looking into effects of electronic
media on child development (Library of Congress, 2009, Bills and Resolutions). The bill
would require research to:

(1) focus on the impact of factors such as media content, format, length of
exposure, age of youth, venue, and nature of parental involvement; and

(2) include as electronic media television, motion pictures, DVDs, interactive
video games, digital music, the Internet, and cell phones. (para. 2)

Learning from Television

Federal regulations have been implemented regarding educational television and
warnings have been issued from the American Academy of Pediatrics pertaining to time
spent viewing. Scholars have debated the effects of television viewing on children since
television’s inception. From these regulations, warnings, and debates, there has emerged
evidence to suggest that young children can learn from television. This assumption is
based empirically on Bandura’s (1977, 1989) theory of social learning and social
cognition. Bandura (1989) suggests that increased television viewing leads to an increase
in the number of models that can influence social and academic development. “Indeed,
infants even as young as 18 months will enact behavior learned from televised models after some time has elapsed” (Bandura, 1989, p. 29). Models shown within the television environment have a greater effect because they allow the viewer to transcend his or her own immediate reality to a global, mediated message of social reality (Bandura, 2001). Bandura’s theory acknowledges that actual learning or modeling may be influenced by viewer attention to the screen, self-efficacy in performing the modeling behaviour, perception of benefits or risks, and social networks—such as family and friends—outside television that impact a child’s behaviour or willingness to learn.

Research suggests that the behaviour of preschool children may be directly correlated with the behaviour of observed models on television. Studies by Christakis and Zimmerman (2007) and Ostrov, Gentile, and Crick (2006) posit that early viewing of television, as a preschool child, can lead to aggressive tendencies later in childhood. Mistry, Minkovitz, Strobino, and Borzekowski (2007) also found a relationship between early and sustained exposure to television and behavioral problems at age seven; however, the relationship disappeared when heavy viewing was not sustained past the age of 36 months. Television’s influence is not limited to socially inappropriate outcomes. Socially appropriate behaviours—such as manners, cooperation, problem solving—are presented on preschool television and modeled by its viewing audience throughout childhood (Anderson, Bryant, Wilder, & Crawley, 2000; Huston & Wright, 1998; Schmidt & Anderson, 2007).

There exists debate concerning the effects of television viewing on the cognitive development of preschool children. Recent studies have focused on the AAP’s recommendation of television avoidance for children under the age of two. Christakis,
Zimmerman, DiGiuseppe, and McCarty (2004) found the early television viewing in children one and three years of age led to attention problems in later childhood. Zimmerman, Christakis, and Meltzoff (2007) studied videos designed for babies and determined that every additional hour of television viewing led to a short-term decrease in the overall vocabulary of toddlers. However, a recently published study (Schmidt, Rich, Rifas-Shiman, Oken, & Taveras, 2009) tracked children from six months of age to three years of age and found no association between television viewing and later language skills. Singer and Singer (1981) found that heavy viewing of television did have “an impact on the structural properties of thought” (p. 152) for preschool children by reducing their capacity to imagine and create. Anderson and Pempek (2005) suggest a video deficit occurs with learning from television; learning occurs but at a lesser rate than learning from another person. However, they also indicate that more research is needed to prove that television has a negative effect on child development under the age of two.

There is greater agreement among researchers that television can have a positive effect on early literacy skills, problem solving skills, and pro-social behaviours for children between four and six years of age (Anderson, 1998; Huston & Wright, 1998; Moss, 2006; Wilson, Kunkel & Drogos, 2008). Sesame Street, Blues Clues, and Mister Rogers’ Neighborhood are a few examples of television series that have been shown to improve vocabulary, reduce aggression, and to enhance preschool children’s confidence in, and ability to, logically solve problems (Moss, 2006). It is for these reasons that this current research will focus on preschool television—television designed to teach children from four to six years of age.
Cultivation theory suggests that television presents a system of messages and that long-term exposure to these messages can contribute to, or cultivate, viewers’ conceptions of the world. Cultivation theorists have tended not to be interested in the impact of individual shows on particular viewing audiences, but rather believe that the viewing of television shows in aggregate, over a prolonged period of time, can have long-term effects on the social reality of heavy television viewers (Gerbner, 1998; Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002; Shanahan, Morgan, & Stenbjerre, 1997). Prolonged viewing of the “pattern of settings, casting, social typing, actions, and related outcomes” (Gerbner, 1998, p. 179) that are presented on television can influence, or cultivate, a viewer’s conception of reality. Concern lies with the fact that the messages presented on television—messages that make up our collective consciousness—are controlled and mass produced by a limited number of corporations whose ultimate concern is profitability (Shanahan & Morgan, 1999). Cultivation studies suggest television is “the mainstream of the common symbolic environment into which our children are born and in which we all live out our lives” (Gerbner, 1998, p. 177). How does this symbolic environment portray the natural world?

According to Shanahan, Morgan, and Stenbjerre (1997), media outlets can be influential in explaining environmental issues to the general public. Many people get their information either from news broadcasts or from the retelling of broadcasts by others. These broadcasts, however, tend to report environmental issues in a cyclical and sensational manner that can cause viewers to become environmentally concerned out of fear rather than connection (Holbert, Kwak, & Shah, 2003).
In fictional genres, cultivation studies demonstrate a lack of environmental content in television’s adult prime-time entertainment programs (McComas, Shanahan, & Butler, 2001; Shanahan & McComas, 1997, 1999). It has been suggested that the absence of environmental content cultivates a lack of environmental concern in heavy viewers because they are unaware of or lack the knowledge to act upon environmental issues (Shanahan & Morgan, 1999).

Other research suggests that it is not a lack of content that promotes apathy toward environmental action; it is the fact that television promotes materialistic values which are at odds with the value of environmental concern, demonstrating that heavy viewers are more materialistic and show less concern for the environment (Good, 2007; Shrum, Burroughs, & Rindfleisch, 2003; 2005). However, Harmon (2001) found a limited relationship between television viewing and the cultivation of materialistic values, suggesting that cultivation theory “offers an overly simplistic and inexact formula for measuring, analyzing, and understanding these concerns” (p. 416).

In their discussion of environmental content in adult television, Shanahan and McComas (1997) suggest that “children's television has remained a haven for environmental issues” (p. 157). Studies suggest that the viewing of television by preschool children can cultivate beliefs and values (Samaniego & Pascual, 2007), and influence consumption demands (Connor, 2006); however there exists little research to suggest a cultivation of environmental concern. The current research is based on the belief that it is important to understand the mainstream message regarding environmental care and concern that preschool television delivers to, and perhaps cultivates in, its viewing audience.
Some critiques of cultivation theory suggest that the use of aggregate viewing exposure does not account for the effect of genre, viewer choice, and long-term memory on the cultivation of social reality (Holbert, Kwak, & Shah, 2003; Potter & Chang, 1990; Tapper, 1995). Potter and Chang (1990) suggest that cultivation’s messaging system be based on type of program watched rather than total viewing hours. For example, watching more violent television shows for a shorter duration may have a stronger cultivation effect on perceptions than a greater number of viewing hours spent watching fewer violent shows. Viewer motives and attitudes affect program choice, reducing the impact of television as a dominant central messaging system (Holbert, Kwak, & Shah, 2003). Viewers also interpret messages viewed on television; this interpretation may affect what message is stored in long-term memory.

According to cultivation theorists, “to say that audiences’ interactions with media texts can produce enormous diversity and complexity does not negate that there can be important commonalities and consistencies as well across large bodies of media output” (Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002, p. 48). Perhaps these commonalities have only a small effect on people’s realities due to the “continual, dynamic, ongoing process of interaction among messages, audiences, and contexts,” (p. 49). However, as Gerbner et al. (2002) illustrate with the effects of temperature on global warming, a small difference in either direction can have a hugely important impact.

*Environmental Literacy and the Development of Preschool Children*

Many programs on preschool television are designed to teach literacy skills (skills needed to read and write), but few programs place emphasis on environmental literacy skills. Roth (1992) defined environmental literacy as “the interrelationships between
natural and social systems; the unity of humankind with nature; technology and the making of choices; and developmental learning throughout the human life cycle” (p. 4). Preschool children are capable of understanding environmental literacy, just as they are capable of learning reading literacy skills.

Educational organizations have outlined age-appropriate environmental activities and skills for children from Kindergarten to grade 12 (North American Association for Environmental Education, 2006; Office of Environmental Assistance (OEA), 2002). The North American Association for Environmental Education (NAAEE) recently proposed additions to its curriculum to include environmental education and literacy for preschool children. The first draft, made available on their website, suggests that preschool children should learn to: observe nature using their senses; recognize changes in nature such as seasons and growth; communicate about the environment using a variety of methods; categorize living and non-living aspects of the environment; and develop an environmental ethic toward other living and non-living things (NAAEE, 2009).

The recommendations to enhance environmental literacy for preschool children recognize the capabilities of this age group. Studies of the environmental cognition and development of preschool children suggest that this age group is capable of defining the term environment, demonstrating concern for anthropogenic impacts to the natural world, and describing ways to preserve and to protect animal species (Littledyke, 2004; Lubomira, 2004; Palmer, 1994). Preschoolers “possess a range of concepts about the physical world in which they are growing up, before the influence of formal school programs” (Palmer, 1994, p. 49).
Preschool children are able to share their stories and conceptions of the environment through a variety of methods. Alerby (2000) found that preschool children could explain their environmental experiences through drawings—a form of symbolic language. Barraza (1999) analyzed children’s drawings in order to track the development of environmental conceptions, revealing the ability of preschool children to formulate their understandings, attitudes, and behaviours at an early age. Witt and Kimple (2006) found that preschool children’s understanding of environmental issues improved with the inclusion of hands-on activities, the reading of a story correlating to the issue, and the allocation of sufficient time for children tell their own narratives of the issue presented during the learning process.

Summary

This section reviewed the increasingly mediated world of preschool children from the perspective of television viewing and the pervasiveness of television sets in the homes of preschool children. This increase has led to conversations and concerns regarding the effects of television exposure, as illustrated by statements and research from pediatric associations and governmental regulations. Social cognitive theory may be used to explain how children learn from television, and research suggests that educational television—television designed for learning—has long-term effects on preschool children’s social and academic behaviour. Cultivation theorists suggest that heavy and repeated exposure to television can also cultivate a system of beliefs and values based on the messages presented in television shows—beliefs and values affecting perceptions of violence, materialism, and environmental concern. Little is known about the environmental content in television designed for preschool children or about the quality
of environmental literacy offered to preschoolers who are growing up in this increasingly mediated society.
Chapter Three: Research Methodology

My research involves a tale of two seemingly separate, yet potentially interwoven, narratives about the environment: the environmental stories told on preschool television and preschool children’s stories about the environment. My thesis allows each set of stories to stand alone, yet also examines the possible effects when the stories are intertwined.

Preschool Television’s Environmental Story

Research Design and Rationale

Humans are storytelling beings, making sense of our world through the stories—or narratives—we share with one another (Connelly & Clandinin, 1990). In our modern lives, the dominant storytelling machine is television. Television delivers a centralized system of messages (Shanahan & Morgan, 1999) that touches virtually all North Americans—including preschool children—either directly, through viewing, or indirectly, through the recounting of television’s stories by others (Signorielli, 1991). My first research question is what environmental story, or narrative, does preschool television present to its viewing audience? To determine the environmental narrative of preschool television, I conducted a content analysis of television preschool programming. A content analysis uses pre-tested codes—or descriptions—to categorize a message into generalized themes (Cohen, Manion, & Morrison, 2007). Recent content analyses have been utilized to explore children’s programming in terms of violence (Christakis & Zimmerman, 2007), educational content (Wilson, Kunkel & Drogos, 2008), prosocial behaviour
(Schmidt & Anderson, 2007), and gender identity (Larsom, 2001). This research builds upon these studies to include environmental content in the analysis of preschool television programming.

Participants

Three television stations—Canadian Broadcast Corporation (CBC), Public Broadcasting Service (PBS), and the Knowledge Network (KN)—were chosen to represent programming from a provincial (KN), national (CBC), and international (PBS) perspective. KN is a British Columbian not-for-profit, commercial-free public television broadcaster that receives funding from the provincial government and from individual donors (Knowledge Network, 2009, Who we are). Their daily preschool programming offers “early learning concepts such as cooperation, trust, empathy and friendship… in addition to literacy, numeracy and life skills” (Knowledge Network, 2009, Grown Ups, para. 1). CBC is a Crown corporation funded by the government of Canada through the Minister of Canadian Heritage (CBC Radio Canada, 2009, Who we are and what we do). Under the umbrella of Kids’ CBC, CBC offers commercial-free preschool television programming aimed at “creating developmentally appropriate, entertaining, and top quality educational entertainment for children” (Kids’ CBC, Production Notes: December 2009, para. 5). PBS is “a private, nonprofit corporation, founded in 1969, whose members are America’s public TV stations” that offer non-commercial television programming (Public Broadcasting Service, 2009, About PBS, para. 1). PBS Kids provides the “highest-quality programming and learning environment for children… [that]… invite kids on a journey to explore the world around them with non-violent, age-
appropriate content that offers positive role models for children to learn from and grow with” (Public Broadcasting Service, 2009, PBS Kids, para. 2).

