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Building Enthusiasm for Nature

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Building Enthusiasm - Quinte

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Building Enthusiasm for Nature

Geography 470
Research in Human Geography

Final Report

April 15 2004
Amy Dickens

Executive Summary

The project was done for Quinte Conservation Authority in Belleville. Quinte Conservation is an organization which prides itself on promoting environmental awareness and enthusiasm within the community. However, it was felt that enthusiasm for nature could be further built within the children that visit the conservation authority in the summer. Quinte Conservation runs a summer camp to promote environmental enthusiasm and education for children aged 7-13. The host organization felt that one area of study which was being neglected within the camp was the information on the bird species that live in the Quinte area and therefore requested the building of an interactive display and workbook to stimulate the enthusiasm within campers about birds.

Along with creating the display and booklet, the purpose of this project was to review existing literature and museum displays to determine the key elements involved in making an interactive display, and to determine what style of learning best affects environmental awareness in children and how this influences the display.

The research began in October 20, 2003 and finished early in April of 2004, taking approximately 150 hours to complete.

Qualitative research methods were used to research the existing literature as well as the displays in museums and other organizations. This is because the project focused solely on secondary research to obtain information. Another reason for the reliance on qualitative research is the project deals mainly with the interacting of humans with their surroundings which is extremely difficult to study in quantitative methods. Three main research methods were used to obtain information: first there was the extensive literature research; second, studying existing

interactive displays at museums and other organizations; and finally further secondary research on bird adaptations to geographical location, migration patterns, and other similar topics.

It was found that children retain the most knowledge and are greatly influenced by hands-on, interactive learning about the environment. Because they are involved in the problem-solving of an issue, they become much more engaged in the issue at hand, and feel as though they are apart of the bigger picture. Hands-on learning evokes emotions which allow the brain to better remember the issue. This style of learning is much more effective than the traditional style of lecturing and reciting.

Concerning what makes a successful interactive display, through secondary research, it was determined that an interactive display is effective when it conveys its intended message clearly and effectively. As for the actual design of the display it was found, to catch the attention of the intended audience, the display should be big and bright with good contrast. The title should be the biggest part of the display and any instructions should be clearly stated. The design of the project should not be too complex as to confuse the audience, it should be straightforward and easy to use.

In the future, it is recommended anyone taking on a similar project know before hand what the topic of study is, so as to not get involved in a topic that is too broad.

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project; Professor Brunger for all his comments and suggestions; and my house mates, who provided me with so many great suggestions and endless support.

Introduction

As one of the many species inhabiting Earth, we have always been surrounded by nature. However, throughout colonization, our perception of nature was that it was something to be feared and something that had to be conquered by man in order to survive. Today, we can see the repercussions of this view of nature. These reverberations have shown us that we need to change how we see nature, and by changing this view we can coexist and live together sustainably. Thus, an enthusiasm for nature is beginning to gain in popularity.

This project is in conjunction with Quinte Conservation Authority in Belleville and focuses on building enthusiasm for nature, particularly in children. Quinte Conservation Authority is one of the biggest promoters of nature enthusiasm in the Quinte Area. Quinte Conservation is a working agreement of three local conservation authorities in Eastern Ontario: Moira River, Napanee Region, and Prince Edward Region. They work with landowners, businesses, community organizations, and all levels of government to maintain and improve the health of local watersheds. They provide many services such as water control, stormwater management, shoreline naturalization, and in particular, environmental information and education. Quinte conservation has an extensive selection of outdoor events, workshops, presentations, and support materials to aid in educating and informing individuals and organizations about the importance of the environment (Infolink 2003). They also offer a summer camp for elementary school children, which promotes the importance of environmental

conservation but is lacking in the area of educating children on birds. Thus, this project focuses on building enthusiasm within children for nature (specifically birds) in the Quinte area. To do this, the project focused on interactivity, a method of learning which is very influential on a child's learning experience.

There were five main parts to the purpose of this project:

- 1) to determine what style of learning best affects environmental awareness in children;
- 2) to identify what these influences were and what resources best support these influences in a display;
- 3) to build enthusiasm for nature by creating an interactive, educational, environmental display concerning birds and waterfowl;
- 4) to research existing museum literature to identify key elements involved in the design of a successful interactive display;
- 5) to develop a curriculum booklet to accompany the display.

Accompanying the purpose of the project are three research questions (as developed by the host organization) which are:

- 1) What makes a successful interactive environmental display?;
- 2) Which experiences are more influential and which are least influential?;
- 3) How do these experiences help in the building of an educational, environmental display?

In order to answer these three questions and fulfill the purpose of the project, an extensive literature review was done on topics such as interactivity, learning styles, environmental

education, and birds, just to name a few. Next, museums were visited to observe completed interactive displays. Finally, the various steps(as outlined in the method) were taken to create the interactive display and the accompanying curriculum booklet containing instructions for the display and other activities concerning birds and geography.

Before delving into the project, there are several terms that should be defined to add clarification to the project.

Conservation Authority- a Conservation Authority (CA) is an autonomous corporate body established under the CA Act of Ontario. CA's manage renewable natural resources on watershed basis. Projects are initiated locally by the CA's member municipalities to meet regional (jurisdictional) conservation needs (Lower Thames 2003).

Nature- a combination of a social creation and the physical universe that includes human beings- understandings of nature are the product of different times and different needs. Thus, nature is not only an object; it is a reflection of society in that philosophies, belief systems, and ideologies shape the way people think about nature and the way they "use it." (Knox and Marston 2001)

Environment- The natural world, within which people, animals, and plants live. It is regarded by many as being at risk from the harmful influences of industrialized societies (Encarta 2003).

Environmental Awareness- The environment encompasses two primary areas: the natural environment and the built or man-made environment. Environmental awareness is an awakened

emphasis of how we, as humans, may better protect, explore, and appreciate these environments so both may flourish and exist in harmony (Thinkbutton Inc. 2002).

Environmental Display- A collection of things, often information, usually free standing kiosk-like structures arranged or done for others to see and obtain information concerning one of more aspects of the environment(either man-made or natural environment), (Encarta 2003 and Scala, Inc. 2003).

Interactive- Involving the communication or collaboration of people with things (displays, kiosks, etc.) in which the viewer/participator controls the direction of learning outcome.(Encarta 2003 and Scala, Inc. 2003)

Literature Review

Introduction

Throughout the history of settlement and development in the world, we have seen huge destruction of land and resources. It has only been within the last forty to fifty years that environmental protection and conservation have become popular. With this popularity has come the realization that environmental education is essential in the conservation and protection of our environment. It has also been concluded that in order to protect the environment in the future, we must take a strong leadership role and teach our future leaders about our historical mistakes and how to avoid their reoccurrence.

Many different learning styles and methods exist today. Much research has been conducted in reference to how children learn and which teaching methods have the most

successful retention rates. Many educators agree that children react best to a hands-on approach to learning.

This literature review will look at a variety of different aspects of environmentally educating interactive displays. First, literature on interactive displays will be given: what makes a good interactive display, and what are the essential elements and steps in a display? Second, different learning styles will be reviewed as well as how to best teach these styles. Following learning styles, environmental education will be discussed in terms of its importance and how to best teach it, followed by a brief review of literature on birds. Finally, several case examples of environmentally educating interactive displays will be reviewed.

Interactive Displays

Interactivity

When reviewing interactive displays, the principles of interactive design and their importance must be looked at first. In Graham's (1999) book, *The Principles of Interactive Design*, she defines interactivity as the combination of different types of media into a presentation that allows the user some degree of interaction. Graham explains, interactive experiences are so powerful because many traditional activities such as reading, talking, or watching a video can be combined into one experience. This new combination of information can change the audience's understanding of a story as they can actively modify the speed, pace, and order of information, explore or ignore information depending on their individual inclination (Graham 1999). This individual choice is what makes interactivity so engaging according to

Graham. Robertson's (1992) article agrees with Graham's degree of importance placed on interactivity. Robertson shows these hands-on experiences provide a basis for developing concepts and by exploring materials and events using all senses can provide extremely powerful lessons. Messenger (1990) adds that interactive-based programs provide children with opportunities to explore material ideas and relationships. This helps foster positive social, emotional, and intellectual growth. However, Robertson takes interactivity one step further than Graham and Messenger and discusses the opportunities created by interactivity. She explains, interactivity provides people with opportunities to use their imagination to solve practical problems and to create solutions. By using one's imagination, each experience can be different even on the same activity. Robertson's article is not very in-depth or lengthy but it complements Graham's ideas and shows that views of interactivity are fairly straightforward and consistent.

Interactive Design

Interactive design is the meaningful arrangement of graphics, text, video, photos, illustrations, sound animation, 3D imagery, virtual reality, and other media in an interactive document. Whether simple or complex, Graham states the best interactive designs present the message clearly, are easy to understand and navigate, and function well. The primary job in interactive design is to design a document that communicates the intended message clearly. Lawson (1989) puts this idea into a specific context in her article, *Setting Learning Centers for Success*, by arguing activity centers can successfully meet the learning needs of children if these centers encourage exploration, manipulation, choice, and decision-making. Graham outlines five

objectives an interactive display depends on: simple, clearly defined goals, a strong message, an intuitive interface, a firm knowledge of effective layout, and technological knowledge to create and test the document. According to Graham (1999) these objectives can be easily met by a specific interactive display process.

