ABSTRACT
Bringing the Mayborn Museum Complex Discovery Boxes into the 21st Century

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Museums have realized the sustaining benefits of school partnerships over the last fifty years and are better meeting the needs of teachers through outreach. This project focuses on one successful outreach program employed at the Mayborn Museum Complex in Waco, TX called Discovery Boxes. Discovery Boxes are thematic kits containing related 3-D objects, media, books and lessons to aid teachers in science and social studies.

This project consisted of redesigning elements of selected boxes based on evaluation from area classroom teachers, in order to increase their accessibility and effectiveness. In order to evaluate these boxes, interviews were conducted with six elementary school teachers who had previously used the Discovery Boxes. The feedback provided from these teachers guided the redesigning of the boxes; and the same teachers then used the redesigned boxes in their classrooms. The teachers evaluated the redesigned boxes and made further recommendations. This project also includes a brief literature review of museum-school partnerships and outreach throughout history and the specific development of Discovery Boxes at the Mayborn Museum Complex.

The results of the project provide recommendations to staff at the Mayborn Museum Complex for the continuation of redesigning the remaining Discovery Boxes. The process and recommendations can also be used as a model by other museums with similar outreach programs.

Bringing the Mayborn Museum Discovery Boxes into the 21st Century

by

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A Project

Approved by the Department of Museum Studies

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Submitted to the Graduate Faculty of
Baylor University in Partial Fulfillment of the
Requirements of the Degree

Of

Master of Arts

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This project is dedicated to my mother, who has always opened doors for me to pursue my dreams.

Introduction

Since the middle of the twentieth century American museums have been challenged to strengthen and develop their educational missions in order to better serve the public and sustain their institutions. For many museums developing outreach programs through school partnerships have been the means to augment in-house tours and programs, as well as expand their educational goals. Institutions have more fully realized the sustaining benefits of these school partnerships over the last fifty years and are better meeting the needs of teachers through outreach. This project focuses on one type of successful outreach program that involves loaning materials, artifacts and specimens to local classroom teachers; often referred to as Traveling Trunks or Discovery Boxes. Discovery Boxes are thematic kits containing related 3-D objects, media, books and lessons to aid teachers in curriculum related topics. A brief literature review will serve as a foundation by discussing the evolution of museum education, museum-school partnerships, and outreach as well as the history of the Mayborn Museum Complex's (MMC) Discovery Box program.

As museum educators enter the 21ˢᵗ century it is likely that they will find themselves in a position to update and redesign once popular and successful programs that seem to be losing steam as the educational landscape changes. As curriculums and technology change, so do the needs of teachers. What museums were doing through programming and outreach years ago may no longer be fully meeting teacher needs and learning goals. In the case of the MMC, the nearly three-decade-old Discovery Box program is showing visible signs of aging, from out-of-date materials to general wear and

tear. While teachers still frequently check out boxes for their classrooms, it is clear from

the neglected state of certain components they are in need of updating. It was the goal of

this project to determine how the Discovery Box program can function at its full potential

to meet the needs of teachers today.

Rationale

The thought to conduct a redesign project on the MMC's Discovery Boxes

originated from my own experience using several of these boxes as a public school

teacher in Central Texas. As a teacher, the Discovery Boxes were a wonderful resource

in the subject areas of science and social studies. The district that employed me was

heavily focused on math and reading at the time, so most of the materials ordered by the

schools for students related to these subjects. As a result, classroom sets of science and

social studies related materials were scarce, and the lessons were usually paper and pencil

based. Needless to say, Discovery Boxes were a welcome resource that were used

several months throughout the school year and shared amongst teachers on my team.

Many students in my classroom had little exposure to museums and their

collections, so handling museum artifacts and examining specimens was a thrilling

experience that sparked their interest and curiosity. Often times examining objects would

trigger discussions, questions, and even explorations on the Internet or in the library.

However, being on a team of ten teachers, the boxes were never in the classroom more

than a few hours at a time. I quickly realized that in order for the students to get the most

out of the boxes, preparation was needed. Although boxes came with binders full of

lessons, activities, and projects, it took time to sort through them and find the appropriate

lesson for my age students. I never seemed to have enough time or energy to take on this

task even though I knew it would benefit my students. Sharing the binder amongst all of the teachers was another challenge.

A year later I became a graduate student in the Department of Museum Studies and became immersed in the museum field. Of particular interest to me was a museum education course where I read about the current trends in community building and school partnerships. I read countless articles and case studies about museum staff collaborating with local teachers and education advocates to improve or create programming and outreach to better serve the needs of the public. I realized that my perspectives as a teacher and museum professional would blend well in contributing to this type of work. With a background in education and experience teaching in the classroom, I was familiar with the realities of the school system and practical needs of teachers. As a graduate student I gained knowledge and insight of the museum field and best practices, allowing me to gain the perspective of a museum educator. Both of these lenses allowed me to consider conducting a collaborative project to update and redesign the MMC's Discovery Boxes to better meet the mission of the institution and the needs of teachers.