Data Collection and Analysis

Recording and coding of preschool programming on each station was initially scheduled for one week in the month of February 2009. Recording times were based on regularly scheduled preschool programming for each station: CBC airs preschool programming from 7am to 11am, PBS airs preschool programming from 7am to 12pm, and KN runs preschool programming throughout the day. I decided to record and code KN programming from 7am to 11am—the same schedule as CBC. Predetermined blocks of programming were recorded on video cassette for PBS and the KN during the week of February 23 to 27, 2009; however, the recorded programming for CBC was lost during the transfer from digital to video cassette. Therefore, I decided to record an additional week of programming for all three stations to ensure the inclusion of CBC in the content analysis. I chose to record programming during the week of April 20 to 24, 2009 due to the position of Earth Day on April 22 and the possible inclusion of additional environmental content. Recordings from February were retained and included in the coding process. This resulted in 110 hours of recorded preschool programming containing 330 episodes from 33 different television series. Interstices—station specific content delivered by hosts or characters between the episodes—were also coded as part of this study.
<table>
<thead>
<tr>
<th>Station</th>
<th>February 23-27, 2009</th>
<th>April 20-24, 2009</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBS</td>
<td>25</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Knowledge Network</td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>CBC</td>
<td>0</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45</strong></td>
<td><strong>65</strong></td>
<td><strong>110</strong></td>
</tr>
</tbody>
</table>

Table 1. Recorded hours of preschool programming per week

To analyze environmental actions and environmental literacy benchmarks on television programming designed for children ages three to six, I created a checklist of codes for each category. I developed a conceptual definition (Neuendorf, 2002) of environmental actions as actions that have an explicit positive effect on the environment. My definition was influenced by Emmons (1994) and Jensen (2002) who both describe the difference between actions and behaviours. Emmons feels that actions involve planning and decision making by one or more people and are intended to achieve a specific goal. Jensen feels an action is:

…targeted at a change: a change in one’s own lifestyle, in the school, in the local or in global society. This approach implies that action in environmental education embraces indirect as well as direct actions; for example, demonstrating against traffic conditions is as valid an approach as cleaning up litter. (p. 326)

The codes I created for environmental actions are outlined in Appendix A and defined as a character on the screen talking about or physically engaged in:

- recycling (placing recyclables in appropriate containers)
- reusing (hand-me-downs, second hand items, thrift shops)
- reducing water consumption or waste (turning off the taps, mending items)
- creating less pollution (riding bicycles)
• picking up garbage (picking up and placing in an appropriate container)
• composting (placing food scraps into designated compost bins)
• planting or gardening (vegetables, trees, plants, seeds)
• protecting species (rehabilitating wildlife, saving habitats)
• saving energy/using solar energy (turning off lights, solar-powered creations).

According to Roth (1992), environmental literacy benchmarks are explicit statements and images that intend to teach “a respect for natural systems… and knowledge of how natural systems work and how human social systems interact with them” (p. 18). I utilized Roth’s definition, as well as the standards for environmental literacy outlined by the Environmental Literacy Scope and Sequence (OEA, 2002) and Excellence in Environmental Education—Guidelines for learning (Pre K-12) (NAAEE, 2006) to determine age-appropriate environmental literacy benchmarks for preschool children (see Appendix A).

The codes I created for environmental literacy benchmarks are defined as character/host discussions or teachings about:

• species identification (physical and behavioural characteristics, explanation of habitat, reproduction or regeneration, food choices)
• ecosystem identification (inclusive of more than one species, abiotic parts: clouds, rocks, sand, and water)
• cycles in nature (life and death, night and day, seasons, water cycle)
• the connections between species (food chains and webs, symbiotic relationship)
• the place of humans within bigger systems (systems such as ecosystems, regions/watersheds, biomes, planets, universe)
• the ability of humans to affect systems (landfill creation, consumption patterns, conservation and preservation activities)

• the responsibilities humans have to care for and to respect living things.

After defining codes for environment actions and literacy benchmarks, I tested the codes with three random preschool shows from PBS during the month of February. As a result of this, modifications of the original codes were made to provide greater clarity. I had to separate the three parts of recycling—reducing, reusing, recycling—into separate categories. I further defined reducing as waste or water specific and created new codes to address the reduction of energy. These codes became saving energy and creating less pollution. The definition for saving energy grew to encompass the use of alternate forms of energy such as solar energy. Some environmental literacy benchmarks were explained with greater clarity using terminology more appropriate for preschool television. I originally had three additional categories regarding systems thinking: systems thinking (information about parts needing to work together to make the whole work); a system can’t work if parts are missing (self-explanatory); and people can have an effect on these systems (choosing type and quantity of energy use, purchasing wants versus needs, use of landfills, and conservation practices). I merged many of the ideas into one category that was easier to understand: people can affect these systems (landfill creation, consumption patterns, and conservation and preservation activities).

Prior to conducting the content analysis of preschool programming, I had two impartial designates measure inter-coder reliability. I trained each assistant individually by thoroughly explaining the meaning of, and giving examples for, every environmental action and literacy benchmark outlined on the checklist of codes for viewing (see
Appendix A). These research assistants took three recorded programs home and utilized my predetermined codes to independently identify and categorize the environmental content in these episodes of preschool programming from PBS. I previously viewed and coded these episodes, ensuring that some environmental actions and literacy benchmarks were present according to my understandings and conceptions of how the codes were to be applied.

After an initial viewing, one assistant required retraining to clarify the environmental action: species identification. She had coded the identification of monsters on *Sesame Street*; however, my interpretation of identifying species required that the species be scientifically valid. Following a second viewing by this assistant, coding results were compared among assistants to assess the efficacy of my predetermined codes. Agreement was 100% for environmental actions and 90% for environmental literacy benchmarks, leading to inter-coder reliability of 0.97 (Neuendorf, 2002).

Using the checklist of codes for viewing (see Appendix A), I watched and coded all pre-recorded television shows and interstices. Although preschool television is commercial free, some programs on PBS were sponsored by corporations and companies. The actions shown or statements made during the announcement of any sponsorship were coded and discussed separately to maintain the commercial-free aspect of this analysis, inclusive of all three stations. Each show was described using the title, date, and station. In 110 hours of programming, 16 episodes occurred more than once. These episodes were coded a second time and used in data collection. Interstices were repeated several times and were coded for environmental content every time they aired. With the use of descriptive statistics (i.e. frequency distribution, range, central tendency), I analyzed and
compared the amount of environmental content within: individual episodes, series, stations, and weeks for PBS and KN.

Preschool Children’s Narratives

Research Design and Rationale

A narrative inquiry (Clandinin & Connelly, 1999) with individual preschoolers provides a companion piece to the content analysis of preschool television programs. Narrative inquiry recognizes the importance of allowing children ownership of their participation in the research process in order to fully ‘hear’ their voices (Mauthner, 1997). Children can be offered a variety of instruments with which to present their ideas and narratives. My narrative inquiry was influenced by Gauntlett’s (2007) research using Lego Serious Play construction blocks to provide a visual metaphor of adult conceptions of their social identities. Gauntlett determined that adults can formulate and change their ideas and opinions through the creation of drawings or the building of Lego models, providing a greater opportunity for clarity than a simple verbal response offered in most structured and semi-structured interviews (Gauntlett, 2007). In an additional creative research project, Gauntlett (1997) encouraged elementary school children to create a video based on their knowledge of the environment, knowledge that children acknowledged they had received primarily through television. Few guidelines were provided, allowing the children more time and freedom to express their ideas.

Creative and visual research provides the opportunity for participants to make, to reflect, and to talk about their conceptions. With greater flexibility and fewer prescribed questions to answer, young children have more time to formulate their thoughts and ideas
and feel less pressure to give the ‘correct’ answer (Thomas & O’Kane, 1998). My research methodology provided this flexibility and the opportunity for creativity during an unstructured play-based interview in which I asked participants to construct and to explain a three dimensional model of their conception of nature using a variety of materials.

Participants and Site

To conduct research with preschool children, I required the approval of the Royal Roads University Ethics Board. Following this approval, I provided letters of permission (see Appendix B) that were distributed at Mes Petits Montessori School in North Vancouver. A school board ethical review was not required as this school is a private, independent enterprise able to grant permission on its own. Five children who presently attend or had attended Mes Petits and their parents agreed to participate. To strengthen the validity of my findings, I required a greater number of participants. Therefore I sent letters of permission via email to all members of the North and West Vancouver Bunnies Ringette team (ages four to seven) asking for participation from team members or from their siblings. One team member and two siblings agreed to participate. The remaining four participants offered and agreed to participate based on informal discussions with their parents regarding my research or based on the recommendation of other research participants. This resulted in 12 preschool children (mean = 5.1 years) being interviewed individually during the months of May and June, 2009. Interviews were conducted at the school, the local library, and my house. Due to my prior affiliation with Mes Petits Montessori as a parent and my affiliation with North and West Vancouver Ringette as an assistant coach, all 12 participants knew me from previous interactions and were
comfortable answering my questions and sharing their stories of nature. This comfort level may have influenced their desire to build a model that would please me. I found, however, that the participants became engrossed in building and explaining their models and forgot that their stories—their conceptions of the environment—were the purpose of my interview.

**Data Collection and Analysis**

To begin the play-based interview, I asked participants to identify or to explain their knowledge of a set of environmental symbols visually portrayed on index cards (see Appendix C). These symbols included visuals such as recycling logos, wind generators, composting, as well as corporate logos for McDonald’s, Apple computers, Starbucks, and Toys ‘R Us. Following this, I asked preschool children to explain their familiarity with the word “nature.” If the participant recognized the word, I asked each child to explain what nature meant. After a brief discussion, each child explained his or her conception of nature through the creation of a three dimensional model of nature and the discussions surrounding their creation. Children were given access to the use of Lego construction blocks, animal and human figurines, modeling clay, and paper and pencil to create their models, offering variety and flexibility in the creation process. During the creation process, I asked each participant to explain what he or she was creating and the reason for any changes in their constructions. Additionally, I asked participants to explain what it would be like for them to walk through their modeled environment and where they might locate themselves within their model. I asked questions to clarify their representations (i.e. tell me again what is this?) or to elicit any emotions (i.e. how would you feel walking through this environment?).
Individual interviews were digitally recorded to be analyzed for recognition of environmental symbols and media logos, offering an initial glimpse into the environmental literacy and environmental conceptions of each participant. Conversations that occurred during the building process were also recorded and later translated into memos and journal notes. Digital photographs were taken of each model (see Appendix D).

As a researcher, I recognize that my own biases regarding the importance of outdoor play and the development of environmental literacy in preschool programming possibly affected my interactions with the children and my re-telling of their narratives of nature. To address these biases, I “assume[d]… an open listening stance and carefully attend[ed]… to the unexpected and unusual participant responses” and I ensured “that the participant’s own voice [was] heard and the text [was] not primarily an interviewer’s own creation” (Polkinghorne, 2007, p. 482). I also utilized member checking at the end of each session. Member checking involves “taking data and interpretations back to participants in the study so that they can confirm the credibility of the information and narrative account” (Creswell & Miller, 2000, p. 127). I asked each participant to confirm the content in their three dimensional models, as well as to confirm the stories that accompanied each piece building block or modeling clay creation.

Revisiting preschool children at a later date to conduct member checking may reveal an entirely different narrative of nature but not necessarily a more “accurate” narrative; therefore, I recognize that my findings are limited to that temporal moment. An audit trail—in the form of memos and research notes (Creswell & Miller, 2000)—was
recorded for every research participant and discussed with another colleague for external confirmation of my interpretation.

To merge the preschool narrative of nature with that of television’s narrative, I asked parents to complete a survey outlining the quantity and type of television viewing per week for their preschool child (see Appendix E). I compared the patterns of viewing with the findings of the narrative inquiry to determine the influence, if any, that television viewing has on preschoolers’ environmental conceptions and recognition of environmental symbols.
Chapter Four: Findings and Discussion

Preschool Television

This study analyzed the environmental content in 110 hours of preschool television on three different broadcast stations—CBC, PBS, and KN—during their children’s weekday programming. The recorded blocks of programming from February 23 to 27, 2009, and from April 20 to 24, 2009, resulted in coding 361 environmental incidents in 330 episodes from 33 different television series. A television series is the broadcasting of several episodes under the same title (i.e. Sesame Street); an episode is defined as one television program from the series, broadcast in its entirety; and an environmental incident is an action or literacy benchmark that was coded using the methods outlined in Chapter Three.

Overall Environmental Content

My first research question asked: What environmental content exists on television designed for preschool children? I coded 361 environmental incidents during the two chosen weeks of preschool programming; 141 were coded as environmental actions and 220 were coded as environmental literacy benchmarks. I found environmental content in both categories on all three stations with each individual station airing more literacy benchmarks than actions during its weekly programming (see Figures 1, 2 and 3).
These findings surprised me; I expected to find very few environmental incidents after communication with another researcher revealed that her unpublished research, conducted in October 2007, found little environmental content on Saturday morning children’s programs (N. Buerkel-Rothfuss, personal communication, December 18, 2008). Although my definitions for environmental incidents most likely differ from Buerkel-Rothfuss’s definitions (personal communication, December 18, 2008), I feel that the increase in incidents from her findings of approximately eight in 13 hours of programming, to my findings of 361 in 110 hours of programming are attributable to more than word choice and interpretation. I also expected to code more environmental actions than literacy benchmarks due to Bandura’s social cognitive theory and the
agreement among researchers that preschool television can teach pro-social behaviour (see Chapter Two). The finding of a greater incidence of environmental literacy may suggest that preschool television programmers recognize the importance of educating young children to understand, to connect with, and to preserve the various systems that function on our planet.