Interactive Display Process

By following this interactive display process, Graham feels that the complicated interactive project process will be easily broken down into smaller, more manageable steps. She outlines five major steps: problem definition, fact finding, idea finding, project visualization, and implementation.

Problem definition begins when a project is accepted requiring the designer to clearly define the goals and requirements. Without defining these, Graham (1999) demonstrates that clear communication will be lost and emphasis will be instead on the bells and whistles of the display. Fact finding includes researching other projects with similar goals and objectives, researching the audience and their requirements and targeting any limitations that will affect the design. Idea finding is the search for a working, interactive visual layout, project visualization is coming up with the ideas which are most visually appealing and creating drawings, and implementation occurs when these drawings are translated into functional interactive project prototypes.

There are other things that need to be remembered in creating an effective interactive display. According to Graham (1999), a designer of an interactive display must consider the

unique issues and advantages that interactivity could bring to the project. The decision of how much interactivity is needed to convey the message is extremely important. The prospective audience will influence your choice of the content, vocabulary, language choices, style of graphics, and layout explains Graham. For example, a project aimed at elementary students might dwell intensively on riddles, and action games, while a product aimed at antique car enthusiasts might include car trivia questions.

As the display must be designed according to its audience, so must the visual layout. Graham (1999) outlines many tips to effective visual layout. The western culture will quickly scan from the upper left of the display to the bottom right to get an overview of the entire image. They will also look at the larger items before the smaller, and be attracted to bright colors but then look at contrast. Cameron (2003) argues that the most important ideas should be large to catch attention, therefore he feels that the title or theme should be clearly displayed, large, and provocative enough to catch the interest of the user.

Graham(1999) also lists several pointers to the visual layout; make it the biggest, brightest, have different colors(as different colors influence different emotions), textures, isolate some items, or use another item to call attention to the most important item.

Once the design has been decided upon and built, several rounds of testing and evaluating must be done.

Evaluation

Graham (1999) suggests several rounds of testing and evaluating be done so the display works as is intended. Veverka (2001) supports Graham's statement by explaining, when you consider all the time and money that are put into exhibits, it is normal to think the designer/builder would want to make sure the display worked before delivering it to the employer. Graham (1999) explains that a good record of errors will include the basic information such as the description of actions performed right before the problem occurred. By evaluating early and often to avoid costly redesigns, Veverka (2001) adds that with the evaluating process, it can be determined whether the display requires a docent, science educator, or teacher to help facilitate and direct the learning activity. He also says that the only way to know for sure if you have a successful exhibit is to evaluate it with your intended market group against specific learning, behavioral, and emotional objectives. These objectives will depend on the learning styles of the children.

Learning Styles

In their 1998 book, *Designing Brain-Compatible Learning*, Parry and Gregory explain that the understanding of the neurological underpinnings of the learning process has increased tremendously in the past few decades. Now, a much more solid foundation on which to base educational decisions exists. The whole learning process has drastically changed over the years. They say in the past, we were taught 'the facts and nothing but the facts.' These facts were then memorized, brought out for a test and then promptly forgotten. Even if not forgotten, the facts

were rarely connected and often were misunderstood. Parry and Gregory explain these facts become more useful when they are used to solve problems or to extend knowledge.

To a great extent, most learning has an emotional element. Whenever the emotions are engaged, the brain releases a battery of chemical messengers that mark the event and signal its importance to the brain. This focuses the learner's attention, and in doing so, facilitates learning. Parry and Gregory (1998) go on to explain that our emotions focus our attention, and attention sets the stage for learning. The human mind can only focus on one thing at a time, and our emotions, mediated by the limbic system, dictate to what we pay attention. Information that has an emotional context seems to be more readily recalled, and by recalling the emotional context, we also usually can recall the details of the event much better. Cameron (2003) adds to these points that a good lesson should induce a thirst for more. By appealing to the emotions and senses, the subject will want to learn more about the subject.

Parry and Gregory go on to explain that the decision whether information is stored as a short-term memory or is discarded is based on three processes: perception, expectation, and attention. Attention is focused on anything that the brain finds new, exciting, pleasurable, or threatening. By actively structuring multisensory experiences, we can also enhance learning in other ways.

In their 1999 book, *Learning Together and Alone*, Johnson and Johnson agree that sensory experiences are remembered best but also add that when creating lessons, decisions need to be made about time limits, students' experiences, ages, and the material and equipment available. At the end of each learning experience, Johnson and Johnson feel that students should

be able to summarize what they have learned and to understand how these skills can be used in the future.

Environmental Education

As children are our future leaders, properly educating them about the importance of the environment is essential. Wolfson and Robinson (1982) define environmental education as the interdisciplinary approach, emphasizing the nature-human relationship. White and Stoecklin (2003) add that environmental education needs to start at an early age with hands-on experience with nature. They show that there is considerable evidence that concern for the environment is based on an affection for nature that only develops with autonomous, unmediated contact with it. They explain, in their early years, children's developmental tendency towards empathy with the natural world needs to be supported with free access to an area of limited size over an extended period of time. Only by intimately knowing the wonder of nature's complexity in a particular place, will one be lead to a full appreciation of the immense beauty of the planet as a whole. In today's society, White and Stoecklin feel environmental education requires that in school's, children have regular personal interaction with as diverse a natural setting as possible. Wolfson and Robinson (1982) illustrate that children are naturally curious and sensitive and are eager to become involved in first hand experiences in the world around them. However, as the learning process advances and children develop cognitive skills, they often lose their senses of wonder and involvement. By the time many are adults, barriers to receiving information from their

senses may be so great that they trust the written or spoken word far more than their own sensory information.

The Project Wild guide put out by the Canadian Wildlife Foundation also feels the importance of environmental education for present and future decisions. They say environmental education prepared young people for decisions affecting people, wildlife and their shared home, earth. In the face of pressures of all kinds affecting the quality and sustainability of life on earth as we know it, it is important to educate children so they develop into responsible members of the ecosystem. This is a good goal of environmental education as we typically teach what not to do, instead of teaching children how to make the right decisions in different situations.

White and Stoecklin (2003) further explain that there is substantial evidence to show the way people feel in pleasing environments improves the recall of information, creative problem solving, and creativity. Early experiences with the natural world have been positively linked with the development of information and the sense of wonder. Wonder is important as it is a motivator for life long learning. Kriesburg (2003) expands on this idea by stating children need wild places to go, to have the freedom to find out for themselves about their nonhuman neighbors. This is increasingly important as children are being further detached from the natural world and immersed more into the technological world. Drawitz & Faulds (1997) add that environmental education also promotes a sense of personal responsibility and allows children to learn that everything is connected to everything else.

Environmental Education: A Manual for Elementary Educators, by Wolfson and Robinson (1982) is also a good source because it suggests ways in which to environmentally

educate children. They outline it is important to be flexible and to adapt to the structure of the group one is working with, to be a willing learner who is enthusiastic about sharing environmental awareness and outdoor discoveries. This manual also goes into detail of different aspects of environmental education such as plants, water, air, and animals.

Teaching about Birds

Birds are very interesting collection of species that have many aspects which can be taught and studied. Wolfson and Robinson (1982) focus on the education of body size and feathering. They explain that there are three general sizes: six inches long, nine inches long, and eighteen inches long and that birds have several layers of feathers to insulate, waterproof and help in flight.

Adaptation

Project Wild (2001) is a much better source for environmental education concerning birds as it describes several activities to help children learn about birds. First, they suggest teaching about adaptations and how birds have evolved their beaks, feet, legs, wings, and coloration to adapt to their habitats. Texas Parks and Wildlife come to similar conclusions on the website. The website discusses how different birds have different shaped bodies depending on what the bird does. By looking at a bird's beak, wings, and feet, the suggest one can often tell what the bird eats and what type of habitat it lives in (Texas Parks and Wildlife 2003.) The Lee County(USA) School District (2000) explains bill shape helps to predict what type of food the bird eats and how it catches this food. Leg size depends on whether the bird wades in the water,

swims, walks, or hops, while feet have adapted to accommodate swimming, grabbing food, walking, etc.(Lee County 2000). Birds have adapted to live in a variety of different places. Some can float while others hunt other animals. Generally, all birds like open places like fields and are only found in the geographical locations to which they have adapted (Texas Parks and Wildlife 2003).

Migration

Many types of birds migrate; songbirds, shorebirds, and waterfowl. All these different species have different styles of migration as some migrate during the day while others migrate at night, some fly solo while others fly in flocks, some flocks are highly ordered while others are loose congregations (Get Outside! 1996). Get outside argues that migration is triggered by a combination of the shortening of days and seasonal atmospheric pressure changes, which allow cold fronts to carry frigid air on strong winds. As it gets colder, insects and plants die, making food sources scarce. To fuel their flights, migratory birds literally gorge themselves as it is their fat that fuels the flight (Get Outside! 1996).

Birds reach their destinations through a combination of navigational factors: reading their internal compass, following landmarks, soaring on the wind, and smelling odors (Get Outside 1996.) Many birds follow the four flyways in North America: the Pacific, Central, Mississippi, and Atlantic as these routes follow natural occurring landmarks such as long valleys, mountain ranges, large rivers, and coastlines (Get Outside! 1996.) The Getnature.com (2001) website adds no two species follow the exact same path from beginning to end; geographical groups of species with an almost continental distribution will travel different paths.