Methodology

To begin the project it was necessary to locate teachers in the area who had prior experience with the Discovery Boxes. Teachers with no experience would not be able to provide information regarding the current state of the boxes and how they were or were not meeting the needs of the classroom. At least two teachers from three different campuses and grade levels was required to ensure that the feedback was not skewed in any one direction or in any one teacher's favor. In order to find potential participants I scheduled an appointment with the MMC's Education Coordinator, Denise Seaman who

keeps record of each box checked out and contact information of the teachers. Additionally, Seaman allowed me access to last year's Discovery Box calendar so that I could anticipate the boxes teachers would most likely be requesting in the fall. This was essential so that the initial evaluation could occur early allowing time for redesign and classroom testing for effectiveness. Because of her organized system, I was able to compile a list of potential teachers quickly. I used Seaman as a reference when contacting teachers and explaining my project, which helped me to gain quick interest and support.

After several streams of communication via phone and email, I was able to confirm participation by six local area teachers who taught Pre-K- 6th grade. The six teachers were from three different campuses, two teachers per campus as planned. I had each pair decide on one box to evaluate together, so that no single box was biased toward one teacher's needs. The chart below reveals the box each pair chose to evaluate on their campus.

Pair #	Box Name
Pair #1 at Campus A	Japan
Pair #2 at Campus B	Native American
Pair #3 at Campus C	Tree

As the chart indicates, Pair #1 chose the Japan box, Pair #2 chose the Native American box, and Pair #3 chose the Trees box. The teacher pairs chose a box with a theme that correlated with their science or social studies curriculum in November, since I would be

updating and redesigning the boxes in the month of October. The chart below clearly

outlines the redesign process.

Pre-Interview (September) Teacher Pair evaluates one box	→	Redesign (October) Box is redesigned based on evaluation	→	Post-Interview (November) Box is returned to teacher pair to use in their classrooms
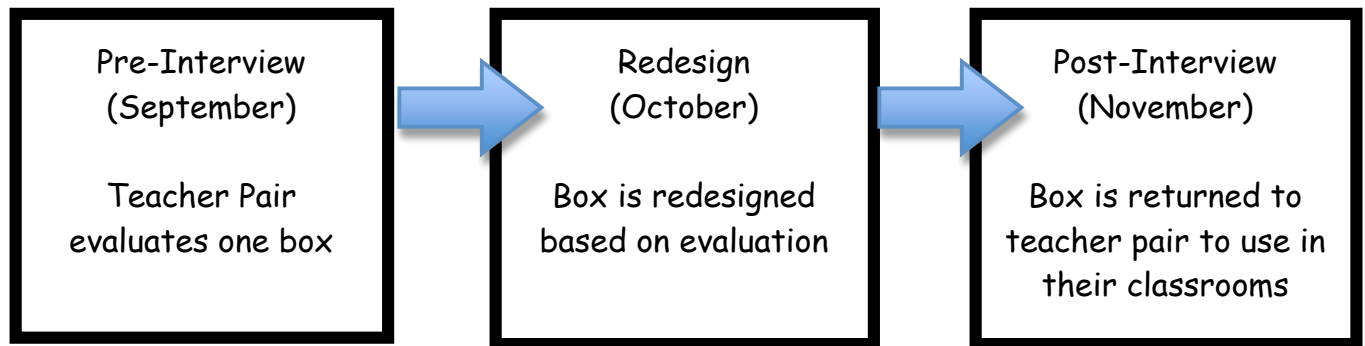
The pre-interviews began with questions pertaining to past Discovery Box

experiences in order to understand teachers' current feelings about the program and gain

insight as to how the boxes were being used in each classroom. Then, the pair of teachers

systematically reviewed and evaluated the Discovery Box they requested. They indicated

whether materials, objects and resources were useful, in good condition, and up-to-date

with their current teaching practices. Recommendations were also made on the following

aspects of the program: check-in and check-out procedures, general design of the box,

materials and objects that could be added or removed, and information on MMC's

website about Discovery Boxes.

In late September, the data from each interview was compiled into charts, making

it easier to sort through and draw conclusions about possible changes or updates. Each

box had its own set of materials to be ordered and updated. Every new item ordered was

recorded into a product inventory list, and then submitted to the staff person in charge of

ordering materials at MMC. All of the changes for each box as well as the interview data

were discussed with Denise Seaman, to ensure that changes were still in line with the mission of the museum and original purpose of the boxes.

The month of October consisted of making several organizational changes to all three boxes in order for teachers to better locate and use items and materials. Because each teacher recommended the boxes provide documents, posters and photographs digitally instead of in paper form that adds bulk and clutter, paper based resources were digitized at the Riley Digitization Center on Baylor University Campus. Each of these resources was uploaded onto a CD that would be inserted into the box for the teacher to use.