These results reveal that environmental content exists on PBS, CBC, and KN programming for preschool children; however this content must be contextualized. After accounting for number of viewing hours per week for each station, I found the number of environmental incidents per viewing hour to range from 2.64 (PBS: February 2009) to 4.0 (KN: February 2009) (See Table 2). PBS did show a marked increase in incidents during Earth Week programming (April 20-24, 2009), improving from 2.64 incidents to 3.84 incidents per viewing hour. My analysis revealed an attempt by PBS to include greater environmental content during the interstices presented during Earth Week—an aspect of programming over which the station exercises direct control.

<table>
<thead>
<tr>
<th></th>
<th>CBC Apr 09 (n=20)</th>
<th>PBS Feb 09 (n=25)</th>
<th>PBS Apr 09 (n=25)</th>
<th>KN Feb 09 (n=20)</th>
<th>KN Apr 09 (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental actions</td>
<td>0.8</td>
<td>1</td>
<td>1.88</td>
<td>1.55</td>
<td>1.05</td>
</tr>
<tr>
<td>Literacy Benchmarks</td>
<td>1.85</td>
<td>1.64</td>
<td>1.96</td>
<td>2.45</td>
<td>2.2</td>
</tr>
<tr>
<td>Total # of incidents</td>
<td>2.65</td>
<td>2.64</td>
<td>3.84</td>
<td>4</td>
<td>3.25</td>
</tr>
</tbody>
</table>

Table 2. Environmental incidents per viewing hour (n=number of hours per week)

Although promising, these findings must be further contextualized. The environmental incidents per episode range from less than 1 (CBC: April 2009) to 1.47 (PBS: April 2009), averaging 1.1 incident per episode (see Table 3). The average duration of an incident was not calculated in this study; however, each coded event or incident lasted less than ten seconds with many lasting only two to three seconds. This,
coupled with an average of 3.28 incidents per viewing hour, reveal that environmental content encompasses approximately 33 seconds of every hour of preschool programming. This suggests that the remainder of content—approximately 59 minutes per hour—lacks environmental actions or literacy benchmarks.

<table>
<thead>
<tr>
<th></th>
<th>CBC Apr 09 (n =70)</th>
<th>PBS Feb 09 (n =65)</th>
<th>PBS Apr 09 (n =65)</th>
<th>KN Feb 09 (n =65)</th>
<th>KN Apr 09 (n =65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental actions</td>
<td>0.24</td>
<td>0.38</td>
<td>0.72</td>
<td>0.48</td>
<td>0.32</td>
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<tr>
<td>Literacy Benchmarks</td>
<td>0.53</td>
<td>0.63</td>
<td>0.75</td>
<td>0.75</td>
<td>0.68</td>
</tr>
<tr>
<td>Total # of incidents:</td>
<td>0.77</td>
<td>1.01</td>
<td>1.47</td>
<td>1.23</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 3. Environmental incidents per episode (n=number of episodes per week)

As with studies of study of prime-time television (McComas, Shanahan, & Butler, 2001; Shanahan and McComas, 1997) the absence of environmental content coupled with heavy viewing may cultivate a lack of environmental concern in preschool children. This is an important consideration, knowing that preschool children are exposed to television before they “develop the tastes and selective patterns of consumption” (Shanahan & Morgan, 1999, p. 20) that may lessen the cultivation effect.

However, preschool television should not be neglected as a possible forum for educating—and cultivating—a pro-environmental ethic among its viewing audience. As this study revealed, some environmental content exists on preschool television. It is important to understand what the specific content entails before any attempts to improve or to criticize the content continue. Greater detail regarding the specific environmental actions and literacy benchmarks will be explained in the following sections of this chapter.
Environmental Actions

Environmental actions account for 39% of the overall environmental content coded. Knowing that children can learn from the models they see on television (Bandura, 1989), it is important to understand what environmental actions are being modeled and discussed. As shown in Figure 4, planting or gardening is the most frequent action (21%) displayed by the characters or hosts in the programming selected for this current study. The act or mention of recycling represents 17% of the actions coded, closely followed by examples of protecting species other than a household pet (16%). Children are encouraged to reuse items in 15% of the overall actions and encouraged to save energy in 11% of the coded actions. Creating less pollution (10%), reducing waste or water consumption (5%), picking up garbage (4%), and composting (1%) are also represented.

Figure 4. Environmental actions as a percentage of total actions

The breakdown of environmental actions per television station is shown in Table 4. PBS programming during Earth Week in April 2009 had the greatest number of actions (47). Most of the interstices that aired between the regular television shows that week
were used to encourage recycling of appropriate containers and reusing supplies such as paper and cans to make new toys or instruments. KN interstices regularly show characters planting and watering a plant, as evidenced in the number of coded incidents for this category. The remainder of this section provides specific examples of each action from some of the coded episodes.

<table>
<thead>
<tr>
<th>Environmental action</th>
<th>CBC Apr 09</th>
<th>PBS Feb 09</th>
<th>PBS Apr 09</th>
<th>KN Feb 09</th>
<th>KN Apr 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling</td>
<td>3</td>
<td>5</td>
<td>14</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Reusing</td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Reducing waste or water</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Compost</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Planting or gardening</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Protecting species</td>
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<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Less pollution</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Pick up garbage</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Save energy/solar energy</td>
<td>-</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total per station</strong></td>
<td><strong>17</strong></td>
<td><strong>25</strong></td>
<td><strong>47</strong></td>
<td><strong>31</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

Table 4. Environmental actions per television station

*Planting or gardening.*

There are many incidents on a variety of series that demonstrated planting or gardening, including: planting a vegetable garden (*Little Bear, Sesame Street, Curious George*), planting a tree (*Jungle Room*), or tending to a flower garden (*Clifford*). Perhaps preschool children are familiar with planting seeds in their classrooms and at home, reflecting the popularity of this message. On *Sesame Street*, the characters visited a farm and learned how to plant vegetables and to see how the food they eat in the city is grown.

All interstices on the KN consisted of three cartoon characters performing a task; one task demonstrated the planting of a seed, watering the pot, and celebrating the
flower’s bloom. This brief cartoon, with no spoken words, aired several times during the coding process and was recorded each time. During one of the interstices that aired several times on PBS, Miss Rosa demonstrated that to grow a flower one needs a seed, soil, water, and the sun. Within planting and gardening incidents, the notion of an organized, manicured garden is promoted to the viewing audience. In one episode of the *Berenstain Bears*, Sister and Brother are interested in planting seeds in the garden. At the same time, Papa Bear laments the appearance of an old stump, spoiling the appearance of his “perfect yard.”

Most of the incidents presented to preschool children involve planting or gardening within a designated area in a structured manner. Little context is provided for plant habitats and the concept of local species. The basic needs of plants are explained to the audience; however, the importance of plants to humans in the production of oxygen was never discussed.

*Recycling.*

Recycling logos were evident in many background scenes for a variety of series. Characters did not explain the three r’s of the recycling logo but did explain how to search for the recycling logo on the bottom of containers before placing in the recycling bin. Curious George visited a recycling facility to learn how the process worked and decided to recycle in order to “make the planet and our trash neater.” On PBS interstices, Miss Rosa encouraged children to recycle in order to “make glass and plastic new again.” She also asked children to play a game during “science time” to decide which objects should be recycled and which ones should be thrown in the trash. Most of the incidents seemed to be reinforcing the recycling concept, suggesting that young children are...
already familiar with the process of sorting recyclable products. Little information is
given to explain how products are made and where the necessary materials are located
within the natural world. This information would provide preschool children with a
greater understanding of the limited resources on our planet and hence the need to recycle
the materials already within the manufacturing process.

Protecting species.

The incidents of protecting species were presented in many surprising ways. The
series, Animal Mechanicals—a world of machines that look like animals—rarely
presented environmental content. However, one episode emphasized the importance of
leaving small trees to “grow up into big mechana logs.” Although the logs were then cut
down to help giraffes build a house, the mechanicals saved a woodpecker during the
harvesting process and found it a new home within the new “mechana forest.”

During the Magic School Bus, viewers learned that protecting species also
involves returning them to their natural habitat. When Wanda lost her pet frog, Bella, in
the beaver pond, she learned that a pond habitat is a better place for a frog than her house.
Despite feeling sad to lose her pet, Wanda decided to leave Bella in an ecosystem with
natural food, water, and shelter.

In an episode of Clifford, Emily Elizabeth decided to save a bird by keeping it
safe in a cage until it learned to fly. However, when deciding what to feed the baby bird,
Emily decided to go to the pet store to buy worms because “dirt makes a mess.”

Preschool viewers were also shown real-life examples of species protection. In an
episode of Sesame Street, Sydney wildlife rescue volunteers saved a possum and a duck.
They explained the focus of the wildlife centre as a place to nurture wildlife until “they
go back home in the bush where they belong.” Each incident of protecting species reinforced the importance of returning species to their natural habitat and did not suggest that animals could be kept as pets—something young children might be interested in doing.

Reusing.

PBS used their interstices on Earth Day to deliver many positive environmental messages. During “Music time with Steve”, Steve demonstrated how to play a canjo—a banjo made from an old can—and sang “don’t throw it away if it can be used again.” An entire episode of Curious George, entitled “Everything old is new again”, showed the doorperson learning how to start a re-use program within the apartment building. Children were shown reusing pizza boxes to make gardens and collecting rain water to give to the plants. Fred Rogers, on Mr. Rogers’ Neighborhood, summed up an important message to preschool children. He built a model of his make-believe village out of empty containers, stating: “you can make your own toys out of anything.” Children also learned that reusing can be about more than consumer products. During an episode of Clifford, Clifford and his friends replanted rose bushes that were going to be thrown away.

Saving energy/using solar energy.

Hi-5—a musical theatre show with weekly themes—aired several episodes about “living in a techno world.” Most of the episodes had the performers enacting robots but the last episode in the weekly theme focused on reducing energy through the creation of solar powered machines with solar panels attached. No additional information was given to explain how energy from the sun is used or why this form of energy is a needed
alternative. Repeated interstices on PBS encouraged viewers to turn off lights and turn off the television when no one is in the room in order to save energy. Again, no context was provided to explain why energy conservation is needed.

*Reducing waste or water.*

*Super Why!*—a show dedicated to problem solving through letter recognition, storytelling, vocabulary, and spelling skills (Public Broadcasting Service, PBS Kids, 2009)—was coded with very little overall environmental content in this current study. However, in one episode that aired on Earth Day, Whyatt must figure out why his mother is upset with him for leaving the tap running. Throughout their adventures, the Super Readers determine that Whyatt needs to turn off the tap in order to save water for others.

To reduce waste, the *Berenstain Bears* are encouraged by Mama to mend a ripped backpack instead of throwing it away. On *Sesame Street*, Big Bird decides to sell off his old toys instead of throwing them into the garbage. However, the Count provides a mixed message while buying the items, saying: “I love retail.”

*Less pollution.*

Television shows coded in this study did not overtly explain pollution to the viewing audience. Some characters were shown riding bikes or taking public transportation (*Martha Speaks*, *Clifford*). However there are many mixed messages for preschool children: *Sid the Science Kid* uses a car to get to school everyday, and in an episode about wheels, Sid did not mention a bicycle or roller blades as means of transportation. He wondered, “How can we drive places without wheels?” *Busytown* is a series filled with motor vehicles where all characters use a car or truck to drive around.
the town. In one episode, the mystery to be solved involved the bubble truck filling the gas station’s tanks with soap bubbles. The characters felt compelled to solve the mystery because “Busytown has almost come to a complete stop” when the cars no longer worked. An interstice on CBC intended to teach French words, showed a car getting refilled after only one lap around the set before the host happily set out to repeat the same process. Cars and trucks are pervasive parts of our society that are easily recognizable by preschool children; this is evident in television’s presentation of motor vehicles as an accepted and celebrated method of traveling.

_Picking up garbage._

Perhaps the small percentage of codes in the “picking up garbage” category suggests that children are already aware of the importance of picking up their garbage. One incidence on _Razzberry, Jazzberry Jam_ simply stated that garbage should be put in the garbage can without providing any reasons for this action. On _Sid the Science Kid’s_ Earth Day episode, one of the Earth’s three wishes is to have people clean up the garbage from the oceans and beaches. In the same episode exploring dirt, Sid suggested “if you find trash in your soil, throw it away. It’s bad.” Viewers are not given an immediate reason for this statement. They must watch the entire show to make the connection—on their own—that the presence of trash in the soil could “hurt the animals.”

_Composting._

During the episode, _The Magic School Bus (Meets the Rot Squad)_ , a recycling bin is used by the classroom children as a place to put rotten things that will break down into soil. Ms. Frizzle leads the children to an old vacant lot to explore the process of
decomposition—the break down of living things by decomposers such as fungi and bugs. Although the explanation is important to understanding composting, there is only one actual act of composting mentioned or shown that is coded in this research. This seems to be a missed opportunity to promote an environmental action that is available in all households or apartments due to the production of food scraps. The lack of information about or demonstrated acts of composting suggest that television programmers do not see composting as a part of everyday life or do not readily understand how to safely and efficiently allow food waste to decompose in their own backyards or balconies.

*Environmental Literacy Benchmarks*

Environmental literacy benchmarks account for 61% of the overall environmental content coded. As reviewed in Chapter Two, preschool children from four to six years of age learn long-lasting literacy skills from educational television that is specifically designed to teach these skills. Although no television series was found in this research that is specifically designed to teach environmental literacy, it is important to understand the concepts presented to young children.