Natural Resources Canada (2002) explains that migrating animals need several habitats. They may breed in one habitat during the summer, winter in another and migrate along a traditional route during spring and fall. In order to preserve abundant and diverse wildlife populations in Canada, it is necessary to preserve suitable habitat.

Get Outside!(1996) concludes by saying that migration was a beneficial adaptation when habitats were relatively stable but in the modern world of speedy development and environmental accidents, people must take responsibility to ensure that adequate habitat remains for birds and other species.

Human Interaction

The Project Wild guide then goes on to discuss the importance of educating about the consequences of human-caused pollutants(for example, an oil spill) on birds. They discuss how, when cleaning up oil spills, damage can occur to the birds' feathers and thus make them no longer waterproof. Next, a discussion of migration of birds and how human activities can affect these migration patterns is supplied, and lastly the guide discusses ways in which pesticides enter the food chain and affect reproduction in birds. This is an excellent source of information and education ideas for interactively educating children about birds.

Case Studies

There are several case studies concerning environmentally educating interactive displays. Although, none are specific to birds, they have very good ideas and show how a display can be affective.

The first article discusses the ease of creating a display. *Interactive display case*, by Jeff Jay (1994) focuses on creating an interactive display on the constellations in a display case. This article shows how an effective display does not have to be an expensively-made display, all that is needed are some basic supplies and a creative mind.

A more in-depth article by Brandehoff (2001) entitled, *'Go Figure!' Exhibit Brings Kids and Calculations Together*, discusses a child's museum exhibit being used in libraries across the USA. This exhibit focuses on building children's math skills with interactive activities based on children's novels. Although the focus of this display is not environmental, it shows that displays do not have to be technologically advanced with electronic bells and whistles but can be very successful as long as the interaction is successful. This specific example is hugely successful in the USA, providing some libraries with their largest attendance ever registered.

Petrecca (1997) also shows the success of simply creating displays in her article, *Zoot Suit dresses up displays in early bid to cultivate loyalty*. The article discusses a company, Zoot Suit who has found, like the 'Go Figure' exhibit that interactive displays are a good alternative to the television to get kids' attention. Displays are a cost-effective way to reach large numbers of kids, feel Zoot Suit.

The Minnesota Zoo argues that interactive displays are cost effective but more importantly, strengthen bonds. At the zoo, a new exhibit, the family farm exhibit has opened and contains interactive displays and other kid-friendly features which they feel strengthen the bond between people and the living earth, and our connection with animals. The zoo feels that children learn most intensively when they are playing (A Needle 2000).

Similar exhibits at the Natural History Museum and Deep Sea World show this reoccurring theme of the high-intensity learning and the large draw these displays have. In the Natural History Museum, the interactive displays concentrated on primates but targeted all age groups from child to adult (Primates 1993). At Deep-Sea World in Scotland, interactive displays were created about water ecology and preservation. These displays were so successful, the aquarium had to design a classroom facility to accommodate the large numbers of classes coming to see the display. Combined, these cases provide some great insight as to what makes a successful display.

Conclusion

After reviewing this literature, a great deal of knowledge is now known about the main ideas and principles concerning interactive display building, a vast knowledge of how the learning process occurs, thus affecting the teaching methods of environmental education, and how to best teach the variety of aspects. From here, the key research questions, “what makes a good interactive display?, what kind of experiences do children remember the most and are the most or least influential?, and how do these influences help in building the display education process?” can be answered and the construction of the curriculum and display can begin.

Methodology

Research Methods

The research methods within this project were strictly qualitative. This is because this project focused solely on secondary research to obtain information, thus there were no raw data to be studied quantitatively. Another reason for the reliance on qualitative research is the project deals mainly with the interacting of humans with their surroundings which is extremely difficult to study in quantitative methods. Therefore, all research done was done qualitatively and focused on data for the Quinte area. Belleville is a city 1.5 hours southeast of Peterborough in Hastings County. It is situated on Highway 401 between Toronto and Kingston and is located on the Bay of Quinte. It is a small city with a population of 46000 people.

Quinte Conservation is located just within the western edge of the city on the corner of Highway #2 and Wallbridge Loyalist Road (see figure 1 in appendix). This conservation area contains six kilometers of trails within the 346 acres of land. The office is run within an old farmhouse and Potter's Creek run down the eastern edge of the property. Across the highway there is a picnic area next to the shores of the Bay of Quinte. As the Quinte Conservation runs right to the edge of the Bay of Quinte, the conservation authority is home to many different species of waterfowl and birds, some which migrate to the area in the spring/summer months and others which reside in the Quinte area year round.

The underlying philosophical approach used in this project was the human geography and social theory philosophy as discussed in Flowerdew and Martin (1997). This philosophy is concerned with what is the nature of human agency and what differences do various ways of thinking about human agency make to the conduct of research (Flowerdew and Martin 1997, 19). Because the project focused on the learning styles and influences of various educational sources

on children, it is apparent a theory that is concerned with these humans and how they interact not only with each other but with their surrounding environment is essential to the project.

There were three main procedures of research methods used. These were extensive literature research, studying existing interactive displays at museums and other organizations, and further secondary research on bird adaptations to geographical location, migration patterns, and other topics which will be discussed further in the report.

The first information collection technique used was to research secondary data. To know what makes a good interactive display, the different learning styles used by children, and how conservation education influenced the home environment, it was imperative to research these topics. This secondary research was done mainly in libraries at Trent and York Universities, as well as public libraries in Belleville and Peterborough. This secondary research involved looking at scholarly journals, books, manuals, work books, etc. to find information pertaining to the project. Notes were recorded from this plethora of sources to be used in the literature review at a later date. This took approximately twenty-five hours and was finished early November. It was critical to do this step first as it would influence how the existing displays in museums were viewed.

Next, museums and organizations with interactive displays were visited. The Canadian Museum of Nature was the first museum visited. From the secondary research, a variety of key ideas as to what makes an interactive display were applied to the displays within the Museum of Nature. Observations were made as to complexity of the display, initial interest in the display, height of display, ranges of interactivity of displays, and level of education within the display. Numerous displays were viewed and tested and observations were recorded.

After the Canadian Museum of Nature, the Science and Technology Museum in Ottawa

was visited. Here the same key ideas were applied to the displays to determine their interactiveness and effectiveness. Observations were made as to the complexity of the display, initial interest in the display, height of display, ranges of interactivity, and education level. It was also noted which displays seemed to have the biggest draw to try and what it was about the display that drew this interest.

The displays in these museums were very elaborate and were developed on a bigger budget than was available for this project, therefore after visiting the museums, the existing interactive displays (either currently on display or in storage) at Quinte Conservation were viewed. The same key ideas were applied to these displays as were applied to the displays in the museums but the effectiveness of the simple display was also evaluated.

This evaluation of the displays took approximately 15 hours to complete. It was thought to take 10 hours, however the observations and actual interacting with the display took a whole day in Ottawa and a half day in Belleville to complete. The viewing of these displays was crucial to the determination of what makes a successful interactive display and also provided some great ideas for the project.

After research had been completed, the research concerning what makes a successful interactive display, additional secondary research was done to determine what activities, games, etc. would be put in the interactive display and accompanying booklet. The research involved finding activities concerning birds and geography. Topics included ideas such as adaptations to geographical location, migratory patterns, bird and human interactions and adaptations, and many others. This research was also done in libraries at Trent and York Universities and the public libraries in Belleville and Peterborough. In addition to this, research was done in the resource libraries at Quinte Conservation. This included going through past summer camp plans and

activities in order to determine what type of activities were deemed most influential by summer staff. A variety of resources with activities to be included in the workbook were also found.

This step of research was conducted last, as the other two initial research steps were highly influential in determining what activities would be the most successful and which would be considered ineffective or boring.

Construction Methods

Before deciding what the display should look like, it was necessary to go through certain construction methods. In the literature research process, a five-step interactive project process was found. The first step of this process is problem definition. As this was already clearly defined by the host organization, the second step was fact finding which had already been completed with the review of literature and existing displays in museums and organizations. The third step is idea finding, searching for a working interactive visual layout. This step involved many brainstorming sessions as to what positive attributes had been seen in the museum and what the layout should be for this project. Next, was the project visualization step which included many rough draft drawings of different possible layouts and ways of interactively portraying the information. After the series of rough drafts, the different ideas were evaluated and the layout and color scheme were decided, it was into the implementation stage where these drawings were translated into a functional interactive display. As the display is being set up in Belleville, pictures were taken of the display at its preliminary stage of the actual display (the display is currently being 'finalized' in Belleville where the proper resources are.)

Next came the creation of the workbook. This workbook was created to allow for a variety of educational and fun activities to do in conjunction with the display. For the construction of this accompanying workbook, it was necessary for the ideas of the display to be created beforehand. Once it had been decided what the display would portray, the workbook

could be created. The first step was to take all the secondary information that had been collected, and sort it into themes to be included in the workbook. It was decided the workbook would include three main parts; the teaching information to accompany the display, activities to do in addition to the display, games with bird themes. First the instructions and maintenance tips were written, followed by the collaboration of activities. These activities came from a variety of sources, and were written to include not just the activity instruction but also background teaching information for whoever chooses to conduct/explain the activity to the children. Lastly, the instructions for several games were written out as in-depth as possible.