Teachers received the updated boxes in November and used them for two full weeks with students. There was no particular format in which teachers needed to use the box or materials. Teachers were free to use the box in any way they wished, choosing to explore or not explore any of the artifacts or materials. Post-interviews were conducted with each teacher pair to assess the improvements to the boxes.

Review of Literature

Overview of Museum Education

American museums have always defined themselves as producers and disseminators of knowledge, and different types of educational programming, exhibits, and research have helped museums support that definition from their early inception in the eighteenth century. While an educational component has always existed, a relationship between museums and schools has not (Frankel 1996, 10). Teachers and students were not a targeted museum audience until the early 1900s when innovative and reformed schools began to promote John Dewey's educational philosophy, which promoted experiential learning in the classroom and beyond. Prior to this shift, the public school system adhered to a more classical educational model that focused on rigorous memorizing of facts and tasks that confined students to their desks, paper and pencil. It was not until the twentieth century either that educational museum work was grounded and supported in educational theory, ridding institutions of their "haphazard and sporadic programming" (Hein 2010, 340-341).

Early museum education advocates, like George Brown Goode (1851-96), Anna Billings Gallup (1872-1956), and John Cotton Dana (1856-1929) pushed for museums to improve the quality of their educational programming so that the public could truly benefit from vast collections. Goode, whom worked for the Smithsonian Institution in the late 1800s, was a strong supporter of "active educational work, including systematic organization of collections, extensive labels and public lectures" (Zeller 1989, 33). Goode's ideas predicted the changes that would occur in museum education in the

coming twentieth century.

Anna Billings Gallup, influential curator and director at the Brooklyn Children's Museum from 1902 to 1937, made it part of her mission to bring children into the museum by opening exhibit cases, and bringing objects out of collection for them to handle and examine. Many of her ideas remain at the heart of informal science education today (Alexander 2008, 170).

Newark Museum director John Cotton Dana was one of the few museum educators in his time that recognized the museum's potential for popular education. Dana believed that museums should open their doors to everyone, and offer itself as a resource for the entire community. He created exhibits with the working class, African Americans, Catholics and Jews in mind, incorporating objects and artifacts that would invite these different populations into the museum environment"(Schwarzer 2006, 13, 176).

The progressive education efforts in most Western societies throughout the twentieth century combined with child development research also resulted in gains and improvements in educational activity in museums. The progressive education movement encouraged practical applications to the classroom that were imitated in museums quite effortlessly such as learning from and with objects, focus on investigation, and appeal to the visitor's interests and prior experiences (Hein 2010, 344). With this emphasis on meeting the needs of visitors through programming, museums began to expand their staff to include education or interpretation personnel.

Slowly, museum educators gained a voice throughout the early twentieth century and established the museum as a place where innovative programming could generate genuine learning that met the needs of different audiences (Frankel 1996, 11). The 1930s

and 40s were a time when many museums made significant shifts to cater to the public through educational programs, lectures, tours, demonstrations. Arthur C. Parker (1881-1955) an influential museologist and archeologist, strongly advised museums to focus on their communities needs. He called museums that were not changing to focus outward on the community "dead institutions". In 1935 he wrote,

> The museum of history in your community should not be a tomb wherein the bones of antiquity silently rest. Your Museum of History rather must be a power station sending out a current that illumines the community and gives a clearer vision of social values (Alexander 2008, 113).

The first attempts at public outreach were offered through tours for school children and through printed educational materials along with the loan of objects for classroom use (Alexander 2008, 289). Museums experienced a steady increase in the 1950s in their school group audience; however, the relationship between museums and schools remained somewhat informal until the 1970s when museum education was recognized more widely among the museum profession. Upon the insistence of the growing number of museum educators, the American Association of Museums (AAM) created a standing professional committee on education in 1973 whose purposes include "promoting high professional standards for museum educators, advocating for the support of the educational purpose of museums, and promoting excellence in museum learning" (Pitman 1999, 10).

This committee assisted AAM in conducting research on the state of museum education across the nation, and the findings were eventually published in a report on the present state and future prospects of American museums titled *Museums for a New*

Century in 1984. It was clear from this report that education reformation made an impact. *Museums for a New Century* devoted a whole chapter to learning in the museum, noting that,

> The current reform movement forces a reassessment of the realistic limits of formal education. In museums, too, the meaning of the learning experience, the relation of museums to schools and the mechanism for education in the museum setting are all worth careful attention. (American Association of Museums, 1984, 26)

Museums across the country increased their educational experiences by providing direct support for schools. Capitalizing on their ability to offer unique and rare learning experiences through their collections and professional education staff, museums began to address the needs of diverse audiences and schools through specific interdisciplinary programming and outreach (Institute of Museum Services, 1996). Education in museums came to encompass the development and interpretation of exhibitions, events, workshops, and even the study of visitors' experiences and educational outcomes. Museum educators worked at a national level in establishing standards for education (Institute of Museum Services, 1996).