As Figure 5 shows, species identification is the biggest aspect (54%) of environmental literacy coded. Discussions during television episodes that explained the connections between species represented 20% of the literacy benchmarks coded and identification of ecosystem features represented 10%. Cycles in nature, recognizing humans as part of a bigger system, explaining the effects that humans can have on the environment and the idea that we have a responsibility to care for the Earth are all represented. A breakdown of environmental literacy benchmarks per television station is shown in Table 5.
As was found in the category of environmental actions, PBS provided greater incidents of literacy benchmarks during Earth Week programming in April 2009. All three stations heavily promoted the identification of species, a developmentally appropriate benchmark for preschool children who are trying to identify and make sense of the world around them. The remainder of this section provides specific examples of each action from some of the coded episodes.
Species identification.

Species identification accounted for 61% of the environmental content coded in this research. Preschool children are interested in naming animals and identifying the world around them; perhaps this explains the inclusion of this environmental literacy in so many series. Most of the series presented incidents of species identification. The main character in Bo on the Go identified the locomotive qualities of two species every episode as she decided how to move on her adventures. The series See the Sea is a short two to four minute presentation of underwater footage obtained by a scuba diver. Children and adult voices in the background discuss the species they observe, such as white-tipped sharks, ornate ghost pipe fish, and harlequin sweet lips fish. They emphasize the physical and behavioral adaptations that make each species successful. Wilbur, a cow who dances when excited about reading, learned how owls and crickets communicate during the episode, “Wilbur’s camp out.” In an episode of Busytown, characters learned that eggs have different characteristics and that ducks make their nests in the long grass near the water. The Doodlebops, a singing and dancing show, included the adaptive features of a chameleon in the episode, “Good at something.”

Species are connected.

Connections are an integral part of life on this planet; all species are interconnected via food chains and food webs that support animal and plant populations. Connections were most often presented during full-length episodes that had an environmental or scientific focus; perhaps this is due to the greater duration required to fully explain the links between species. In one episode of Between the lions—a series
dedicated to early literacy—the narrator read the book, *Are you a snail*, to the audience. Through this process, viewers learned the place of snails in various food chains. The book, *Wonderful Worms*, was also read during this episode. This story explained the connections between worms, leaves, and soil in the process of decomposition. In *The Magic School Bus*, Miss Frizzle often asked her students to look for the connections during their field trips. On a trip to the beach, students learned the connections between phytoplankton, zooplankton and the rest of the food chain. They investigated land and ocean food chains, learning “if something happens to one part of a food chain, it happens to all parts of the food chain.” In a different episode, the students explored food chains and habitat characteristics for beavers in a pond.

*Ecosystem identification.*

*The Magic School Bus* also identified ecosystem characteristics for the viewing audience. In the episode, “All Dried Up,” the students learned that a desert can be made by a rain shadow effect and identified the features of a desert that make food and shelter scarce. In *Peep and the Big Wide World*, Peep, Quack, and Chirp learned that clouds can bring lightning and rainstorms that help the growth of fruit and flowers. Sid the Science Kid wanted to know the properties of dirt. After asking his friends, his parents, and his teacher, Sid learned the different parts and different kinds of dirt in his school yard. On Earth Day, CBC aired a song about nature “providing everything we need” during one of the interstices. The lyrics explained that the sun, air and water are our natural habitats.
**Cycles in nature.**

Sid the Science Kid used the term ‘transformation’ to describe the seed/plant, kitten/cat, and tadpole/frog cycle of growth. He investigated the conditions necessary for growth, deciding that all things grow slowly with food, water, air, and sunshine. He also explored the freeze/thaw cycle using the term reversible changes. The Berenstain Bears learned to be patient while waiting for seeds to grow, realizing that “plants use water and energy from sunlight to make the compounds they need to grow” in a process called photosynthesis. Brother and Sister Bear also learned to observe the cycles in nature that indicate a change in seasons. They observed that cold and wet temperatures made the leaves change colour. Curious George used his observation skills to study clouds and wind in order to predict the weather cycle. The students from *The Magic School Bus* identified the process of decomposition as one of the cycles essential for life on Earth.

**People can have an effect.**

The idea that people can affect the state of the environment can be laden with negative repercussions for our actions as humans or filled with empowering possibilities of community action. Preschool children are just beginning to recognize the larger world around them and to understand that their actions can influence other species. Preschool television presents very little information to support this benchmark, preferring instead to focus on identifying animal and plant species and habitats. However, a few incidents were coded during my research. In Curious George’s exploration of the recycling process, George learned that humans can choose to recycle to make new bottles and cans instead of allowing garbage to pile up in landfills. During another episode of *Curious*
George, the man with the yellow hat explained why a tropical island existed in their part of the world. Mr. Wilson imported palm trees and planted them, causing the island’s original ecosystem to disappear. The man with the yellow hat, however, finished his explanation with the premise that having a tropical island might not be such a bad thing. Although his enjoyment of the island quickly ended when he decided “sand is messy” and he “can’t get a picture with all those trees in the way.”

*Humans are part of larger systems.*

Understanding the systems that make up the world is an environmental literacy that preschool children can and should understand (OEA, 2002). Preschool television rarely identifies humans as part of larger systems. The most relevant content occurs when terms such as the universe, stars, galaxies, and planets are utilized to reference our place in the solar system. *The Magic School Bus* provided the most in-depth explanation, informing viewers that humans are part of the solar system and that Earth is the only planet that can support life.

All three coded incidents for the category, responsibility to care for living things came from one episode of *Sid the Science Kid* that aired on Earth Day. During this episode, Sid decided that the best way to celebrate the Earth is to take care of it, deciding that he “will be a scientist who takes care of the Earth” when he grows up. He stated that people had a responsibility to care for the earth: “it’s the only Earth we’ve got. We’ve got to take care of it every day, not just Earth Day.”
Television Stations and Series

The following section further breaks down the environmental content into individual television series broadcast on PBS, CBC, and KN. The purpose is not to attach greater merit to individual television series or stations, but to reveal the environmental content coded on these specific series during the selected weeks. I acknowledge that certain series may have a stated purpose (i.e. building confidence – *Dragon Tales*) that one could argue is not directly related to the environmental content in the coding process. I also acknowledge that many series have weekly themed episodes that are repeated in a cyclical manner (*Sid the Science Kid, Mr. Rogers’ Neighborhood, Hi-5*); the environmental component of these series may lie in episodes outside my viewing period.

*CBC.*

The content analysis of CBC identified environmental actions or literacy benchmarks in all televised shows except for *Turbo Dogs* and *Super Why!* (see Table 6). *Turbo Dogs* is a “cool racing show that brings high octane fun with a comical cast of canine friends who are wild about racing” (CBC, Production Notes, 2009); storylines centred on race cars did not show evidence of environmental content. Although no environmental incidents were coded for *Super Why!* during April 2009 on CBC, *SuperWhy!* aired on PBS with some environmental content noted during the coding process for that station. *See the Sea* provided the greatest percentage of CBC’s environmental content (26%); however, *Bo on the Go* recorded the greatest number of environmental incidents per episode (2.5). The interstices presented environmental actions and literacy benchmarks using vignettes of Canadian children exploring their
local ecosystems to explain farming, creating maple syrup, and dog sledding; however, their primary focus lies with encouraging children to develop healthy breakfast habits (CBC, 2009) rather than promoting environmental actions.

<table>
<thead>
<tr>
<th>TV Show (episodes per week)</th>
<th>Environmental Action</th>
<th>Environmental Literacy</th>
<th>Total</th>
<th>Total per episode</th>
<th>Percentage of station’s total environ. content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save Ums (3)</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.7</td>
<td>4</td>
</tr>
<tr>
<td>Turbo Dogs (3)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Animal Mechanicals (10)</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0.4</td>
<td>7</td>
</tr>
<tr>
<td>Bo on the Go (4)</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>2.5</td>
<td>19</td>
</tr>
<tr>
<td>See the Sea (10)</td>
<td>0</td>
<td>14</td>
<td>14</td>
<td>1.4</td>
<td>26</td>
</tr>
<tr>
<td>Busytown (5)</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>Mighty Jungle (5)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.2</td>
<td>2</td>
</tr>
<tr>
<td>Super Why (5)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gofrette (5)</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>Bruno (5)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.2</td>
<td>2</td>
</tr>
<tr>
<td>Wilbur (5)</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0.6</td>
<td>6</td>
</tr>
<tr>
<td>Lunar Jim (5)</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>0.8</td>
<td>7</td>
</tr>
<tr>
<td>Doodlebops (5)</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td>Interstices</td>
<td>6</td>
<td>3</td>
<td>9</td>
<td>n/a</td>
<td>17</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>17</strong></td>
<td><strong>37</strong></td>
<td><strong>54</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Environmental content per television series and episode on CBC

*PBS.*

The aggregate content analysis of two weeks of preschool programming on PBS identified some environmental content on all series (see Table 7). For a detailed description of the individual weeks, see Appendix F. *Curious George* and the PBS Kids interstices account for the greatest percentage of this station’s environmental content, each with 21%; however, *Sid the Science Kid* recorded the greatest number of environmental incidents per episode (3.3). *Sid the Science Kid* garnered 20% of the total content with Sesame Street following with 15%. *Curious George* and *Sid the Science Kid*
are both designed to encourage and to foster preschool children’s curiosity in science and the natural world (Public Broadcasting Service, PBS Parents, 2009). PBS Kids interstices are also designed to encourage exploration of the natural world through short, repetitive segments that emphasize projects that children are capable of completing (Public Broadcasting Service, PBS Parents, 2009).

<table>
<thead>
<tr>
<th>PBS Feb. and Apr. 09 (total number of episodes)</th>
<th>Environmental Action</th>
<th>Environmental Literacy</th>
<th>Total</th>
<th>Total per episode</th>
<th>Percentage of station’s total environ. content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sesame Street (10)</td>
<td>5</td>
<td>19</td>
<td>25</td>
<td>2.5</td>
<td>15</td>
</tr>
<tr>
<td>Curious George (20)</td>
<td>14</td>
<td>20</td>
<td>34</td>
<td>1.7</td>
<td>21</td>
</tr>
<tr>
<td>Sid – Science Kid (10)</td>
<td>7</td>
<td>26</td>
<td>33</td>
<td>3.3</td>
<td>20</td>
</tr>
<tr>
<td>Super Why (10)</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>0.7</td>
<td>4</td>
</tr>
<tr>
<td>Clifford (20)</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>0.45</td>
<td>6</td>
</tr>
<tr>
<td>Dragon Tales (20)</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>0.15</td>
<td>2</td>
</tr>
<tr>
<td>Word World (20)</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>0.25</td>
<td>3</td>
</tr>
<tr>
<td>Between the lions (10)</td>
<td>2</td>
<td>10</td>
<td>12</td>
<td>1.2</td>
<td>7</td>
</tr>
<tr>
<td>Mr. Rogers’ Neighbourhood (10)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>Interstices</td>
<td>29</td>
<td>5</td>
<td>34</td>
<td>n/a</td>
<td>21</td>
</tr>
<tr>
<td>Total:</td>
<td>72</td>
<td>90</td>
<td>162</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7. Environmental content per television series and episode on PBS

Knowledge Network.

The aggregate content analysis of two weeks of preschool programming on KN identified some environmental content on all series except Pingu (see Table 8). For a detailed description of the individual weeks, see Appendix F. Although Pingu is a penguin who lives in Antarctica, the show provides no oral dialogue to explain any possible environmental content, choosing to showcase the technique of clay, stop-frame animation (Pygos Group, 2007). The Magic School Bus provided the greatest percentage (25%) of the KN’s environmental content and the greatest number of environmental
incidents per episode (3.6). Produced from 1994 to 1997, the *Magic School Bus* was sponsored by the National Science Foundation to show children the world through exciting adventures. The series is no longer in production and the links to the official website are no longer active. Although *Sid the Science Kid* represented a significant percentage of PBS’ total environmental content, the episodes aired on the Knowledge Network were fewer in number and represented only 6% of the total content. This analysis did, however, identify 2.0 environmental incidents per episode of *Sid the Science Kid*.

<table>
<thead>
<tr>
<th>KN</th>
<th>Feb. and Apr. 09 (total number of episodes)</th>
<th>Environmental Action</th>
<th>Environmental Literacy</th>
<th>Total</th>
<th>Total per episode</th>
<th>Percentage of station’s total environ. content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martha Speaks (10)</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>0.8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Dora the Explorer-10</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>1.0</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Pingu (10)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hi-5 (10)</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>0.9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Magic School Bus -10</td>
<td>5</td>
<td>31</td>
<td>36</td>
<td>3.6</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Peep (10)</td>
<td>2</td>
<td>10</td>
<td>12</td>
<td>1.2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Berenstain Bears (10)</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>1.8</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Clifford (20)</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>0.9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Noonbury (6)</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0.5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Get Squiggly (6)</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0.67</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Sid – Science Kid (4)</td>
<td>1</td>
<td>7</td>
<td>8</td>
<td>2.0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Jungle Room (4)</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>1.25</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Little Bear (20)</td>
<td>5</td>
<td>8</td>
<td>13</td>
<td>0.65</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Interstices</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>n/a</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>52</strong></td>
<td><strong>93</strong></td>
<td><strong>145</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8. Environmental content per television series and episode on KN

*Sponsorship of Programs on PBS*

Programming on PBS for both weeks (February and April, 2009) was sponsored by corporations or organizations. A brief identification of sponsors occurred before and
after the sponsored series in the form of recognition advertisements (see Table 9 for a list of sponsors). During the two weeks of this study’s content analysis, individual series retained their sponsors and the same recognition advertisements were repeated on a daily basis.