The creation portion of the project took approximately 75 hours to complete and there are still evaluations and tweaking to be done after the implementation of the display.

There were few constraints in the research of this project. One resulted from the requirements of the basic level of the display. The majority of research done on interactive displays concerned displays which were electronic and involved lights and electric movement, however this type of display is not feasible for the host organization. Therefore, it would have been more beneficial if more secondary data could have been obtained, discussing non-electronic interactive displays.

Another constraint occurred when evaluating the existing displays at the museums. As I am a university student, not a seven-year-old, it is difficult for me to know what appeals to children much younger and in very different mind-sets than myself.

One constraint occurred within the construction methods. Because of the distance between the host organization and where the construction was taking place, the display had to be sent away to be fully completed (cloth backing applied to backboard, lamination, hook installation, velcro, etc. done at the conservation authority with their resources) and installed

before pictures could be taken for this report. However, a detailed explanation of the interactive display will be given in the results section.

Results

For this project, there are two very distinct sections within the results section. First, there are the results drawn from the secondary research and the viewing of interactive displays. This research will be used to answer key research questions one and two: ‘What makes a successful interactive display?’ and ‘which experiences were more influential and which were least influential?’ From the answering of these two questions, the third research question, ‘How do these experiences help in the building of an educational, environmental display?’ can be answered. In answering this third question, a detailed description of the interactive display will be given showing how the results from the first two questions influenced the design of the display. This will be followed by a brief description of the workbook as it will be included in the report.

Secondary Research Results

From the secondary information collected from the literature, a superabundance of ideas emerged about interactive display design. First, the topic concerning the importance of interactivity emerged. Interactive experiences are felt to be exceptionally powerful because many traditional activities such as reading, talking, or watching a video are all combined into one experience when traditionally they are all experienced separately (Graham 1999.) This combination of activities coupled with individual choice allows for an engaging experience as the audience can modify the pace, speed, and ignore or further explore information depending on their preference(Graham 1999.) The fact that these interactive displays appeal to the senses, means the audience is provided a basis for developing concepts and the audience is able to use

their imagination that is so often suppressed. By using one's imagination, every audience member's experience will be different, and each experience may be different each time the activity is used (Robertson 1992.)

After researching interactive design, a variety of results emerged. One overlying idea is, whether the display is simple or complex, the most effective interactive displays are those designed to present their message clearly, are easy to understand and navigate, and function well (Graham 1999 and Lawson 1989.) Interactive displays should be simple, have clearly defined goals, a strong message, an intuitive interface, and a firm knowledge of an effective layout, all of which can be met through a strong interactive display process (Lawson 1989 and Graham 1999.) As previously discussed in the methods section, there are five steps to the display as outlined by Graham: problem definition, fact finding, idea finding, project visualization, and implementation.

There are various other components that need to be remembered when creating an interactive display. It is important that the message and visual layout are conveyed appropriate to the audience the display is targeting. For children, large, bright ideas with contrast will be looked at before smaller images (Graham 1999.) Thus, the title and main ideas of the display should be large and clearly displayed to catch the audience's eye. In short, the visual layout should be the big, bright, and have different colors, isolation of important aspects. However, it is important to remember that the objectives of the display depend on the learning styles of the audience.

There are a variety of learning styles found to be used by children. A lot has changed in the past twenty years in terms of learning styles. In the past, the facts and just the facts were taught to students who were then expected to regurgitate the facts for tests and then retain these

facts for the rest of their lives. However, more often than not it was found, after examinations, these facts were promptly forgotten (Parry and Gregory 1998). It is now realized that most effective learning has some degree of an emotional element attached to it. Whenever the emotions are triggered, the brain releases chemical messengers that mark the event as significant in the brain. This focuses the learner's attention, thus facilitating learning as attention is heightened, and attention sets the stage for learning (Parry and Gregory 1998.) Attention focuses on anything that the brain finds new, exciting, pleasurable, or threatening.

Many results were collected concerning environmental education and its effectiveness. Many sources argued that environmental education must start at an early age and have a hands-on approach to be truly effective. There is considerable evidence that concern for the environment is based on an early fondness for nature. Only by intimately knowing nature can children develop a concern and care attitude for nature. Wolfson & Robinson (1982) illustrate that environmental education also help children retain their senses of wonder and involvement that are normally lost as cognitive skills and learning processes advance. White and Stoecklin (2003) add that the way people feel in pleasing environments improves their recollection of information, creative problem solving, and creativity. Environmental education also prepares children to make decisions that will not just affect themselves but the people and the environment around them. The Project Wild guidebook demonstrates that it is important to educate children so they will grow up to think sustainably, as a responsible member of the ecosystem as a whole.

Museum Research

The Canadian Museum of Nature had a wide variety of interactive displays all ranging in complexity, and level of interactivity and education. The majority of displays, because targeting families with young children, were not very complex. Instructions, if any, were extremely easy to follow, in very large print and contrasted with the background as to make them stand out very

effectively. Those displays which concerned measurement were harder to follow and interest was quickly lost.

Initial interest was highest for activities that were brightly colored and had aspects that involved touch. Different textures and objects that could be held in the hand were extremely appealing. Those activities that were blandly and uniformly colored were quickly overlooked.

All interactive displays were built at heights to facilitate children. The majority of displays were constructed for older children (approximately 5 years and older) so those displays that were higher had steps for smaller children to use in order to be at eye level with the display.

The majority of displays at the Museum of Nature had high levels of interactivity. Most involved hands-on problem solving where children had to find the origin of species on a globe or were to put puzzle pieces in the right order to determine evolution(see fig.2 in appendix.) There were some displays that just involved pushing a button to light up the object inside the box. These displays were not exciting and very little interest was paid to them.

The Museum of Science and Technology contained very different displays than those at the Museum of Nature. The interactive displays at the Museum of Science and Technology were much more complex. The majority of the displays involved computers in one way or another and involved a lot of pushing buttons. They also required a lot of reading of instructions which became uninteresting very quickly and which would be hard for younger children to read small print on a computer screen.

Initial interest started off on a high note when first entering the museum. The displays had lights and noises to draw you initially, but in a short period of time, this became redundant and soon, all displays looked the same.

The height of displays was at a height at which both children and adults could use without being uncomfortable or missing part of the display. However, the level of interactivity was

moderate for most of the displays as they only required pushing of buttons(see fig 2 in appendix). There were no texture differences for the most part and did not require much except for persistence of pushing buttons to come to the correct answer. The education levels of these displays were typically very high, perhaps too high for children under the age of ten.

The displays at Quinte Conservation were extraordinarily simple compared to the museum displays but they relayed their message very effectively. Complexity level was low, for the most part the displays consisted of matching the name with the correct species. Initial interest would not have been high in the museum but within the environment that the display was set up (in the lobby of the office) it was one of the few things that children could play with. Brightly colored pictures drew initial attention along with the background contrast. The display height was perhaps too high for children as they would have difficulty reaching the highest cards on the board but interaction level was high. Cards could be moved around and stuck anywhere on the board, children can control the pace and outcome of the displays. The amount of knowledge within the matching display may have been too much for children but it was very educational in nature.

Secondary Research Findings

Using both the literature research along with the observations taken at the museums, the first research question can be answered. A successful interactive display is one in which appeals to a variety of the senses and incorporates different activities into one activity. It obviously, must be hands-on and should be organized in a way in which the audience controls the outcome of the lesson.

In terms of design, the display should immediately appeal to the sense of sight. In order to do this, bright, contrasting colors should be used to draw the eye to the display. Three-dimensional objects also catch one's attention. In order to keep attention, the activity should be

fairly straightforward as to not necessitate long instructions. Once the activity has been commenced, a successful interactive display will incorporate hands on activities with ideas of choice and decision-making.

When targeting a younger audience, the display should not be set up on a high table nor have any objects out of reach of the children. This also means the display should be kept simple as to not overwhelm them. Instruction must be minimal and the project must flow smoothly, as not to confuse and thus, losing the interest of the child. The displays that will be most successful will be those with different objects for children to touch or move, for they will feel very involved in the problem-solving process.

These aspects of a successful interactive display can be achieved though a well planned display. A clear plan must be made before hand with several revisions, and evaluation must be a constant variable in the display process in order for the experience the child takes away from the display to be considered an influential experience.

The second research question, 'which experiences were most influential and which were least influential?', can also be answered through the secondary research findings. Those experiences that contain an emotional element are extremely influential to children. Experiences that have an emotional context are much more easily recalled and the details of this experience are much more in-depth. Environmental experiences need to start at a young age and have a very strong hands-on approach to be most influential on the lives of children. In the early years of child development, concern for the environment is based on independent, unmediated contact with the environment. Intimately knowing the wonder of nature's complexity in a particular place, leads to a full appreciation of the complexity of nature. Children are able to best recall the outcome of lessons and teach parents from experiences, in which they were primarily involved in creating a solution to the problem/issue at hand. Thus, they become conscious members of the

whole ecosystem rather than fact regurgitators. Early experiences with the natural environment have been positively linked to the development of information and a sense of wonder, an important motivator for lifelong learning.