The 1980s and 1990s brought a revolution to the mission of museums as their focus changed from an inward concentration on their collections to an outward concentration on the communities they served (Anderson 2004, 284). Museums became "about something and for somebody" at the same time when they began providing interpretation for their vast collections with the public in mind (Weil 1999, 229). As a result museum education has become the primary vehicle to serve a diverse public. Museum educators

design and offer enriching programs for all age groups utilizing museums' resources as teaching tools. Research shows evidence that

> The relationship between museums and the public has altered appreciably in recent years, from a situation where the public had little say in museum affairs to one where the sense of public is an overriding factor…[and that] the meaning of the collection has also altered accordingly, from objects collected for their own sake by an individual, to one where choice and display of the objects is shaped by public concerns (McClean 1994, 244).

Museums are now evolving into institutions that are providing resources for the community based on community feedback. In the case of teachers and schools, museums now offer educational training through pre-service classes and professional development. Children and adults are now being reached through new programs in newly designed locations that are accessible to a diverse audience, which includes visitors with impairments, after-school clubs, churches, and public housing (Institute of Museum Services, 1996).

Museums shifted from predominantly curatorial to more education-centered institutions in the 1970s-1990s. The increasing competitive economic climate and cultural diversity of these decades made educational outreach a crucial factor in attracting new visitors and new money (De Leon 2010, 4). Thus a shift is evident in a series of landmark publications published by AAM which focused on the benefits of museum education to a greater public. In 1969, the AAM published *Americas Museum: The Belmont Report*. The report was an appeal for direct federal support of museums. That would enable museums to offer more educational programs for the general public. As a

result of this report Congress was persuaded museums' educational mission justified state and federal governments to offer tax exemptions and other forms of federal support (Schwarzer 2006, 194).

Museums for A New Century stated quite clearly that museums needed to "realize their full potential as educational institutions" (AAM 1984, 59). In 1992, *Excellence and Equity* raised the issue of attracting a culturally diverse audience and was the "first major report on the educational role of museums ever to be issued by the American Association of Museums" (AAM 1992, 3). The purpose of the report was to "assert that museums place education – in the broadest sense of the word – at the center of their public service role, and to assure that the commitment to serve the public is clearly stated in every museum's mission and central to every museum's activities" (AAM 1992, 7).

Museum- School Relationship

Museums have a long history of providing services to schools, paralleling the rise of public schooling (Rubin 2006, 3). Museums began strengthening their partnerships with schools at the end of the twentieth century. As was forecasted in *Museums for a New Century*, "The museum-school relationship shows considerable potential,...particularly in light of the recent calls for strengthening the quality of instruction in science, the arts and the humanities in the schools" (AAM 1984, 68). But the report also made it clear that the current relationship between museums and schools had been marked with both success and dissatisfaction. Museums needed to become strategic, innovative and attentive to the needs of schools in order to sustain their relationship. It was recommended that museums and schools to effectively communicate their mutual objectives (AAM 1984,69) as well extinguish the "us and them" mindset that many teachers and museum educators held

when reporting on their relationship with each other (Hicks 1986). It was additionally

concluded that classroom teachers needed insight to the resources museums could

provide, and that museum educators needed teachers to view the museum as a valid

educational resource and experience for students. Recommendations to museums were

based on surveys completed by educators within schools and within museums (Hicks

1986).

In 1996, the Institute of Museum Services published *True Need True Partners:*

Museums and Schools Transforming Education (Hirzy, 1996). This report gave specific

examples of museum and school partnerships demonstrating the various ways museums

and schools were working together to address education issues. Among the solutions

discussed were cooperative learning, integrated and interdisciplinary curriculum, the

creation of new teaching resources, and community partnerships (Hirzy, 1996). *True*

Needs True Partners also included guidelines for starting partnerships between school

and museums (Hirzy, 1996). These various research efforts helped direct and develop the

field of museum education, as well as provide practical steps for the future.

Since these informative publications, the museum-teacher relationship has seen

significant shifts. The teacher has become a provider of feedback, recommendations, and

resources to the museum rather than a receiver of what the museum has to offer (Hicks

1986). In the 21st century this has much to do with the emphasis on specific learning

standards for each grade, and Federally mandated No Child Left Behind assessments,

bringing a fundamental shift to museum education. Teachers have been put in the

position of needing to justify field trips and content they are presenting to students.

Without a valid link between school and museum curriculum funding is often denied to

school groups for museum visits. As a result, most field trips and outreach programs developed in the last two decades for schools have been clearly aligned with the curriculum (Hooper-Greenhill 2007, 99). As one student of museum education has observed, "Time, effort and funds must be spent by museums to ensure that their educational programs are aligned with state standards, and more importantly, the programs must be marketed in this way for school districts to utilize them" (Henson 2002, 4).