<table>
<thead>
<tr>
<th>Television Show</th>
<th>Name of Sponsors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sesame Street</td>
<td>American Greetings&lt;br&gt;Beaches&lt;br&gt;Earth’s Best&lt;br&gt;McDonald’s&lt;br&gt;New Balance</td>
</tr>
<tr>
<td>Curious George</td>
<td>Chuck E. Cheese&lt;br&gt;Rainforest Café&lt;br&gt;Sun Maid Raisins</td>
</tr>
<tr>
<td>Sid the Science Kid</td>
<td>Boeing&lt;br&gt;First 5 California&lt;br&gt;Rose Hills Foundation</td>
</tr>
<tr>
<td>Super Why!</td>
<td>BECU Credit Union</td>
</tr>
<tr>
<td>Clifford</td>
<td>Chuck E. Cheese&lt;br&gt;Department of Education</td>
</tr>
<tr>
<td>Dragon Tales</td>
<td>American Greetings</td>
</tr>
<tr>
<td>Word World</td>
<td>Department of Education</td>
</tr>
<tr>
<td>Between the Lions</td>
<td>Barksdale Reading Institute&lt;br&gt;Chick-fil-A</td>
</tr>
<tr>
<td>Mr. Rogers’ Neighborhood</td>
<td>PCC Natural Markets&lt;br&gt;Sears Roebuck</td>
</tr>
</tbody>
</table>

Table 9. Sponsors for PBS programs

In addition to the sponsor advertisements, PBS and the local Seattle affiliate aired promotions for upcoming television shows, local cultural events, and on-line activities. All advertisements were coded using the methodology outlined in Chapter Three. Only two advertisements contained environmental content: *Earth’s Best* (environment action: planting and gardening) and *Sun Maid Raisins* (literacy benchmark: species are connected). Each advertisement aired twice a day for a total of 20 environmental
incidents during the two week analysis. Other sponsors emphasized the importance of reading, family connections, safety, and activity through a variety of visual and oral presentations.

Although some environmental content is present and products are not offered for sale, I feel the use of recognition advertisements is problematic during commercial-free programming. Children learn to identify sponsor names, either through spoken word or the use of corporate logos, and may begin to associate the sponsor with the values offered during the advertisement. For example, Chuck E. Cheese advertisements promoted safety equipment and physical activity; PCC Natural Markets promoted healthy food choices; McDonald’s advertisements celebrated the various ways to play. Children may be persuaded to believe that eating at or buying food from these sponsors is acceptable because they all promote cultural accepted values. The repetitive nature, short duration, and placement of these advertisements between episodes represent a “training ground” for preschool children to prepare for the future recognition of commercials.

Summary

This section outlined the results of a content analysis of weekday preschool television programming on three television stations (CBC, PBS, and KN). The first significant finding is the presence of environmental content in the programming. This content was coded as an environmental action or an environmental literacy benchmark based on predetermined codes outlined in the previous chapters.

Environmental literacy benchmarks surpassed actions, accounting for 61% of the coded environmental content. Species and ecosystem identification account for the majority of the benchmarks; these benchmarks represent knowledge that is
developmentally appropriate for preschool children who are starting the process of identifying and labeling the world around them (Samuelsson & Pramling, 2009). There were a greater number of incidents that explained the connections between species than I had originally anticipated; this is the beginning of an understanding of systems on our planet that is so important to reducing the anthropocentric view of humans as a dominant species (NAAEE, 2009). I was disappointed with the limited number of incidents explaining the effects humans have on systems and the responsibility of humans to care for the Earth. Perhaps these concepts are viewed as beyond the developmental capacity of preschool children in the eyes of television programmers. However, as discussed in earlier chapters, educational guidelines for teaching environmental literacy and research regarding the capacity of preschool children believe that children can understand, recognize, and explain environmental concerns.

Environmental actions account for only 39% of the coded environmental content, despite the knowledge that educational television can teach and reinforce positive social behaviour. The actions with the greatest number of codes, planting or gardening and recycling, can be seen as age-appropriate activities that instill confidence in preschool children. The effects of these actions are immediate and reinforce the idea that individuals, including young children, have the ability to do something to address environmental concerns. Conversely, composting and creating less pollution are activities that require greater adult input and their effects are not as immediately evident.

Although environmental content is present in preschool programming, the amount of content is limited in relation to the number of incidents coded per viewing hour (3.28). Knowing that each incident lasts for a duration of less than ten seconds, the presentation
of environmental content is approximately 33 seconds per viewing hour. This is very
disappointing in a time when environmental concern is somewhat of a mainstream topic
in political and social conversations. Adding to this disappointment is the fact that much
of the content is not contextualized or fully explained to the audience. Preschool children
are left to interpret the messages, as well as attempt to understand the contradictions, on
their own.
Preschool Narratives

The second research question in this study asked, What conceptions of the environment do preschool children share in their stories? Twelve children—six boys and six girls—from four to six years of age participated in an unstructured, play-based interview process to explain their conceptions of nature. All children came from homes where English is the language spoken; one participant cited French as an additional language spoken. Eleven out of the 12 participants have at least one sibling; the mean age is 6.3 years of age. At least one parent of all participants has completed high school, 58% have an undergraduate degree, and 25% have a graduate degree. Seventy-five percent of households in this current study reported an income greater than $100,000 and 17% reported an income greater than $60,000, revealing the middle to upper class economic and educational status of the participants and their families. Therefore, the preschool participants in this study cannot be considered to represent the average or typical preschool child in the Lower Mainland of British Columbia.

Interviews began with participants identifying ten environmental symbols and ten corporate logos (see Appendix C). These findings will be discussed in relation to television viewing later in this chapter. Following questions of symbol recognition, each participant created a three-dimensional model of his or her conception of nature. All participants were given access to the same building materials and were not aware of the models of any previous participants. However, the actual models were secondary to the stories shared during the building or creative process (Cameron and Clark, 2004). I initially discuss the participants’ stories using the two main questions I asked during the interview process, What is nature? Where would you be in this model?, as a thematic
guide. The subsequent themes in the following discussion—giving nature labels, identifying species, and making connections in nature—come from Samuelsson’s and Pramling’s (2009) research with preschool children. They found that preschool children were able to identify and to discuss their conceptions of nature, and they did so within the categories of labelling nature, identifying species, and making connections between humans and nature.

It must be noted that the unstructured nature of the interview, and my choice of questions, guided each participant in the creation of their conception of the environment. I have tried to allow the voices of the participants to be heard as much as possible but acknowledge that, as a part of a narrative inquiry, my voice is also present in their stories. My choice of words in both questions and answers, as well as any assistance given building the models such as finding blocks or fastening creations together, may have influenced the words of the participants. My use of the word ‘nature’ to represent the environment may have also affected preschool participants’ interpretations or explanations. Pseudonyms are used throughout the presentation and discussion of my findings in order to maintain the anonymity of participants.

What is Nature?

Preschool children know more about nature than they are able to answer with the simple question: what is nature? (Samuelsson & Pramling, 2009). However, I wanted to discover the initial definition of nature that participants formulated when given the option to use only oral methods in their response and to determine if their definition expanded with the use of the creative research process.
When initially asked, what is nature?, some participants seemed perplexed and fidgeted in their seats. After prompting with the question, have you heard this word before?, all participants were able to offer an answer. Every participant stated that he or she had previously heard of the word ‘nature’; however, four children (Maria, Alexandra, Logan, and Ariel) could not explain the concept any further. Rebecca and Ethan described nature as “birds and plants”; Daniel and Ruby simply stated “leaves” and “ants” respectively.

Several of the participants felt confident in their ability to define ‘nature.’ Jacob proudly stated, “the wild,” but he could not elaborate when asked to explain in greater detail. A four and a half year old boy, Mark, described nature as “putting things together outside.” Another boy, Jackson, answered: “nature is where we live… the trees and stuff… nature is science.” The youngest participant—Kira, age 4—confidently explained that, “nature is the wind and the rain… Mother Nature makes the wind, rain and the sun.”

The conceptualization of nature is a task that would present challenges for almost anyone asked. How one defines nature or “natural” is a human-created construct that is intricately tied to personal experiences, beliefs and values, social and cultural influences, and ecological knowledge—and therefore, a construct that is ever-changing.

Placement of Self

As participants began building their idea—or conception—of nature using Lego building blocks, animal characters and human figurines, modelling clay and paper, I offered a choice of figurines to represent the participant within his or her model. The final location was recorded in Table 10, with three children changing their initial choice during the building process. Jackson placed himself under a tree, stating: “I’d like to sit under a
tree and think about the trees.” He spoke of his love of science and related that he likes to think about “how stuff works.” Ruby also wanted to sit under a tree; however, her story was filled with sadness and curiosity. She longed to know more about trees:

I like to climb them but I can’t because I’m not strong enough yet… I can’t go in trees…what do they look like from the inside and from on top in the branches?
Have you ever been up there?

Mark wanted to be in a tree because he “likes to climb on trees”; however, he was the only participant who had difficulty maintaining self-representation in the model. He decided his figurine would represent a man who could climb buildings and he could not put himself back into the model even when offered additional figurines. Jacob chose to leave himself out of his elaborate model, stating “I like to play Lego and Wii”; yet he was able to explain his favourite outside activities while building an aquarium, gift shop, and beach with several other figurines chosen to represent his family members and friends.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackson</td>
<td>Under a tree</td>
</tr>
<tr>
<td>Daniel</td>
<td>Playground</td>
</tr>
<tr>
<td>Maria</td>
<td>Beside a pile of sticks</td>
</tr>
<tr>
<td>Alexandra</td>
<td>Flower garden</td>
</tr>
<tr>
<td>Mark</td>
<td>In a tree, not in model</td>
</tr>
<tr>
<td>Logan</td>
<td>Campfire</td>
</tr>
<tr>
<td>Ariel</td>
<td>Camping</td>
</tr>
<tr>
<td>Rebecca</td>
<td>Research station in Antarctica</td>
</tr>
<tr>
<td>Ethan</td>
<td>Backyard</td>
</tr>
<tr>
<td>Kira</td>
<td>Tunnels at the beach</td>
</tr>
<tr>
<td>Jacob</td>
<td>Not in model</td>
</tr>
<tr>
<td>Ruby</td>
<td>Under a tree</td>
</tr>
</tbody>
</table>

Table 10. Final location for figurine preschool child chose to represent him or herself
Maria put herself near a pile of sticks because she “likes to play with sticks” while Daniel chose the playground because he likes to “build Hot Wheels tracks and race my cars outside.” Ethan also wanted to play outside so he chose to place his figurine beside the soccer net he built in the model of his backyard. Ariel initially wanted to have her representation eating lollipops in a variety of places; however, she chose to be camping with her granny and granddad as the final destination. Logan also changed his mind throughout the process. His figurine began its journey in the forest playing “I spy”, then traveled to the beach to “jump on logs like balance beams,” eventually deciding to settle in front of a proudly constructed campfire.

After mentioning that one should “always wear a hat when going outside,” Kira placed her figurine at the beach. She stated that the “ocean makes tunnels on the beach to play in,” and quickly added another figurine to represent her sister. Alexandra also added several additional figurines as she built a model of her neighbourhood. She placed a representation of herself in the garden where she could help with the carrots and the flowers. A figurine representing her mom was close by because “mom needs to watch me while gardening.”

Rebecca was the only participant who chose to place herself into a scene from the future. She could readily explain her current experiences in the forest and in her backyard; however, she chose to create a model of Antarctica—a place she has never visited. Rebecca used building blocks to represent a research station and she positioned her figurine behind some computers “working as a scientist to see how cold the water is… [because]… we want water to stay cold.”
Most participants chose one spot to place their figurine and left it there for the duration of the interview. All but two of the participants felt like they were a part of nature, or at least a part of the construct they were building. They were actively engaged in the environment they had created. Some were gardening, playing, building with sticks, or camping, revealing activities that the participants had already experienced in nature.

*Giving Nature Labels*

This section explains the objects mentioned or displayed in the interview process with each participant. They are categorized as plants and animals, people other than the participant, playground objects, and additional human created objects (see Table 11).

<table>
<thead>
<tr>
<th>Participant</th>
<th>Plants and animals</th>
<th>People (other than self)</th>
<th>Playgrounds</th>
<th>Human created objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jackson</td>
<td>Trees, water, bears</td>
<td>Hunter</td>
<td>Park</td>
<td>House, motorcycle</td>
</tr>
<tr>
<td>Daniel</td>
<td>Trees, pumpkins</td>
<td>Cyclists, families at playground</td>
<td>Paved area</td>
<td>Hot Wheels, bikes, water guns</td>
</tr>
<tr>
<td>Maria</td>
<td>Birds, trees, goat, sticks, lake</td>
<td>Brother, family</td>
<td>Tire swing</td>
<td>Tent trailer</td>
</tr>
<tr>
<td>Alexandra</td>
<td>Flowers, grass, tree, cheetah, giraffe, rocks, penguin, monkey, sand, beach, carrots</td>
<td>Mom, Dad, Neighbour, Hunter/Archer</td>
<td>Park</td>
<td>Bench, car, hopscotch</td>
</tr>
<tr>
<td>Mark</td>
<td>Tree, apple tree</td>
<td>Man with walkie-talkie and gun</td>
<td>Swing</td>
<td>Building, walkie-talkie, gun</td>
</tr>
<tr>
<td>Logan</td>
<td>Flowers, trees, blue sky, rocks, sea star, sand, logs, sea glass, types of grasses, baby trees, rainbow, birds, nest, forest</td>
<td>Sister, mom, dad</td>
<td>Slide, flag</td>
<td>Telephone wires, campfire, bench</td>
</tr>
<tr>
<td>Ariel</td>
<td>Grass, trees, dog, garden of flowers, hippopotamus, giraffe, acorns, squirrels, forest</td>
<td>Granny, Granddad, Dad, family</td>
<td>Swinging ride, slide</td>
<td>Collection box, swimming pool, house, campfire, car</td>
</tr>
<tr>
<td>Rebecca</td>
<td>Sharks, ocean, bunnies, penguins, dog, alligator, ice, tree, deer, beaver, polar bear, logs in water</td>
<td>Mom, Dad, family</td>
<td>Swing</td>
<td>Research station, computer</td>
</tr>
<tr>
<td>Ethan</td>
<td>Grass, trees</td>
<td></td>
<td>Swing</td>
<td>Soccer net, ball, trampoline</td>
</tr>
<tr>
<td>Kira</td>
<td>Trees, birds, nest, robins, ocean, sand, island, butterfly, puddles, penguin, polar bear, dolphin</td>
<td>Sister, Dad</td>
<td>Park</td>
<td></td>
</tr>
<tr>
<td>Jacob</td>
<td>Trees, monkey, banana, crabs, beach, sharks, fish</td>
<td>Storekeeper, Scuba Diver, Friend, Brother</td>
<td>Swing</td>
<td>Aquarium, gift shop, hammock, tree house, bike shop, fish shop, swimming pool, car</td>
</tr>
<tr>
<td>Ruby</td>
<td>Trees, lake, animals, sticks</td>
<td>Relatives</td>
<td>Swing, spinner, slide</td>
<td>Building for animals</td>
</tr>
</tbody>
</table>

*Table 11. Giving nature labels: Categories for objects and people in participants’ stories.*
Plants and animals.