There is a variety of evidence to support the claim that education in a pleasing environment allows for better recollection of information. Children are much more creative in problem-solving when they are immersed in the environment in which they are discussing than when they are disconnected from the setting and are learning about the issue as second-hand news rather than experiencing it for themselves.

Experiences are least influential when they are tightly structured and deal with just facts. These experiences are not influential to the environmental consciousness of children as they are rarely connected with an emotional context and are more often than not misunderstood. This is often linked to the environment in which these facts are being learned. The classroom is largely disconnected from the natural environment and is not a very stimulating environment. Thus, it is more difficult to recall information on a topic that is so disconnected from the environment in which the children learn about it.

After answering the first and second research questions, the third research question, 'How do these experiences help in the building of an educational, environmental display?' can be answered. This question is for the most part, answered through the construction of the display. As stated in the results of the second research question, it is imperative that children come to solve these problems on their own, at their own pace and comprehension level for the experience to be most influential, thus when planning the display, the activities were designed to be very hands-on and independent learning. Four activities were chosen which were felt to exemplify these characteristics. The first activity involves mapping the body parts of a bird. In order for this exercise to be independent, children must take the seven, velcro-backed body part cards and

stick them in the appropriate regions of the bird's body. The drawing of the bird is the central characteristic of this exercise and the areas of the body under question are clearly labeled(see figure 3 in appendix). When children feel they have the right body part names in their corresponding areas, they can lift the picture of the bird to reveal and see an outline of the same bird with the body parts properly labeled on the bird(see fig. 4& 5 in appendix.) This activity is the initial stage to learning how birds adapt to their geographical location. It is first important to understand the different, less-obvious body parts of a bird aside from the beak, wings, and feet.

The second activity involves a series of pictures of different birds and ducks, from large birds of prey, to small seed eaters. The objective of this activity is for children to learn the name and characteristics of different birds found in the Quinte area and to realize that birds come in variety of shapes and sizes, with very different physical, and behavioral characteristics. Below the colorful pictures of these different birds are interesting facts about the bird dealing with either its physical appearance or behavior. The child can guess the name of the bird either from the visual of the bird or through the knowledge contained in the fact. Once they believe they know the answer, the fact can be flipped up to reveal the name of the bird. A variety of pictures and facts were created so they different birds which are displayed can be changed daily if desired. This activity allows children to see very different types of birds and learn about their characteristics that are sometimes difficult to see and study while out in nature(see fig. 6 in appendix).

The third activity deals with the adaptation of specific body parts to the geographical location in which these birds live. Within a series of four boxes, children are required to construct different birds, by following the adaptation clues given at the top of each box. The children are to take the velcro-backed, puzzle-like body parts and construct the bird on the board according to the adaptation outlined(see fig. 7 in appendix). If the wrong body piece is used, the puzzle pieces will not fit neatly together as they will when the bird is properly constructed. This

activity teaches children that birds have evolved within their different locations to best survive in their habitat. This makes the learning process much more fun as children have total control as to the final product of the bird, and will learn what the purpose of each adaptation is through the construction of the bird, rather than having the same material lectured to them.

The fourth activity of the display is the final activity dealing with geographical adaptation. Within this activity there is a series of five containers each containing a different substance representing different types of food(see fig. 8 & 9 in appendix.) There are also a variety of different materials(such as a clothes pin and tongs) representing the different types of beaks/bills of birds(see fig. 8 in appendix.) Children can try to pick up the ‘food’ with each beak to determine which beak is best adapted for each food(see fig. 9 & 10 in appendix). At the bottom of the container, underneath the food is the answer as to which beak is best fitted for this food(see fig. 11 in appendix.) This is the most interactive activity of the display. It is the most independent of the four activities and allows children to feel like they are actually the bird trying to pick up their food. This experience is much more influential than if an educator were just the stating the facts of beak adaptation for the children get to experience first hand why one beak works the best and why the others fail to pick up certain foods.

Construction Results

In the actual design process of the building of the display, the characteristics of what makes a successful display were heavily applied. As the background color of the display will be an off-white colored material, and the host organization wanted the colors used to be “earthy” colors(representing land, water, etc.), the contrasting colors chosen for the display were green and blue. The colors used were vibrant and contrast well against the off-white color of the background. As outlined by Graham(1999), the titles of the project are large and bold to catch the eye. These titles are put at the top of the display as western culture typically reads left to right, top to bottom.

Because the target audience of this display is children aged seven to ten years, there are several design steps that needed to be included. First, any textual explanations or titles on the display had to be written at a level at which the children would be able to comprehend the instructions. This also meant using bold, capital letters which are easiest to read. The height of the children was another factor to take into account. All displays are fairly low in height to accommodate even the smallest of children. Titles of the activities were placed at a level which would be approximately eye level for children and all activities are physically reachable. As the attention span of children is less than that of adults, the visual layout of the displays are fairly simple, as to not overwhelm the child. The design and intent of each of the displays is straightforward and simple enough for children to clearly understand the display.

The workbook also incorporated the experiences which were determined to be most influential on children. The activities within the book all involve the children to be either physically acting out an activity or using problem-solving skills. As the workbook is included within the appendix, the report will not go into great detail as to its contents.

Recommendations

The main recommendation of this project is for the host organization to use the display and workbook in order to build enthusiasm for nature within children. However, there are other recommendations to ensure to success of the display and workbook.

First off, it is imperative to remember the audience is children, thus their attention span is limited. Because the display will be used mainly in the summer, children do not want to feel like they are in school, thus children should not be expected to spend a lot of time at the display, nor should they be expected to be experts on geographical adaptation after using the display. Any

lesson they come away with, shows the display was successful.

In order to ensure the longevity of the display, period inspection of the laminated, velcro pieces should be done. The majority of pieces of the displays should not require replacement but it should be noted when a piece is deteriorating so replacement can be done quickly.

Prizes and awards are a good way to ensure children take the display seriously and try their hardest. It should be remembered that this is a camp setting and children are there to have fun. Prizes are a great way to heighten interest.

There are certain times of the day in which these activities would be most effective. The high energy games included in the workbook will receive the highest amount of participation if done in the early morning when it is coolest, or directly following lunchtime when children have a lot of energy. Slower paced games are great to do in the shade or indoors at the hottest times of the day or at the end of the day when children are tired. Games and activities that do not require a great deal of physical activity are great to do indoors on a rainy day. The display should be left out all day and can be an activity children can do when they finish other activities quickly or as part of a rotational circuit of several activities occurring simultaneously.

Conclusion

There are a variety of avenues in which to build enthusiasm for nature. For this project, the purpose was to build enthusiasm in children toward birds. It was felt this would best be done through an interactive display and workbook of activities. Before this was done, it was imperative to determine what style of learning best affects environmental awareness in children, to identify what influences this awareness, and what resources best support these influences in a display. It was found that an interactive, hands-on style of learning best supports environmental awareness in children. This is because they are apart of the solution-creating experience rather than just having the facts thrown at them.

A successful interactive display was determined to be a display that conveys its message clearly and effectively. The design of the display should appeal to all the senses. It should be bright and contrasting to catch the audience's attention, and should appeal to the sense of touch by having hands-on components. The display should also not be overly complex for the target audience in terms of text and visual layout. By putting all these factors together, a very successful display will be the end result.

There are some limitations to this project that should be addressed. First, budgets were found to be a large constraint in the building of the display. It would have been beneficial to build the display all in one step. However, in order to save money, the host organization took the display to finish the building of the display with resources from the CA. This affected the completeness of the picture for this report, however, the detailed description (provided in the results section) will suffice. Also, the interactivity of the display could have been heightened had there been a bigger budget to put greater technology into the display.

The second limitation within the project was the breadth of the topic. There are a variety of other aspects of birds that could be made into a display. It was very hard to narrow down the display to one or two aspects and still please the host organization. Initially, there were so many areas of study that seemed important to children's environmental educational, it took a great deal of time to agree on a topic(ie.birds) that would please both the organization and the course.

This could be a possible idea to explore in other research in the future. The host organization could look into having other displays looking at the other aspects of birds made in the future to accompany this project.