Museum-school partnerships are of particular advantage to urban schools with low student achievement; these urban schools also tend to be under-funded and under-resourced. Although the United States gives every child the basic right to an education, it does not necessarily mean that it will be a quality education. The complex system of shared policymaking and funding among national, state, and local governments results in unequal education opportunities for the poor, minorities, and underprivileged (Steiner 2008, 1). All public schools receive a portion of funding from local property taxes, meaning that children in wealthier neighborhoods with higher-property taxes (usually suburban areas) have greater access to a quality education than do children from the poorer inner cities and deprived rural communities. The inequalities can be seen in several areas, " particularly a lack of qualified teachers, poor facilities, technology, and lack of resources to provide genuine real-world experiences in subjects like science where this type of learning is most beneficial" (Steiner 2008, 1).

Museums have responded to the needs of the suffering public school system by developing high quality outreach programs that provide rich cultural experiences. "Underprivileged" schools and remotely located schools have found outreach programs

particularly valuable. By partnering with informal learning environments such as

museums, teachers also gain assistance in meeting the needs of their students. Museums

are institutions that have the potential to provide exactly what 21st century reformed

public education (especially in science) is demanding: cost effective programs that

increase students' interest and provide teacher support (Valli 1999, 65).

Museum Outreach

As the 21st century approached, it was clear that museums needed to make a bigger

impact on the communities that surrounded them by further developing their outreach

programs. Outreach can be defined as "any type of museum related program that extends

beyond the museum walls, bringing a part of its mission and collection into a classroom

or other off-site location, including into your home via the Internet" (Cutler 2009, 87).

Furthermore, an off-site visit is considered "outreach" which can include materials and or

activities related to the collection that will enhance or can even replace a museum visit.

Outreach programs have been created to meet the learning needs of different audiences.

In AAM's 2002 publication, *Mastering Civic Engagement,* museums are challenged to

pursue their potential as active, visible players in community life. An opening essay by

Robert Archibald urges museums to reinvigorate their civic role and purposes and offers

guideposts for inquiry and transformation. Archibald writes,

> I realized that the ability of museums to expand community service depends
>
> upon the creation of new and really collaborative relationships, where we do
>
> not presume to know what audiences need. In these new relationships we will
>
> regard ourselves as reservoirs of information and expertise and will relinquish our
>
> traditional authoritarian roles in favor of new responsibilities as both resources and

facilitators of dialogue about those things that matter most to people

(AAM 2002, 3).

For school children and homeschoolers museums have created traveling trunks/kits, distance learning or videoconferencing, mobile museum, art contests, living history interpreters, and puppet shows to name some examples. For more mature groups programs like speakers bureau, online exhibits, and lifelong learning classes have been created (Cutler 2009, 88).

Museums build partnerships with schools to supplement classroom teaching and put their collections to good use. Sometimes these partnerships are formalized by having contracts with local school districts. In the absence of a traditional lessons, schoolteachers may request field trips to complement classroom learning (Berry 1998, 136).

Many creative outreach programs sprouted up in response to the 1970s energy crisis in the United States. The energy crisis came to public attention when an oil embargo by the Arab-controlled Organization of Petroleum Exporting Countries (OPEC) was imposed from October 1973 to March 1974 to protest U.S. military support of Israel. The embargo led to a period with a high rate of inflation combined with an economic recession. "U.S. gas prices went from 35 cents a gallon in the beginning of 1970 to around 90 cents near the end of the 70s" (Cengage, 1995).

This was a significant shift in world economics and politics, and it caused the U.S. government to impose emergency energy-conservation measures, such as, lowering thermostats to sixty-eight degrees, reducing air travel and highway speed limits, halting coal-to-oil conversions, licensing more nuclear power plants, and relaxing environmental

regulations. Additionally carpools and public transportation increased as gas stations

closed. Business and school schedules were also shortened to conserve fuel. "The

embargo ended in March of 1974 but the effects stayed until the end of the century"

(Cengage, 1995).

The National Opinion Research Center (NORC) at the University of Chicago

tracked the spread of the energy crisis across the nation through national probability

sample surveys that indicated changes in behavior and attitudes of the public as they

encountered energy shortages. A 1973 report reveals that both driving for shopping on

social or recreational trips decreased significantly following the Christmas holidays,

museums falling in the category of recreational (Murray et al. 1973, 262).

With the current economic downturn, history may be repeating itself. Conflicts

overseas have caused gas prices to rise, and businesses (particularly small ones) around

the country are beginning to feel the hit. Political instability in Libya has raised the price

of gas to more than $3.25 per gallon, the highest since October 2008 (Markowitz 2011).

Rising gas prices will certainly affect school field trips, along with increased national,

state, and local school budget cuts. Museums and institutions that depend on this type of

revenue will have to once again become creative through outreach programming and

partnerships that save schools money (MacDonald 2011).

Discovery Boxes as Outreach

As discussed previously, museums have found ways over the past century to

partner with schools to provide educational materials and programs, so that teachers can

create high-quality learning experiences for their students (Hirzy, 1996; Sheppard, 1993).