All preschool stories and models shared the inclusion of trees as part of their conceptions of nature. This is, no doubt, partially due to the two three-dimensional trees within the available building materials. I included these trees to assist with the creation of the models, hypothesizing that—if they were experiencing difficulty—all preschool children would be able to begin their conceptions once they viewed a tree. Trees were possibly chosen by all due to their prevalence within the lives of these children. Most participants placed animals in their models, choosing them from a variety of animal shapes within the building blocks. Several children utilized modelling clay to create their own birds, bananas, sea stars, flowers, and fish. Some participants added appropriate ecosystem features for their animals (i.e. ice for a polar bear). Others included animals that had no relevance to the ecosystems of Vancouver and North Vancouver, adding giraffes and monkeys beside their favourite playground objects.

People.

The most common additional people included in the narratives and models were immediate family members or close relatives of the preschool children. Participants spoke of family members watching them while playing or playing with them (Alexandra, Logan, Ariel, Kira, and Jacob); accompanying or taking them to the ‘natural’ areas described or built (Maria, Logan, Ariel, Rebecca, Kira, Jacob, and Ruby); and identifying species or ecosystem features (Logan, Ariel, Rebecca, and Kira). Daniel mentioned seeing other people riding their bikes when he was riding his bike and Alexandra included her neighbours in her discussion of favourite activities to do near her house.
Alexandra and Jackson included a Lego archer figurine; Jackson identified it as a hunter who would kill the animals in his model and Alexandra added a target for the archer to practice—something she “saw on a Godzilla show.” Mark included a man who was climbing the outside of a building with a “walkie-talkie and guns for his stuff”; however he did not identify the man or explain his actions when asked additional probing questions. Jacob added a shopkeeper for his aquarium gift shop, as well as a scuba diver to catch fish to “give it to the guys who sell it at the fish shop.”

Playgrounds.

Every participant emphasized the importance of playgrounds in their conceptions of nature. They shared stories of going to their favourite neighbourhood playgrounds or of utilizing playgrounds in their backyards, campgrounds or school yards. They described the playground as a place to play tag, climb trees, swing, slide, and play games. Most included aspects of a playground in their models, choosing them from a swing and spinner within the building blocks or creating their own slides and swings from modelling clay. Even Rebecca, whose model is a research station in Antarctica, included a “swing to play on after… [her]…research.”

Human-created objects.

Human-created objects, other than playground items, were included by all but one participant. Buildings such as gift shops, houses, aquariums, research stations, and animal shelters were explained in the narratives of Jackson, Mark, Ariel, Rebecca, Jacob, and Ruby. Motor vehicles—cars, motorcycles, and tent trailers—were identified by Jackson, Maria, Alexandra, Ariel, and Jacob as a means to travel to or to enjoy the location
described in their models. Swimming pools (Ariel, Jacob), benches (Logan, Alexandra),
campfires (Ariel, Logan), and toys to play with (Daniel, Ethan) also found importance in
the conceptions of some participants.

Identifying Species

This section differs from the labelling of objects in that additional information
was provided by the participant to explain the species being identified. For example, the
placement of a giraffe in the model would be labelling; the description of a giraffe eating
the leaves from a tree would provide greater information to identify this species. Listed
below are the examples of species identification in the narratives of the participants.

Alexandra: giraffes eats (sic) trees
          penguins live in snow far away
          monkeys live in trees
          coconuts grow on trees
          fastest cat is the one with the black dots

Mark: apples grow on trees

Logan: sea star has as much (sic) points as a star
       birds live in nests

Ariel: hippos eat grass… giraffes eat trees

Rebecca: sharks and penguins like cold water
         polar bear lives on ice

Kira: birds live in nests
      penguins and polar bears like ice and winter
      their home is the world (talking about butterflies)

Jackson, Daniel, Maria, Ethan and Ruby did not provide any additional
information in their models or stories to suggest further identification of the plants or
animals, even when asked to clarify.
Making Connections in Nature

Jackson and Logan utilized their models to explain the cycle of life for animals and plants. Jackson placed a hunter next to a grizzly bear and stated that “the animal dies” when the hunter shoots his arrow. Jackson discussed his fear of the bear-human relationship: “I like bears that don’t fight… bears that don’t bite me.” Logan built a variety of trees in his field, adding baby trees to replace others because “sometimes they get cut down for telephone wires.” Logan also explained if he “cut down a tree with my chainsaw, it’ll be dead.”

Ariel, Alexandra, Mark, and Logan described connections between seeds, plants, leaves, and trees. Ariel excitedly explained finding a seed on a walk with her dad and planting the “nut that squirrels eat.” She exclaimed that she is “growing a nut tree with my dad.” Ariel further described her success in planting bean seeds at school and explained that trees “need to grow up and give fruit.” Alexandra also has experience planting seeds with her mom. She remembered planting carrot seeds in her garden last summer and harvesting the vegetables. Mark described his understanding that when the trees change colour, the leaves are dying. He stated: “trees are going to change colour… wait for the leaves to dry up and then it changes colour.” While building a flower out of modelling clay, Logan explained the importance of leaves on flowers. The “leaves on flowers are for eating… flowers eat stuff inside the leaves from the sun.” He further explained that he learned this on a television show.

There are a few connections to human actions in the stories of Logan and Rebecca. As mentioned earlier, Logan described the impact of humans cutting down trees. In his representation of a beach scene, Logan included green sea glass. He
explained that this came from bottles and “from people drinking and leaving them behind.” Rebecca did not overtly explain human impacts on ocean temperatures yet her desire to become a research scientist in Antarctica because she “wants the water to stay cold” suggests that she has heard about the impacts of climate change.

Discussion of Preschool Narratives

The variety of objects and people presented in the stories of the preschool participants reveal the ways in which the children interact with nature in their daily lives, and perhaps the ways they see nature interacted with on television. All participants included species such as trees, plants, and animals, in settings that were familiar and relevant to their experiences. No participant was alone in their stories; family members, friends, or neighbours were always included. Parks, playgrounds, campgrounds, and forests were explained as places preschool children had visited in the past. The inclusion of human-made objects was not seen as “unnatural” to any of the participants; all models and stories included playground structures and many included houses, technological objects, or vehicles.

A finding of interest is that all participants represented their species in ecologically appropriate ways. They were very confident in placing birds, giraffes, and other animals or plants in their habitats without any exaggeration of the physical or behavioural characteristics of these species. Participants could not always identify the source for their knowledge, stating that they “just know” or had learned it from programs on television or books they had read.

References to television can be found in most of the participants’ stories when I asked them to further explain how they had attained their knowledge of species. This may
suggest that the preschool population in this study pay attention to what they are watching on television and retain the information presented. Their use of television to learn how to identify and explain species’ characteristics and habitats reinforces the environmental literacy benchmark findings of the content analysis. Some participants also included or discussed species and characters that they had seen on television.

Alexandra added an archer shooting his arrow at a target because she had previously seen this on “a Godzilla show.” She elaborated that she enjoyed watching the movie, Godzilla with her family. Logan explained his understanding of photosynthesis by relating what he learned from a Magic School Bus episode about plants. Kira proclaimed that she liked Dora because “she’s an adventurer…she finds things.” Then Kira explained her own explorations at the beach with her siblings.

A few participants were able to explain connections that exist in nature, suggesting that they are able to conceptualize and understand systems theories discussed in the previous content analysis of environmental literacy benchmarks. It is not possible to determine how these connections were learned and subsequently expressed by the participants. Perhaps this knowledge is related to time spent outside observing these systems in nature; discussions with parents, caregivers, or teachers; or absorbed from content presented on television shows.

The use of this creative research process did expand the participants’ ability to explain their definition of and conceptions of nature. When initially asked, “What is nature?”, most participants provided one or two word answers or could not explain their conceptions. However, throughout the research process, all participants identified plant and animal species, explained their favourite activities in nature, and shared their
thoughts about the meaning of and role of nature in their lives. A summary of their initial definitions of nature and a selection of quotes from their stories is presented in Appendix G.
My third research question sought to determine if television viewing is related to preschool children’s conceptions of the environment and their recognition of environmental logos. Due to the small sample size (N=12) of preschool participants, a cultivation effect or correlation between television viewing and other variables cannot be substantiated. Nevertheless, findings from the demographic questionnaire and television viewing habits of preschool children and their parents revealed important insights. See Appendix H for the demographic and viewing habits questionnaire and detailed charts of the results explained in this section.

*Television Viewing Habits*

Preschool children in this study watch an average of 1.3 hours of television per day, including weekends. Forty-three percent of their television viewing takes place with a sibling present, 31% with a parent, and 21% on their own. This reflects their family composition, with all but one participant having at least one sibling. Seventy-five percent of children in this study watch Saturday morning cartoons, weekday afternoon television shows, and nature documentaries; however 50% never watch prime time television shows and 58% never watch news broadcasts. These results, along with the finding that 92% watch weekday morning television shows, confirmed the popularity and acceptance of the preschool television time slot chosen for the content analysis portion of this study.
Heavy and Light Viewers

In addition to demographic questions, parents were asked to rate their perceptions of the television viewing habits of their preschool child (see Appendix I). I adapted Shrum, Burroughs, and Rindfleisch’s (2005) five-point scale measuring television viewing for the preschool participants and their parents. The seven-point Likert scale was totaled, each question receiving a value of 1-7, and added to the number of hours of television each child watched on a weekly basis. The statements, “my preschool child watches less television than most children his/her age” and “my preschool child hardly ever watches television,” were reverse coded to give a value of 1-7. To attain a total for television viewing hours, I multiplied the information given for a typical weekday by five and doubled the amount of hours provided for a typical weekend. Hours spent watching DVDs and movies were not included in order to keep the data collection relevant to television programming. The total scores indicate greater number of television viewing hours.

Participants were divided into heavy viewers and light viewers of television based on their total score (see Appendix I). Mark, Jacob, Kira, Alexandra, Daniel, and Ethan were classified as heavy viewers, watching an average of 14.5 hours of television per week. Maria, Ariel, Ruby, Jackson, Logan, and Rebecca were classified as light viewers, watching an average of 3.9 hours of television per week. A note of interest is that 58% of parents were unsure if their child watches less television than most people his or her age. Parent scores, without the inclusion of hours of television viewing, were totaled but the classification of heavy and light viewers did not follow the pattern of their preschool children. Eighty-four percent of parents in this study feel that they do not watch a lot of
television, with 58% reporting that they hardly ever watch television (see Appendix H for complete results).

Narratives and logo recognition.

Although the sample size is too small to determine a cultivation effect on the stories of preschool participants, I compared the narrative content of heavy and light viewers using the themes outlined in the previous section: giving nature labels, identifying species, and making connections in nature. The narratives of all participants, regardless of viewing level, attached labels to nature such as identifying trees, birds, and people. Five participants did not identify species in their stories, or provide any additional information regarding physical or behavioral characteristics and habitats. These participants were spread out among heavy (3) and light viewers (2) with no clear relationship to suggest that heavy viewers provide fewer descriptions. Six participants did not explain any connections in nature during the creative research process; four of these were heavy viewers. This might suggest that heavy viewers do not conceptualize the connections between systems in nature but there are too few participants to offer any real insight.

Preschool children were shown 20 index cards at the beginning of each interview and asked to identify the pictures on each card. Half of the visuals contained corporate logos and half of the visuals showed environment symbols. There was little difference in logo or symbol recognition for heavy and light viewers of television. Heavy viewers’ recognition totaled 36 logos and 37 environmental symbols, and light viewers equally recognized 39 logos and 39 environmental symbols. Perhaps recognition has little to do with television viewing due to the commercial-free broadcasting of preschool
programming. Perhaps the pervasiveness of logos in our society—in arenas other than television—accounts for the similarity in recognition between heavy and light viewers. Findings also suggest the recognition of logos and environmental symbols alike is a function of the participant’s age; the youngest participants, all under five years of age, failed to recognize at least half of the corporate logos or the environmental symbols presented.