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Appendix

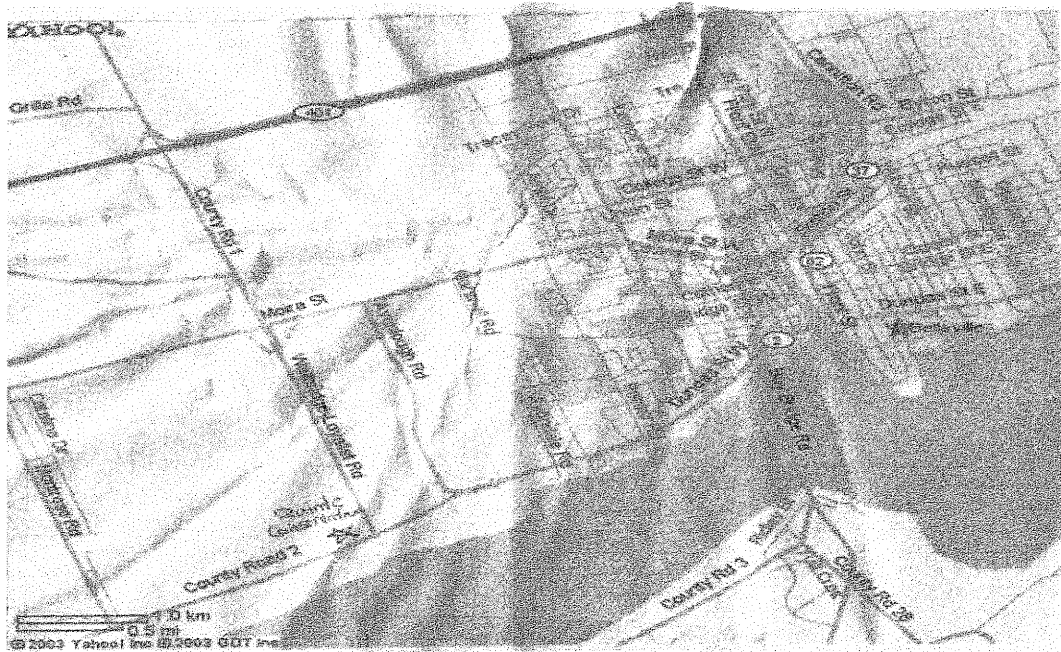
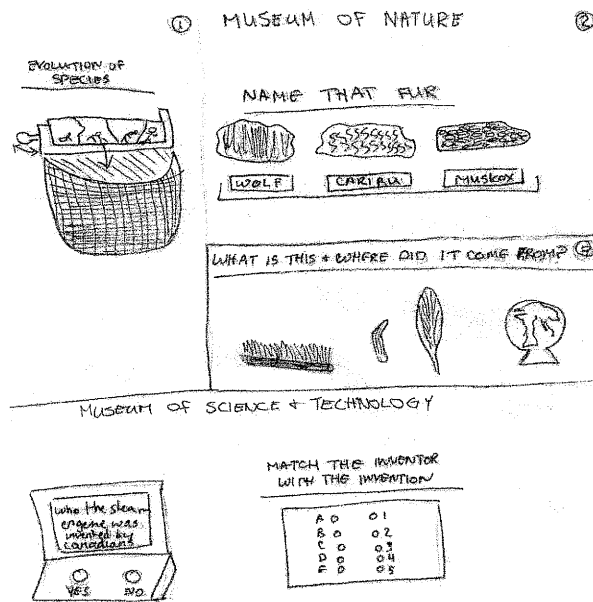