Educators, students, and their families may use these educational materials; thus learning

to see the museum as a resource (Sheppard, 2007). These educational materials can create public awareness and increase the value of museums as learning institutions. Often these learning materials take the form of Discovery Boxes or Traveling Trunks.

During the time of Jim Crow laws, some of the earliest traveling trunks were developed by museums in the segregated south, allowing for African American students to gain exposure to specimens and artifacts (Schwarzer 2010, 171). These loan kits developed by museums consisted of artifacts centered on a specific theme, and were a mix between museum collections and materials collected by donors and museum personnel (Corwin 1972, 193). Kits also may have included an assortment of pictures, pamphlets, maps and three-dimensional objects, not necessarily to be handled by children. Another early effort dates back to a 1909 loan program pioneered by the American Museum of Natural History in New York, where touch exhibits were loaned to New York City schools (Marsh 1987, 3). These early attempts were however of limited use in teaching in-depth concepts.

In the mid and late 1960s the Boston Children's Museum attempted to further develop their kits by applying for a federal grant that allowed them to create MATCH units (Materials and Activities for Teachers and Children). These kits were much more elaborate in that they included authentic materials, books and media built around specific whole-class and small group activities. Units were to be used for weeks at a time with detailed lesson plans, teachers' guides and background materials. Other museums also began to expand topics to match what students were learning in science and social studies (Corwin 1972, 193).

The pedagogy on which these MATCH units (and those that followed) were

centered was the emerging "student-centered" curriculum in the 1970s. The student-centered curriculum promoted meeting the needs, abilities and interests of the student not the teacher direct learning. The implications for teaching and curriculum centered around the idea that learning the concrete must precede learning the abstract, and that learning is most meaningful when one learns through interaction with his environment (Tuckman 1973, 13).

In the late 1980s museums began providing slide packages, laminated reproductions, videos, lesson plans, and information booklets all based on the school's needs (Zeller 1987, 53). These materials were not only designed as extensions of the museum experience but to help teachers who are not trained in the arts feel more comfortable with the material (Zeller 1987, 53). In the case of many museums today, resources and materials are packaged together and presented in subject-specific thematic units. These packages have been called a variety of names: traveling trunks, museum trunks, trip-out trunks, classroom kits, and discovery boxes.

Trunks today come in various shapes and sizes, however most trunks consist of multiple lessons based on state standards that can be taught without museum staff to students ages K-12. Trunks can vary anywhere in size from a binder containing handouts, lesson plans, pamphlets, and poster size images, to a standard suitcase that contains original artifacts, books, multimedia resources (such as DVDs) and materials for activities. Some museums charge a rental fee per box; others charge a rental fee until the cost of the trunk has been paid and then offer the trunk to schools free of charge. Trunk materials are increasingly being digitized as online resources grow and added onto museum websites for easier access (DeLeon 2010, 15).

Mayborn Museum Complex Discovery Box History

In order to gain information about the MMC's Discovery Box history, I spoke with a few Mayborn Museum staff members, as well as a former volunteer and coordinator of the program. Through these non-personal interviews I was able to gather information regarding the program's inception and programs of influence.

The Sue and Frank Mayborn Natural Science and Cultural History Museum Complex opened in 2004, unifying what were formerly three separate facilities: the Strecker Museum (natural science and cultural history), the Ollie Mae Moen Discovery Center (a children's museum), and the Governor Bill and Vara Daniel Historic Village (an open-air living history museum). The Strecker Museum began in 1857 as the Baylor University Museum. John Kern Strecker became curator in 1903 and served until his death in 1933. The University Museum was named in his honor in 1940 by the University president at the time, Pat Neff. Although now a part of the MMC, the Strecker Collection continues to be preserved and studied.

The Waco City Council PTA started the Youth Cultural Center in 1962. It was created to give children "a place to look, think, and learn." The center's name was changed to the Ollie Mae Moen Discovery Center in 1994 in honor of Mrs. Moen who helped found and run the center until 1982. In 2003 the center was closed as a separate entity; however, its educational programs, hands-on exhibit concepts and public use collections were integrated into the Mayborn Museum Complex when it opened in 2004.

The Governor Bill and Vara Daniel Historic Village was donated to Baylor University, and moved to the campus from Liberty in 1985. The Strecker Museum director orchestrated the 213-mile transport of twenty-three structures at the time, Calvin

Smith (Gerhardt 1995, 66). By convincing the Texas Association of Structural Movers to "adopt the move as a Texas Sesquicentennial project, donating its time, equipment, and expertise" (Gerhardt 1995, 68). The Village was dedicated and opened to the public in 1991. The Village has undergone considerable structural restoration over the past twenty years and is currently being renovated and redesigned, with a grand reopening planned for 2012.

The MMC is the largest museum in the region and offers exhibits and activities for the entire family including discovery rooms, natural and cultural history exhibits, Baylor University history exhibits, a historic village, and a wide variety of temporary exhibits. The MMC also houses the Department of Museum Studies, which offers a graduate degree and undergraduate minor for Baylor University students.