Discussion of Cognition and Cultivation

Van Evra (2004) offers that “There is growing emphasis on the role of cognitive skills and cognitive activity…in children's level of comprehension of media content.” Children, and adults, are no longer viewed as passive recipients of information transmitted by television and other media. Social cognitive theory (Bandura, 1986) suggests that, although viewers emulate models on television, viewers also exert control over their thoughts and feelings and this in turn affects how they react to various situations and models. Drawing on uses and gratifications theory, Blumler and Katz (1974) suggest that viewers of television actively choose how they will interpret the messages and what influence the content will have in their lives. Are preschool children actively engaged while viewing television?

According to the data provided by the participants’ parents, the preschoolers in this study are active viewers of television. Most parents agreed that their child watches television on a daily basis (75%), pays close attention to what he or she watches (75%), and often talks about what he or she watches (92%). Although I cannot claim that the participants in this study have a need for cognition, cognitive skills are promoted and reinforced by this population: all participants attended a fee-based, educational preschool;
parents have a high level of formal education and represent middle to upper-class in society; and parents are highly involved in their child’s development with little daycare. The need for cognition (NFC) and attention to television have been shown to lead to an environmental cultivation effect—a lack of environmental concern—in adults watching fiction and non-fiction programs (Shrum, Burroughs, & Rindfleisch, 2005). Perhaps these indicators, NFC and attention to television, could lead to a cultivation effect in this study’s population of preschool children designated as heavy viewers. Good (2009) suggests that NFC and attention to television are related to an environmental cultivation effect only with the viewing of fictional content. The current study’s content analysis revealed that preschool television is primarily composed of fictional characters and settings. Therefore Good’s findings may have implications for the children in this research who pay attention to preschool television and may have a high NFC. It is for these reasons that future research into the cognitive processing of preschool children and the role of television in their lives is essential.
America's most powerful environmental information source is the media….current formats for presenting environmental news are highly useful in making the public aware of the existence of an issue or problem. They provide, however, little educational background on what causes the problems or its underlying science. News coverage, in particular, contains a steady stream of isolated facts and abbreviated messages that penetrate the public's mind without providing a context. The result is that myths or misperceptions can arise and persist. (Coyle, 2005, p. 69)

The first research question in this study asked: What environmental content exists on television designed for preschool children? The findings, as outlined and discussed in Chapter Four, revealed that environmental content exists on preschool television in the form of environmental actions and environmental literacy benchmarks. Literacy benchmarks accounted for 69% of the environmental content coded; this may suggest that preschool television programmers recognize the importance of educating young children to understand, to connect with, and to preserve the various systems that function on our planet.

However, it is worth noting that preschool television also lacks many of the qualities that Coyle mentions (in the above quote) are missing from mainstream news broadcasts. Preschool television can teach academic skills, but the environmental content found in this study was presented in small, isolated pieces with little context given to aid
in understanding the importance of this content. All environmental incidents lasted for a
duration of less than ten seconds—with many lasting only two to three seconds—and the
total number of incidents was less than four per hour. Preschool children are left to
interpret these isolated pieces on their own, with little to no guidance to explain how the
incidents relate to a larger environmental concept. This study did not explore preschool
children’s understanding of television’s environmental content; however, I believe that
the presentation style and lack of context, as Coyle suggests, could lead to myths and
misperceptions in children’s understanding of environmental issues. Can this content, or
lack of content and context, also lead to an “environmental cultivation” effect in
preschool children?

*Environmental Cultivation*

The third research question in this study, Does television viewing affect preschool
children’s conceptions of the environment?, sought to determine if such an environmental
cultivation effect existed. Due to the small sample size (N=12) of preschool participants,
a cultivation effect or correlation between television viewing and other variables could
not be substantiated with this population. Environmental cultivation is a term used by
Good (2009) to describe television’s cultivation of a lack of environmental concern with
adult viewers. The theory of cultivation suggests that long-term exposure to the
television’s central messaging system can cultivate beliefs and values that are similar to
those presented on the screen. But cultivation studies fail to identify the quantity of
viewing that meets the requirement of long-term exposure. Cultivation studies are
conducted in the short-term; they measure weekly and daily viewing patterns and
extrapolate these findings to suggest implications of long-term exposure. Therefore, I
propose that the current study’s content analysis of two separate weeks of preschool television be accepted as the first step in the exploration of preschool children’s environmental cultivation.

In 1994, American children claimed that 71% of their environmental understanding came from watching television; in 2002, despite the growth of the internet, children reported receiving 72% of their environmental facts from television (Coyle, 2005). Television continues to be easily accessible to young children; is present in most North American homes; and requires no literacy skills of its audience (Shanahan & Morgan, 1999). The current study revealed that limited environmental content is evident on weekday morning television, suggesting that an environmental cultivation effect can occur with preschool viewers who have long-term exposure to this programming. However, future research is required to extend these findings beyond this programming time slot and should include a content analysis of all television programming the preschool children are viewing.

**Materialism and Social Learning Theory**

Good (2007) shows that materialism is a mediating factor in cultivating a lack of environmental concern in adult television viewers. If an environmental cultivation effect exists with preschoolers (i.e. a lack of environmental concern related to heavy television viewing), is materialism, rather than long-term exposure, a mediating factor? Although preschool television offers commercial-free programming, stations are still run by corporate sponsors who don’t want to “draw attention to the environment as a social problem versus a domain that is up to individuals…to protect” (Shanahan & Morgan, 1999, p. 104). Gauntlett (1997) echoed the same concerns, suggesting that environmental
“issues have not been disregarded or buried, but rather have received a treatment which has put the flow of critique into a hegemonically neutral zone, where fault is found in individual rather than organized social behaviour” (p. 157). The current study did not explicitly examine materialism in preschool television; however findings support the notion that preschool children are being educated to take individual responsibility for environmental issues by recycling, protecting species, and maintaining manicured gardens. Critiques of our consumer driven culture were not evident in any programming; reducing consumption was never offered as a way that humans can have an effect on natural systems.

Gauntlett (1997) suggests that television producers are professionally socialized to avoid political tension and the focus on individual actions is a way to give children confidence that they can make a difference. Christakis and Zimmerman (2009) state that the “media’s presence in the lives of young children is large and growing. Given this irreversible trend, the reality is that research paradigms must focus on behavioral optimization rather than on reduction or elimination of TV altogether” (p. 1182). Social learning theorists would support this statement and suggest that children can learn from the models they view on television programs. Findings from this study highlight that there are a lack of environmental actions on preschool television. Television programmers who are interested in improving pro-social, environmental behaviours in this population should take note.

*Creative Research with Preschool Children*

Creative research occurs when people are engaged in making something as part of the research process. They are given more time to formulate their ideas, to reflect upon
their creations, and to access different parts of their brain through the stimulation of nerve endings on their hands (Gauntlett, 2009). The preschool children in this study are no different.

The second research question in this study asked: What conceptions of the environment do preschool children share in their stories? The variety of objects and people presented in the stories of the preschool participants reveal the ways in which the children interact with nature in their daily lives, and perhaps the ways they see nature interacted with on television. As discussed in the preceding chapter, all participants included animal and plant species; family members, friends, or neighbours; and parks or playgrounds to explain their conceptions of nature. Some participants were able to explain connections between species, as well as to identify the effects human activity might have on the natural world. Through the creation of three dimensional models of their conceptions of nature, preschool children were able to provide greater detail in their stories, to reflect upon their creations, and to change their ideas with ease. A richer conversation was shared with the participants through this process than through the use of a structured question and answer interview.

However, it is not possible to determine how the knowledge of species or the explanation of connections were learned and subsequently expressed by the participants. Perhaps this knowledge is related to time spent outside observing these systems in nature; discussions with parents, caregivers, or teachers; or absorbed from content presented on television shows. The scope of this study can only suggest possible influences based on the information shared in the stories of the preschool participants. Despite these limitations, the current study’s findings contribute to Gauntlett’s (2007) research
suggesting that, through the creation process, we can make meaning of our own thoughts and ultimately connect with others as we share our creations. Findings in this study confirm that preschool children can also make meaning of their world and share their ideas through the creative process.

Limitations and Delimitations

This study is delimited by a number of factors. I chose three television stations—PBS, CBC, and KN—for their blocks of commercial-free weekday preschool programming; however, other television stations that offer similar preschool programming during their Saturday schedules were excluded due to the presence of commercials. During the content analysis, I recorded PBS from 7am to 12pm, based on their scheduled preschool programming. I recorded CBC from 7am to 11am based on their scheduled preschool programming. However, KN runs preschool programming throughout the day so I matched their taping hours with that of CBC, the other Canadian television station in the study. This excluded the analysis of additional preschool programs that are regularly broadcast on KN. The results of the content analysis were determined by one week of television programming in February (PBS and KN) and one week of programming during Earth Day in April (PBS, CBC, and KN); greater validity would be achieved with additional content analyses at different times of year and over a longer duration. Additional delimitations include the age restriction placed on eligibility for preschool interviews. Restricting interviews to preschool children within the age range of four to six years old excluded younger children who may have been able to express their stories and conceptions.
Limitations that may have affected my findings are based on the demographical characteristics of my interview participants. All 12 participants attended fee-based preschools and all participants resided in North Vancouver or Vancouver, British Columbia. These children represent the middle to high socio-economic status of families that can afford preschool. To explore the possibility of environmental cultivation, a larger population of preschool participants is required. In addition to a greater number of participants, a greater variety of socioeconomic statuses and life experiences outside the Lower Mainland of British Columbia would provide richer detail in the narrative inquiry. A random sampling of preschool children might generate additional themes to understand preschool children’s conceptions of the environment or to consolidate the findings presented in this study.

The findings of the content analysis of preschool programming were potentially affected by the loss of one week’s worth of programming on CBC. Appropriate and reliable back-up plans need to be in place to avoid this problem in the future. Having a greater amount of time to conduct a detailed content analysis, such as a week of programming coded for every season, would provide a clearer picture of the amount of environmental content on weekday preschool television.

Future research

Both areas of research in this study—environmental content on preschool television and the use of play-based narratives to understand the environmental conceptions of preschoolers—are in their infancy and offer the excitement that comes with exploring new research venues and methodologies. Many content analyses exist for preschool television; I could find none that specifically address environmental content.
Researchers have recognized the ability of preschool children to conceptualize the environment; however, I believe this is the first study to use play-based narratives with preschool children in the creation of a metaphorical model of the environment. An interesting project would involve longitudinally tracking the children in this study and having them construct their conceptions of the environment as a child, teenager, and adult. Revisiting participants on several occasions would provide an interesting snapshot into the stability of and the changes in conceptions that might occur as a part of childhood development. The methodology of utilizing Lego, and other play materials, could be explored with older children who could rate the value of model building as a way to explore and to consolidate their conceptions of the environment. Having adults construct a metaphorical model of nature using Lego would add to Gauntlett’s (2007; 2009) research using Lego to explore social identity, learning styles, and parliamentary concerns.

A more in depth content analysis of television—one that samples more than just weekday morning programs—could track environmental content and offer insight into the frequency and complexity of environmental information being presented to preschool children. This could extend to the ever-expanding world of technology and the importance of analyzing the impact of these media influences on young children and their conceptions of the environment.

Preschool children will encounter environmental problems and concerns in their lifetime that are potentially unknown to humans. Knowing how young children conceptualize and interact with the natural world—and listening to their stories—can provide adults with relevant and meaningful information, information that can aid in the
creation of education curricula and media representations that promote, rather than neglect, environmental literacy.
References


http://www.pbs.org/aboutpbs/aboutpbs_corp_pbskids.html

http://www.pbs.org/parents/preschool/about.html

http://www.pingu.net/uk/brand-history.htm


Appendix A: Coding Checklist for Environmental Content

1. Name/Date/Channel of show

2. Descriptors for environmental actions:
   
a. recycling (placing recyclables in appropriate containers)
   
b. reusing (hand-me-downs, second hand items, thrift shops)
   
c. reducing water consumption or waste (turning off the taps, mending items)
   
d. creating less pollution (riding bicycles)
   
e. picking up garbage (picking up and placing in appropriate container)
   
f. composting (placing food scraps into designated compost bins)
   
g. planting or gardening (vegetables, trees, plants, seeds)
   
h. protecting species (rehabilitating wildlife, saving habitats)
   
i. saving energy/using solar energy (turning off lights, solar-powered creations)

3. Descriptors for environmental literacy benchmarks:
   
a. recycling (placing recyclables in appropriate containers)
   
b. reusing (hand-me-downs, second hand items, thrift shops)
   
c. reducing water consumption or waste (turning off the taps, mending items)
   
d. creating less pollution (riding bicycles)
   
e. picking up garbage (picking up and placing in appropriate container)
   
f. composting (placing food scraps into designated compost bins)
   
g. planting or gardening (vegetables, trees, plants, seeds)
   
h. protecting species (rehabilitating wildlife, saving habitats)
   
i. saving energy/using solar energy (turning off lights, solar-powered creations).
Appendix B: Letter of Consent

Dear Preschool Parents:

I am currently a Master of Arts student at Royal Roads University exploring the environmental literacy levels of preschool children. As part of my present course work under the direction of Dr. Jennifer Good of Brock University and Dr. Richard Kool at RRU, I would like to extend an invitation for your preschool child—aged four, five, or six—to participate in a play-based interview process. This process will use building blocks, drawing materials, and art supplies to help your child explain his or her conceptions of ‘the environment’ or the natural world through the creation of a two or three dimensional model. This will require approximately 15 minutes, depending on the creation process.