Figure 1: Map of Belleville



- too electronic for my project
- lots noises
- bright colors

Figure 2: sketches from museum visits

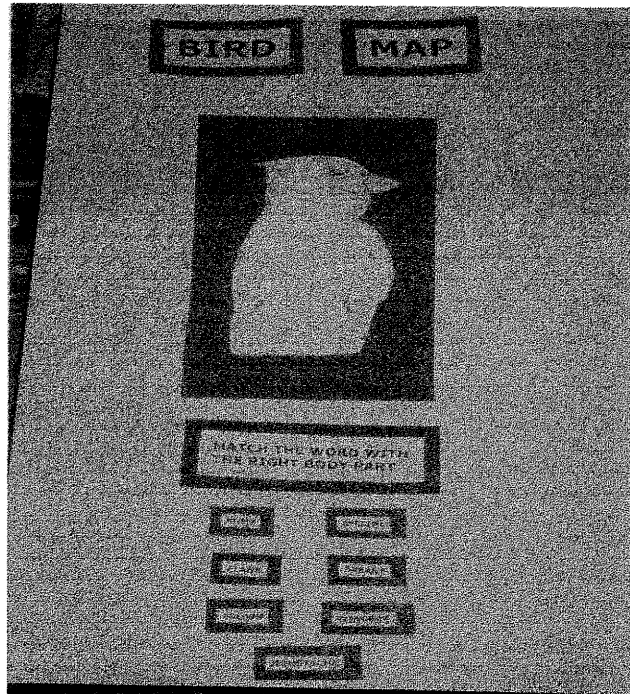


Figure 3: Bird map Display initial stage

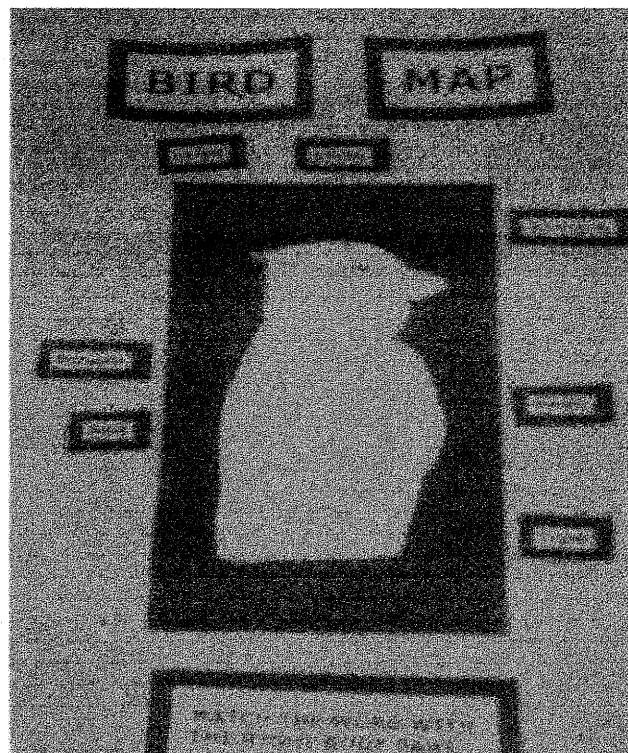


Figure 4: Display showing beginning stages of word matching

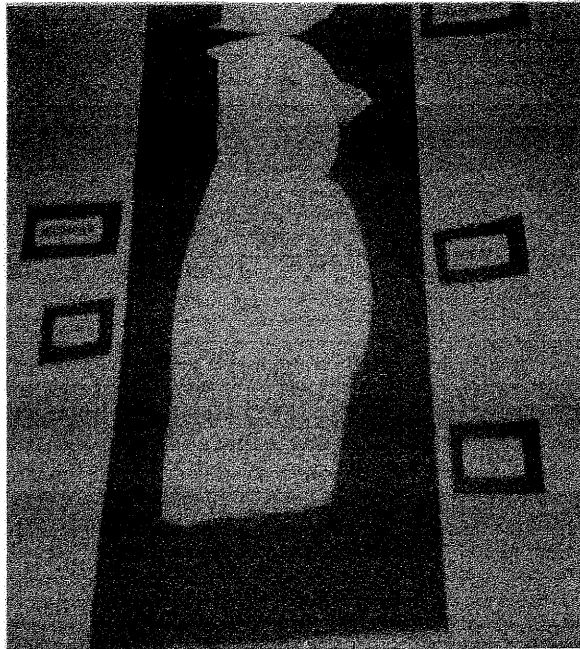


Figure 5: Inside answer area of Bird map display

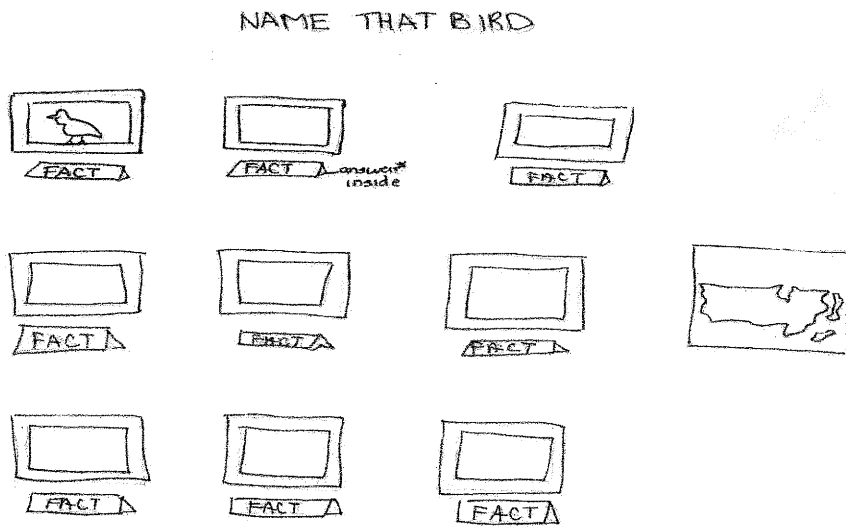


Figure 6: Draft of Name that Bird display

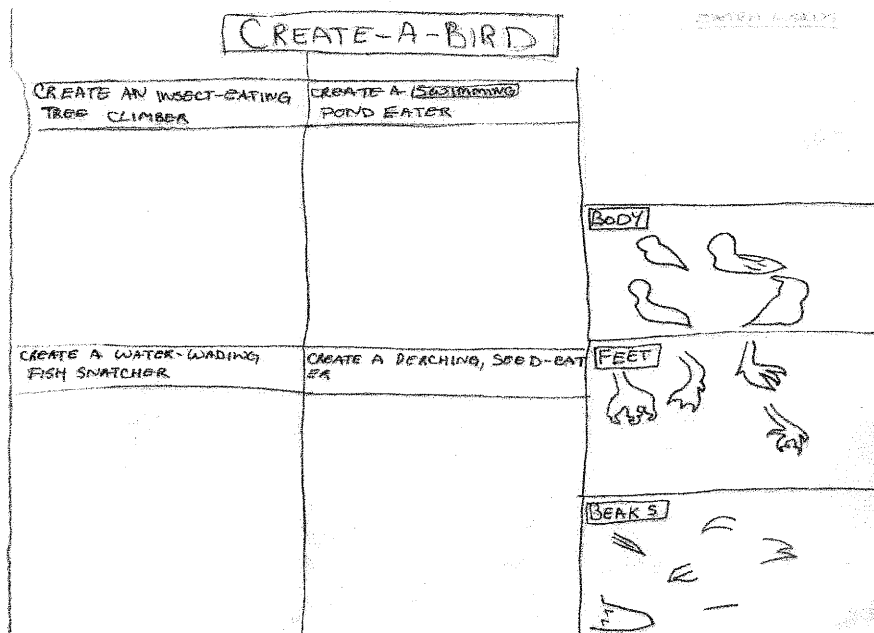


Figure 7: Create-a-bird draft drawing

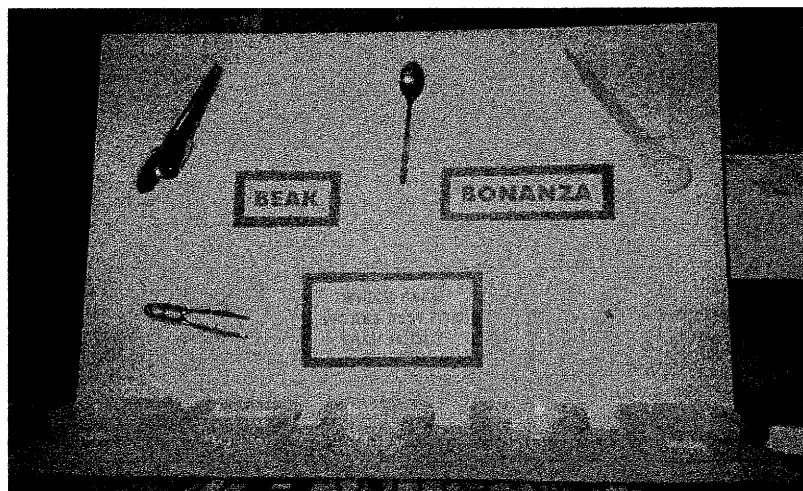


Figure 8: Beak Bonanza display in initial stages

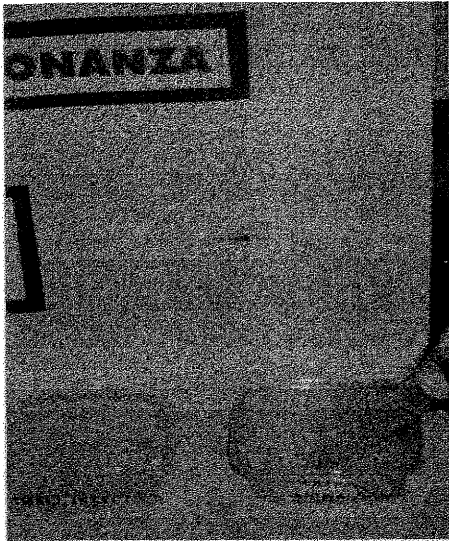


Figure 9: testing of beak efficient



Figure 10: testing of beak efficient

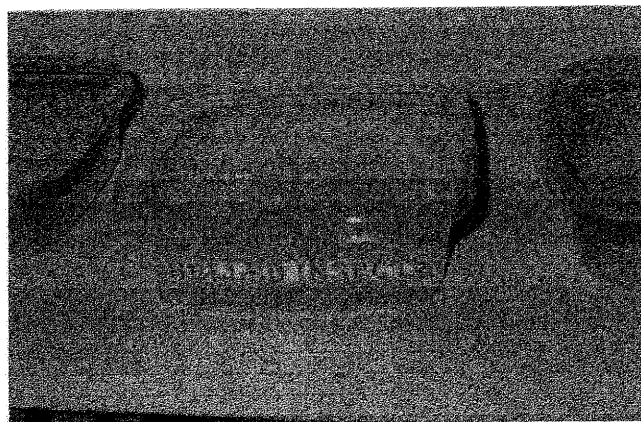


Figure 11: Container showing placement of answer of which beak best fits food type.

Building Enthusiasm for Nature Workbook

Bird Activity Guide

prepared by: Amy Dickens
April 2004

Introduction

This workbook is designed to facilitate learning activities concerned with birds in the Quinte Area. The following is a variety of activities that can be performed in a variety of setting, for children aged 7-13 years.

The first section will explain the interactive display activities, followed by a section of activities and finally a section of games with bird themes will be given.

Interactive Display

There are four sections to the display: (1)bird map; (2)who am I?; (3)create-a-bird; and (4)beak bonanza. These four sections will be explained in greater detail separately.

(1)BIRD MAP

The first activity involves mapping the body parts of a bird. In order for this exercise to be independent, children must take the seven, velcro-backed body part cards and stick them in the appropriate regions of the bird's body. The drawing of the bird is the central characteristic of this exercise and the areas of the body under question are clearly labeled. When children feel they have the right body part names in their corresponding areas, they can lift the picture of the bird to reveal and see an outline of the same bird with the body parts properly labeled on the bird. This activity is the initial stage to learning the how birds adapt to their geographical location. It is first important to understand the different, less-obvious body parts of a bird aside from the beak, wings, and feet. Make sure that the part names are placed below the bird picture before each child starts as to not ruin the experience for child to use the display

(2)WHO AM I?

The second activity involves a series of pictures of different birds and ducks, from large birds of prey, to small seed eaters. The objective of this activity is for children to learn the name and characteristics of different birds found in the Quinte area and to realize that birds come in variety of shapes and sizes, with very different physical, and behavioral characteristics. Below the colorful pictures of these different birds are interesting facts about the bird dealing with either its physical appearance or behavior. The child can guess the name of the bird either from the visual of the bird or through the knowledge contained in the fact. Once they believe they know the answer, the fact can be flipped up to reveal the name of the bird. A variety of pictures and facts were created so the different birds which are displayed can be changed daily if desired. This activity allows children to see very different types of birds and learn about their characteristics that are sometimes difficult to see and study while out in nature. It is essential to double check and make sure the right fact is underneath the correct bird picture.

(3)CREATE-A-BIRD

The third activity deals with the adaptation of specific body parts to the geographical location in which these birds live. Within a series of four boxes, children are required to construct different birds, by following the adaptation clues given at the top of each box. The children are to take the velcro-backed, puzzle-like body parts and construct the bird on the board according to the adaptation outlined. If the wrong body piece is used, the puzzle pieces will not fit neatly together as they will when the bird is properly constructed. This activity teaches children that birds have evolved within their different locations to best survive in their habitat. This makes the learning process much more fun as children have total control as to the final product of the bird, and will learn what the purpose of each adaptation is through the construction of the bird, rather than having the same material lectured to them.

(4)BEAK BONANZA

The fourth activity of the display is the final activity dealing with geographical adaptation. Within this activity there is a series of five containers each containing a different substance representing different types of food(rice can be used to represent small insects, beans for shelled insects, gummy worms for worms, and rice in water for water insects/animals. There are also a variety of different materials(such as a clothes pin and tongs) representing the different types of beaks/bills of birds. Children can try to pick up the 'food' with each beak to determine which beak is best adapted for each food. At the bottom of the container, underneath the food is the answer as to which beak is best fitted for this food. When filling the container with the correct food double check that the correct material is going in the correct container.

Activities

ADAPTATION ARTISTRY

Birds have a variety of adaptations which have evolved so that the bird is better suited to its environment and lifestyle. A variety of major adaptations are listed in the Project Wild Activity Guide(pg. 139). The major purpose of this activity is for students to realize that there are advantages for birds in looking how they do, recognizing some of the ways in which birds are physically adapted to their environment

Procedure

- 1) Discuss with students the various types of adaptations. Or brainstorm a list of bird characteristics and describe the advantage of the adaptation represented by the characteristic.

- 2) Tell the children they will each have a chance to design their own original bird, one which is well adapted to its environment. Each child should decide:
 - where the bird will live
 - what it will eat
 - its type of mobility

- 3)Based on these choices, the children will decide the adaptations that are necessary for their bird and write them down.

- 4) As a craft exercise, have the children create this bird using leftover or scrap craft materials. Have the children write a short story which includes the name of the bird, its food sources, habitat, and lifestyle.

- 5) Have the children introduce their bird to the rest of the group, explaining its characteristics. Prizes can be given to most original bird.

NO WATER OFF A DUCK'S BACK

The impacts of environmental pollution are often difficult to see. A major oil spill, however, provides dramatic evidence of potential impact to wildlife. People are involved in efforts to prevent oil spills and their consequences. They are also involved in efforts to clean up after such oil spills take place. Such actions are not always successful, and sometimes they have unfortunate consequences as well. For example, the process of using detergents to clean oil from the feathers of birds caught in spills may also damage the birds' feather structure and arrangement thus affecting the birds' waterproofing.

Procedure

- 1) Divide the group into smaller groups of 3 or 4. Each group needs a shallow pan partially filled with water. Place a feather in the water and have the groups observe how it floats

- 2) Add a known amount of oil, approximately the size of a twoonie., enough so the oil surrounds the feather. Have the groups observe how the feather still floats, but that its structure is affected.