The Discovery Box outreach program was granted funding in 1984 through the Junior League of Waco. The program was invented and developed about a year earlier at the suggestion of Houston McGaugh, who was the Education Director of the Strecker Museum at the time. McGaugh was inspired by the Smithsonian National Museum of Natural History (NMNH) exhibit called "Discovery Room," that opened its doors in 1974.

The Discovery Room was the first place in a museum devoted to collections, where visitors were allowed to touch sample objects, such as skulls, fossils, plants, and cultural artifacts. It began in 1967 as an experiment. Caryl Marsh, a psychologist working as a special assistant to the Secretary of the Smithsonian Institution, was asked to advise about how to improve a small exhibit for the Anacostia Neighborhood Museum in the District of Columbia (White 1991, 1).

The exhibit consisted of about a dozen boxes, 10x16x5 in size. Each box was

crammed with a different category of objects; shells, minerals, fossils, mounted

butterflies and insects, pottery, arrowheads, even miscellaneous artifacts'…Visitors

took boxes from the open shelves to a table where they could sit and examine

things at their own pace (Marsh 1987, 3).

With this experience in mind, Caryl Marsh envisioned a similar exhibit in the National

Museum of Natural History on the Mall downtown. The director of the Museum of

Natural History agreed to the plan, and Judith White came from the Boston Children's

Museum to be part of the planning effort. In 1972, the National Science Foundation

provided a $50,000 grant to support development of the "experimental touch exhibit"

(Marsh 1987, 4).

McGaugh wanted to blend this idea with one that local teachers had been

suggesting to the staff at the Strecker Museum (prior to it being the Mayborn Museum

Complex) for years, that artifacts be loaned to teachers to take back to their classrooms

and extend their learning from the museum field trips. The education staff brainstormed

ways for teachers to access objects and artifacts and they came up with Discovery Boxes.

The first three boxes the staff knew they wanted to create were based on the most popular

exhibits at the Youth Cultural Center (later changed to the Ollie Mae Moen Discovery

Center in 1994); Native American, Pioneers and Mammals. Because the Strecker

Museum was part of Baylor University, the staff decided to ask Baylor's School of

Education to take on the initial curriculum designing of these three boxes using state

standards. Students in the School of Education drafted and outlined brief teacher packets

for each box.

The design of the box was decided based on weight, size, durability and price. Teachers wanted boxes that were big enough to carry a substantial amount of specimens and artifacts but not so large that they could not carry it to and from their schools. The box decided on was made of a sturdy and durable cardboard that was 2 ½ by 1 ½ feet in size. In order to keep the cardboard looking clean and unharmed the staff decided to cover it with contact paper. The education staff also worked with the collections department at the Strecker Museum to fill the boxes with secondary specimens and artifacts without provenance that could be handled by students and teachers. The education staff worked with local area teachers to figure out the appropriate amount of time for each box to be loaned as well as the check-in and check-out process. Teachers wanted the boxes in their classrooms for a week at a time, but stressed the need to pick up the boxes a few days before the week started in order to prepare.

Evaluations were inserted into each box for teachers to give recommendations and new boxes would be created or updated based on teacher suggestions. Environmental themed boxes were created in the early 90s in support of the Keep Waco Beautiful organization. This nonprofit organization was founded in 1985 to campaign for beautifying the city through cleaning, recycling, and educating and creating community awareness. Strecker Museum tours also provided ideas for new boxes for example, the "Christmas Around the World" tour led to the "Christmas Around the World" themed discovery boxes.

The staff entertained the idea of going into schools with the boxes to give short presentations, however logistically the staff was never large enough to execute the idea effectively. The boxes promoted themselves quite rapidly by word of mouth throughout

the 1990s. Teachers would often share the boxes with other teachers at their campuses and teachers would find out about the boxes on field trips and request them. Teachers began to check out boxes months in advance and would plan their curriculum around the boxes because the hands-on experience with specimens and artifacts enhanced their lessons and student learning.

When the Strecker collection and the Ollie May Moen Discovery Center were integrated into to the Mayborn Museum Complex in 2004, the boxes went through a brief decline in use because the museum could now facilitate more classes and learning in the museum. However, not long after the new MMC began operation, the boxes went through a revamping and materials were updated extensively giving teachers more specimens and artifacts to share with their classrooms.

As of the 2010-2011 school year, the MMC Discovery Boxes consist of six categories: International, National, Natural Science, Physical Science, Health, and Environmental. There are eleven International boxes, six National boxes, sixteen Physical and Natural Science boxes, four Health boxes, and two Environmental boxes. Each set of boxes contains a broad range of specimens and artifacts, hands on materials, posters, media and books. Teachers may reserve any of the boxes free of charge for one week at a time by contacting the coordinator of the program. The boxes may be reserved weeks or months in advance and the boxes are to be picked up and dropped off at the Mayborn Museum Complex. The teacher's requests are logged into an electronic events calendar, as well as recorded on a paper calendar for organizational purposes.