Photographs will be taken of each model and the conversations during the creation process will be recorded using a digital recording device. Participants will retain their anonymity; names will not appear on any documentation, will not be included in the audio recording, nor will children be photographed. Following the interview, I will ask you to complete a short questionnaire to gather demographic information regarding your family structure and activities. You, or your child, may withdraw your child’s participation at any time during this process; in such cases, all documentation recorded, transcribed, or photographed up to this withdrawal will be included as part of the research process.

At the conclusion of this research project, a summary of the findings, respecting anonymity, will be presented to Royal Roads University in the form of a completed thesis. All research documentation from participants will be kept in a secure location during the research process and for one additional year following the completion of this thesis.

Please reply via email and add your name and signature below to grant consent for your child to participate in this research study. If you have any questions or concerns regarding the nature of this study, please contact myself at laura.magrath@royalroads.ca, Dr. Jennifer Good at jgood@brocku.ca, or Dr. Richard Kool at rick.kool@royalroads.ca.

Sincerely,
Laura Magrath

By signing this letter, you give free and informed consent for your preschool child to participate in this project and agree to the data collection provisions outlined in the letter above.

Child’s Name: ____________________________ Parent/Guardian Name: ____________________________

Signed: ____________________________ Signed: ____________________________
(parent/guardian) (researcher)

Date: ____________________________ Date: ____________________________
Appendix C: Symbols for Media and Environmental Benchmarks

<table>
<thead>
<tr>
<th>Environmental symbols</th>
<th>Corporate Logos</th>
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<tbody>
<tr>
<td>Reusable water bottle</td>
<td>Webkinz</td>
</tr>
<tr>
<td>Earth</td>
<td>Apple Computers</td>
</tr>
<tr>
<td>Energy Star logo</td>
<td>Starbucks</td>
</tr>
<tr>
<td>Recycling symbol</td>
<td>McDonald’s</td>
</tr>
<tr>
<td>Turn cars off (no idling) symbol</td>
<td>Lego</td>
</tr>
<tr>
<td>People showing steps in composting</td>
<td>Toys ‘r us</td>
</tr>
<tr>
<td>Cloth bag</td>
<td>Hot Wheels</td>
</tr>
<tr>
<td>Wind turbine</td>
<td>Toxic substance symbol</td>
</tr>
<tr>
<td>Put trash in can symbol</td>
<td>Walt Disney movies</td>
</tr>
<tr>
<td>Compact fluorescent light bulb</td>
<td>X-box</td>
</tr>
</tbody>
</table>
Appendix D: Pictures of Preschool Models

Participant 1

Participant 2

Participant 3

Participant 4

Participant 5

Participant 6
Participant 7

Participant 8

Participant 9

Participant 10

Participant 11

Participant 12
Appendix E: Demographic Questionnaire for Parents of Preschool Participants

Demographic questionnaire

Number: _____

1. Number of family members living in household: _______________________

2. Age(s) of siblings ______________

3. Language spoken at home ______________

4. Family income:
   _____ below $30000   _____ $30000 - $59000   _____ $60000-$100000   _____ > than $100,000

5. Highest level of education (one or more parents):
   _____ elementary   _____ high school   _____ undergraduate   _____ graduate school

6. Please provide an approximate number of hours per day, on the average weekday your preschool child participates in the following activities:

   Preschool   _________   Daycare   _________
   Organized sport   _________   Television show viewing   _________
   Music/arts lessons   _________   Movies/DVD viewing   _________
   Other   _________   Unstructured outdoor play   _________
   (please specify and list approximate hours)

7. Please provide an approximate number of hours per day on the average weekend your preschool child participates in the following activities:

   Organized sport   _________   Television show viewing   _________
   Music/arts lessons   _________   Movies/DVD viewing   _________
   Other   _________   Unstructured outdoor play   _________
   (please specify and list approximate hours)

8. Please give a percentage for each category to describe your preschool child’s television viewing: (total should add up to 100%)

   _____ with a sibling   _____ with a parent   _____ on his/her own   _____ other
9. Please circle the answer that best describes your preschooler’s television viewing in a typical week.

(a) My preschool child watches Saturday morning cartoons on television.

Always  Often  Sometimes  Never  Not sure

(b) My preschool child watches weekday morning children’s programs on television.

Always  Often  Sometimes  Never  Not sure

(c) My preschool child watches weekday afternoon children’s programs on television.

Always  Often  Sometimes  Never  Not sure

(d) My preschool child watches nature documentaries on television.

Often  Sometimes  Never  Not sure

(e) My preschool child watches prime time programs on television not specifically designed for children.

Often  Sometimes  Never  Not sure

(f) My preschool child watches television news.

Often  Sometimes  Never  Not sure

10. Please circle the answer that most appropriately describes your preschool child:

(a) My preschool child spends time watching television almost every day.

Strongly agree  Agree  Slightly agree  Not sure  Slightly disagree  Disagree  Strongly disagree

(b) My preschool child watches less television than most children his/her age.

Strongly agree  Agree  Slightly agree  Not sure  Slightly disagree  Disagree  Strongly disagree

(c) My preschool child hardly ever watches television.

Strongly agree  Agree  Slightly agree  Not sure  Slightly disagree  Disagree  Strongly disagree

(d) I have to admit, my preschooler watches a lot of television.

Strongly agree  Agree  Slightly agree  Not sure  Slightly disagree  Disagree  Strongly disagree
(e) My preschool child pays close attention to the program when he/she watches television.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

(f) My preschool child often talks about things he/she has seen on television.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

11. Please circle the answer that most appropriately describes your television viewing habits:

(a) I spend time watching television almost every day.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

(b) I watch less television than most people.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

(c) I hardly ever watch television.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

(d) I have to admit, I watch a lot of television.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

(e) I pay close attention to the program when I watch television.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

(f) I often talk about things I have seen on television.

Strongly agree    Agree    Slightly agree    Not sure    Slightly disagree    Disagree    Strongly disagree

Thanks for taking the time to complete this questionnaire. Your help and the help of your preschooler are greatly appreciated!
Appendix F: Weekly results for PBS and KN programming

**PBS (February)**

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<tr>
<th>TV Show (episodes per week)</th>
<th>Environmental Action</th>
<th>Environmental Literacy</th>
<th>Total</th>
<th>Total per episode</th>
<th>% of station’s total environ. content</th>
</tr>
</thead>
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<td>15</td>
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<td>29</td>
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<tr>
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**PBS (April)**

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### Knowledge Network (February)

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<th>Total per episode</th>
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## Knowledge Network (April)

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<td>Sid - Science Kid (2)</td>
<td>0</td>
<td>2</td>
<td>2</td>
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<td>4</td>
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<td>Little Bear (10)</td>
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<td>5</td>
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<tr>
<td>Interstices</td>
<td>4</td>
<td>0</td>
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<td><strong>Total:</strong></td>
<td><strong>21</strong></td>
<td><strong>44</strong></td>
<td><strong>65</strong></td>
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## Appendix G: Preschool Participants’ Descriptions of Nature

<table>
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<tr>
<th></th>
<th>Gender</th>
<th>Age</th>
<th>Pseudonym</th>
<th>What is nature?</th>
<th>Quotes while creating</th>
</tr>
</thead>
</table>
| 1 | Boy    | 4.9 | Jackson   | “where we live, the trees and stuff… it’s science” | “I’d sit under a tree and think about the trees”  
“I like grizzly bears that don’t bite me.” |
| 2 | Boy    | 5.9 | Daniel    | “leaves” | “I remember doing a pumpkin hunt at my school… in the garden.” |
| 3 | Girl   | 4.5 | Maria     | “heard it but I don’t know what it is” | “we’re getting books for our tent trailer”  
“the lake is too cold for swimming… no thank you.” |
| 4 | Girl   | 5.7 | Alexandra | “heard it but I don’t know what it is” | “mom needs to watch me while I’m gardening”  
“I like to build a rock mountain at school” |
| 5 | Boy    | 4.5 | Mark      | “putting things together outside” | “I climb on trees”  
“I need to put tape on the trees so they get stronger by growing together.” |
| 6 | Boy    | 5.8 | Logan     | “heard it but I don’t know what it is” | “I see flowers everywhere”  
“Leaves on flowers are for eating… flowers eat stuff inside the leaves”  
“Baby trees sometimes get cut down for telephone wires.” |
| 7 | Girl   | 4.9 | Ariel     | “heard it but I don’t know what it is” | “I have a collection box for nature”  
“I’m growing a nut tree with my dad from a seed we found on our walk.” |
| 8 | Girl   | 5.8 | Rebecca   | “birds, plants” | “I’m testing to see how cold the water is… want the water to stay cold for the penguins.”  
“I look for bears and beavers with my mom and dad in the forest.” |
| 9 | Boy    | 4.5 | Ethan     | “birds, plants” | “I just like to play games outside” |
| 10| Girl   | 4.0 | Kira      | “wind, rain… mother nature makes the wind, rain and the sun” | “I saw a bird’s nest on a walk at the beach”  
“I heard baby robins on the way to school with my dad.”  
“I like Dora… she’s an adventurer…she finds things.” |
| 11| Boy    | 5.8 | Jacob     | “wild” | “I collect crabs under rocks… my brother got a lobster shell!”  
“I like swimming outside better because I get heated up with the towel and lie on the ground to get warm by the sand.” |
| 12| Girl   | 4.5 | Ruby      | “ants” | “I like to climb them but I can’t because I’m not strong enough yet.”  
“What do trees look like? Have you been up there?” |
Appendix H: Demographic Information from Parent Questionnaire

Language spoken at home: English 12 (100%)

<table>
<thead>
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<th>Income</th>
<th>Responses</th>
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<td>$30,000 to $59,000</td>
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<tr>
<td>$60,000 to $100,000</td>
<td>2 (17%)</td>
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<tr>
<td>Greater than $100,000</td>
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<td>Undergraduate</td>
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<td>Four</td>
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<td>Seven</td>
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<td>Eight</td>
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<td>Nine</td>
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<tr>
<td>Ten</td>
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Median: 7 years; mean: 6.3 years

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<th>Number of family members</th>
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<td>Four</td>
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<td>Five</td>
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### Daily Activities

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<td>2.5</td>
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<td>2.5</td>
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<td>2</td>
<td>1.5</td>
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<td>Outdoor play</td>
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Mean (hours): Preschool (2.6), TV viewing (1.3), Movies (0.5), Outdoor play (2), Organized sport (0.75)

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<th>7</th>
<th>8</th>
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<td></td>
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Mean (hours): TV (1.4), Movies (1.6), Outdoor play (3.2), Organized sport (0.5)
### Television Viewing Patterns

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<th>TV every day</th>
<th>&lt; most his or her age</th>
<th>Hardly ever watches TV</th>
<th>Watches a lot of TV</th>
<th>Pays attention</th>
<th>Talks about TV watched</th>
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<tbody>
<tr>
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<td>3 (25%)</td>
<td>1 (8%)</td>
<td>1 (8%)</td>
<td>4 (33%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>4 (33%)</td>
<td></td>
<td>3 (25%)</td>
<td>5 (42%)</td>
<td>6 (50%)</td>
<td></td>
</tr>
<tr>
<td>Slightly agree</td>
<td>2 (17%)</td>
<td></td>
<td>3 (25%)</td>
<td>5 (42%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not sure</td>
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<td></td>
<td>1 (8%)</td>
<td>1 (8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slightly Disagree</td>
<td>2 (17%)</td>
<td></td>
<td>2 (17%)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Disagree</td>
<td>3 (25%)</td>
<td>2 (17%)</td>
<td>9 (75%)</td>
<td>4 (33%)</td>
<td>1 (8%)</td>
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</tr>
<tr>
<td>Strongly Disagree</td>
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<table>
<thead>
<tr>
<th>Category (Parents)</th>
<th>TV every day</th>
<th>&lt; most people</th>
<th>Hardly ever watches TV</th>
<th>Watches a lot of TV</th>
<th>Pays attention</th>
<th>Talks about TV watched</th>
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</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>1 (8%)</td>
<td>4 (33%)</td>
<td>3 (25%)</td>
<td>1 (8%)</td>
<td>1 (8%)</td>
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</tr>
<tr>
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<td>6 (50%)</td>
<td>2 (17%)</td>
<td>1 (8%)</td>
<td>4 (33%)</td>
<td></td>
<td>6 (50%)</td>
</tr>
<tr>
<td>Slightly agree</td>
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<td></td>
<td>4 (33%)</td>
<td>2 (17%)</td>
<td>1 (8%)</td>
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<tr>
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<td>4 (33%)</td>
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<td>1 (8%)</td>
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<td>On own</td>
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<td></td>
<td></td>
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*Percentage of television viewing with: Sibling: 43%, Parent: 31%, On own: 24%, Other: 1%
### Types of Television Shows

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<th>Category</th>
<th>Saturday morning shows</th>
<th>Weekday am shows</th>
<th>Weekday pm shows</th>
<th>Nature docs</th>
<th>Prime-time shows</th>
<th>News</th>
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<td>Often</td>
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<td>1 (8%)</td>
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<td>1 (8%)</td>
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<tr>
<td>Sometimes</td>
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<td>6 (50%)</td>
<td>8 (67%)</td>
<td>9 (75%)</td>
<td>5 (42%)</td>
<td>5 42%</td>
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<td>Never</td>
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<td>1 (8%)</td>
<td>3 (25%)</td>
<td>3 (25%)</td>
<td>6 (50%)</td>
<td>7 58%</td>
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### Appendix I: Heavy and Light Viewers – Likert Scale and Television Viewing

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<th>Lik. 3</th>
<th>Lik. 4</th>
<th>Lik. 5</th>
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Environmental Symbol and Corporate Logo Recognition

Heavy Viewers

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