- 3) Have the groups SPRINKLE powdered detergent on the oil and water. Observe how the feather now sinks as the natural oil of the feather is also removed by the detergent.

- 4) Have the groups brainstorm other clean up techniques that are less damaging to the birds.

MIGRATORS

Many species of birds migrate. Some bird migrations are quite short, others are long journeys. Migrations are gruelling, particularly for small birds. To survive their migrations, birds depend on a number of critical stopping and refuelling habitats along the way. Many of these habitats are disturbed by humans. This means that exhausted, hungry birds may not find enough food for the remainder of the trip.

Procedure

- 1) Discuss the various ways that birds adapt to winter. Explain that migration is something that most small songbirds do to avoid the coldest months.
- 2) Print out and distribute maps of the major "flyways" of North America (see www.atlas.gc.ca)
- 3) Divide the group into groups of five and have them select three bird species from the Quinte area that are migrators.
- 4) Have the children speculate on why their species migrate. (Does the insect diet die in the winter? Can they not get to their food source because of ice?)
- 5) Have the children list the possible ways that human activities may affect bird migration.

MIGRATION BARRIERS

The major purpose of this activity is for children to recognize some of the problems that can occur as a result of human actions affecting aspects of the environment. In this case, draining of wetlands is used as an example.

Procedure

- 1) Have the children draw a mural of a migratory bird's habitat. Ask the children to put in the appropriate vegetation, water sources, and other animals that also occupy this habitat.

- 2) Once the pictures are complete, tell the children that a major housing development is being built in the area. Ask the children what will happen to the wetland if the houses are built in the same area.

- 3) Ask the children to come up with a way that the housing development can still be allowed to be built without filling in the wetland.

- 4) Have each child explain what they drew and why they drew it.

ARE WE DISTURBING BIRDS?

Every living thing needs a decent home to survive. Imagine what would happen if your home were demolished and you had nowhere to go. Every time their homes are disrupted or destroyed, wildlife species are forced to move elsewhere or get squeezed out of existence. We use pesticides which poison their food supply, we fill in ditches, make dams or drain swamps, making life very difficult for many species.

Procedure

- 1) Discuss with students the habitat elements that all living creatures need to survive.

- 2) Have students brainstorm a list of all human and natural activities that can interfere with healthy habitats and cause problems for birds.

- 3) Have students brainstorm what human activities have occurred within the year in the Belleville area. What birds do they think lived in that area and how were they affected by this development?

- 4) How can we reduce the impacts and destruction of these bird habitats?

CHICKADEE ATTRACTION

Chickadees are naturally very curious birds. This activity will show children just how curious these little birds actually are. **This activity requires children to be very quiet and still, therefore it is a good activity to do at the end of the day when the children are tired and hot.*

Procedure

- 1) Explain to the children that chickadees are very curious birds and can be very daring birds despite their small size.

- 2) Divide the children into small groups of 3-4. Explain to them they are going to find a quiet place with a lot of low-hanging branches and shrubbery where chickadees are known to reside. Once they have found their spot instruct them to lay on their backs and wait for a couple minutes to decrease the obviousness of their presence.

- 3) Instruct the children to take turns making a quiet *FFSSHHHHHH FFSSHHHH FFFSSHHHH* noise with their mouth. If the children are quiet enough the chickadees will come extremely close to the children to find out what is making that noise.

Other Ideas

As craft ideas, have children build nesting boxes with the appropriate pieces (which are stored in the barn)

Another craft idea is to create bird feeders out of pop bottles or milk cartons. Allow the children some creativity in the making of their feeder and have them explain which birds they feel will use this feeder and why.

GAMES

OWLS AND CROWS

Owls and crows are two bird species that are not afraid to use scare tactics to keep each other away from their respective nests. This is a fast-paced game but educational at the same time.

Procedure

- 1) Split the children into two teams, one being the owls and the other being the crows. Give all the owls armbands to wear in order to differentiate between the two teams.

- 2) Explain to the children that owls and crows are known to chase each other. Explain that this game will consist of a series of statements about different bird species. If the statement proclaimed is true, the owls are going to chase the crows. However, if the statement is false then the crows will chase the owls.

- 3) Take the children to a field and mark the ends of the field as the 'home base'. Place a skipping rope across the middle of the field.

- 4) Have the two teams line up on either side of the skipping rope facing each other. Once the statement is made, the children have to decide quickly whether the statement is true or false and accordingly run away or chase the other team. If an owl is caught he/she must give up the arm band and become a crow and if a crow is caught he/she must be given an armband to wear.

THICKET GAME

This game deals with adaptation of animals to their environments. It does not pertain solely to birds, however it can if wanted.

Procedure

- 1) Ask one child to be 'it'. He/she is then titled the predator.

- 2) Take the children to a thicket that has a lot of places to hide and cover. Explain to them they are all birds that are hiding from their predator. Explain that they must try to hide and not get noticed by the predator. However, they must be able to see the face of the predator from their hiding spots.

- 3) Have the predator count to ten as all the other children run and hide. Tell the children to get down and then allow the predator to open his/her eyes. The predator can squat down, jump in the air, take one step in either direction but they cannot walk around. Have the predator call out all the children he/she can see. Then have them close their eyes again.

- 4) While the predator is counting to ten again, have the remaining hiding children take five steps closer to the predator and then find a new hiding place. Once the children are in their place the predator can open hi/her eyes.

- 5) Steps 3 & 4 are repeated until there are only a couple children left hiding. Have them stand up in their spots. It is amazing how close some children can get without being noticed.

MIGRATION HEADACHE

Migration is a very interesting topic. Some birds travel at night, others during the day, all at varying times of the year.

There are a variety of remarkable migratory birds in our area: mallard ducks, geese, herons, gulls etc. All require the presence of wetlands in their breeding habitat and on their wintering grounds. The primary threat to the survival of these migratory species is the disappearance and degradation of wetlands. Without wetlands, dozens of species face the loss of their habitat.

The purpose of this activity is for students to dramatically experience some of the important factors which affect the survival of migratory water bird populations.

Procedure

1) Select a large playing area about 20 meters in length. Place paper plates in two patches on the playing field at either end of the playing field. Have one end represent the nesting habitat and the other the wintering habitat. Choose the number of plates so that you have one plate for every three children at each end

2) Explain to children they are migratory birds and they are going to migrate to the wintering habitat on your signal. Explain to them that they must have one foot on a plate in order to survive as each bird needs a habitat. Explain that for the purposes of this activity, only three birds can occupy a habitat at a time.

3) Have the students migrate to the other habitat. The first time all will be successful in finding a habitat. Before the children migrate back to the nesting habitat, take away one or two plates and explain that a large wetland has been drained for development purposes. Those children that do not find a habitat will die(stand to the side of the field) as they could not find a habitat.

4) Keep taking plates away creating reasons for the disappearance of wetlands until a large group of children are standing on the sidelines. Have them explain some reasons for the decline in numbers of migratory birds and what can be done to stop this decline

BIRD ALPHABET

This game is a quiet game and is great to slow down the pace of the day.

Procedure

- 1) Have the group of children and leaders sit in a circle.

- 2) Explain to the children that starting with the letter A, you are going to go around the circle and try to think of a bird name that starts with each letter of the alphabet.

- 3) When a child cannot think of a bird for their corresponding letter, they must sit back and wait until noone can think of an answer.

BIRD HIKE

Take the children on a hike through the conservation authority and have them look, and listen for signs and sightings of birds. Have them take a pencil and piece of paper on a clipboard and record these signs. Have a prize for the group with the most legitimate list of bird signs.

DEADLY LINKS

People have developed pesticides to control organisms. Herbicides are used to control unwanted plants and insecticides are used to control unwanted insects. Many of the toxic chemicals contained in these pesticides have a way of persisting in the environment and often get more concentrated as they move up the foodchain. The impacts on bird species higher on the food chain- the Bald Eagle or Cormorant have been well documented.

Procedure

- 1) Divide the group into three groups: grasshoppers, shrews, and hawks(there should be three times as many shrews than hawks and three times as many grasshoppers than shrews)
- 2) Give each grasshopper a paper bag signifying their stomach
- 3) With the children closing their eyes, distribute 'food'(white and colored) paper around a playing field.
- 4) First send the grasshoppers out to collect as much food as they can. At the end of 30 seconds, the shrews are sent out to try and catch the grasshoppers. If a grasshopper is caught, he/she must give up the stomach to the shrew.
- 5) Once 60 seconds has passed since the shrews having been chasing the grasshoppers, the hawks are released to catch the shrews. Give the hawks 2 minutes to catch as many shrews as they can.
- 6) At the end of the 2 minute period have the children come and make a circle, bringing with them the collected stomachs. Have the children empty their stomachs and count how many white pieces they have and how many colored pieces they have.
- 7) Once this has been done, inform the children that the colored pieces represent pesticide. If there are any grasshoppers are left with their stomachs, they are now dead if they have ONE piece of colored paper. Any shrews for which HALF OR MORE of their food supply was colored pieces are now dead. The hawk with the highest number of colored pieces is not dead yet, but there are visible affects, such as the thinning of their eggs so that the eggs do not hatch. All the other hawks are not yet affected.

Adapted from the Project Wide Activity Guide(2001)

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