Within each box is an inventory sheet for teachers to use when unloading and reloading the box. A museum worker checks in every box when the box is returned to

ensure that materials are present or replaced if broken. Inventory sheets are replaced and updated when new materials are added or taken away.

According to the "2010-2011 Discovery Box Usage" data, the boxes have been checked-out by twenty-four different K-12 area schools (public, home school, and private), a total of eighty times; which is four boxes per week on average. Jill Barrow, former assistant director of education at the MMC generously provided this overview of Discovery Box history (Barrow 2011).

Implementation of Redesign Project

Pre- Interview with Teachers

My project was contingent on teacher participation, so one of the first steps involved finding local area teachers. However, not just any teacher could participate. Because my main goal was to collect feedback that would inform changes, I needed teachers who have already used the boxes and felt comfortable evaluating materials in a candid manner. A teacher who had never used the boxes with his or her students would not be able to give informed options, recommendations or suggestions about the materials or lessons.

To locate teachers who fit my criteria I worked with the MMC Education Coordinator to compile a list of potential teacher participants. Teacher names were pulled from the Discovery Box calendar, which lists the dates a teacher checked out a specific box and his or her contact information. The calendar was useful in determining which teachers were consistently checking out boxes, and thus had a lot of experience. I anticipated that the teachers who checked out boxes frequently would be more likely to participate because of their strong relationship with the museum and staff. Additionally, the calendar allowed me to anticipate which boxes teachers would probably want to evaluate based on the time of year. By examining each month of the calendar it is easy to see the social studies or science curriculum being taught. I examined the month of November, which was the month that the participants would receive the redesigned boxes to evaluate the changes. Taking note of the most popular boxes checked out at that time,

I had the Education Coordinator reserve those boxes for me until the interviews were conducted to ensure that I had access.

The next step of this project involved the creation of a set of interview questions (Appendix A) and an efficient interview process for teachers that would allow me to gather information in order to appropriately redesign each Discovery Box. The interview questions needed to be broad enough so that teachers could evaluate the materials and objects without feeling that they were being led in any direction, and specific enough to efficiently evaluate all of the content within each box and the program in general. Thus, the interview was split into two sections: 1) past experience with previous Discovery Box program; and 2) suggestions for redesign based on a hands-on evaluation of the actual box and its content.

In order for the interview process to run efficiently and effectively I decided to interview both teachers from each campus at the same time. I emailed the interview questions, consent forms, project timeline and any other related documents a week prior to the interview to fully inform each teacher on the project and its methodology. All of these documents would be presented to the teachers in a file folder upon the actual interview meeting as well.

Each interview followed a similar format. I explained the purpose of my project and the teacher's role in informing the redesign of the Discovery Box program. The teachers read and signed the consent form and answered questions about their past experience with the boxes. Then, I allowed the teachers to look through the box they requested and describe any elements out loud that needed changing. I wrote all of their feedback on sticky notes as they described each suggestion. The sticky notes were

attached to the actual object or materials, so I would be able to easily identify which objects needed changing.

The average interview time was 45 minutes. The three groups of teachers were able to provide me with a sufficient amount of feedback on past experience as well as suggestions for redesign within that time frame. After the interviews were completed, I compiled the information into a chart in order to better analyze the data (see Appendix B)

Data Summary

The data indicated that the teachers had similar past experiences with the boxes. All of the teachers reported that the following elements in the box were helpful: hands-on elements, videos, protective packaging of the items, books, and free access to the boxes. Comments from teachers included the following regarding past experience with boxes;

- "I like to check these boxes out to show my students objects that I don't have access to otherwise."

- "My students LOVE to touch all the objects in the discovery boxes."

- "My class enjoys when I check out discovery boxes because they are always so anxious to see what is inside of the box. They love being able to see and touch things from different places."

The teacher pairs varied in finding these areas helpful: visual aids, curriculum binders, cassettes or CDs. Interviews revealed that Discovery Boxes were used in different ways, depending on their curriculum. Some used the boxes in a small group to focus on specific objects that tied in with their content that week, and others used them in a large group to supplement the content. The actual time students spent exploring the box throughout the week varied from an hour to three hours. Each teacher said that they

usually passed the box from one classroom to another, which limited their time with the box.

As far as the check-in and check-out process, teachers reported the following suggestions for improvement: more information for each box available on the MMC website (i.e. pictures, inventory lists, descriptions), rating system on the MMC website according to grade levels the boxes target, a "welcome sheet" with instructions for first-time users, and more assistance from staff when picking up the boxes (i.e. have a cart available).

The elements that teachers felt were missing from the boxes were: media in the format of a DVD or CD, first time user information labels on all objects, activities that utilize materials from the box, updated posters, books, and variety in artifacts and specimens.

All of the teachers stated that the curriculum binders were moderately or somewhat helpful. Teachers thought that the appearance of the curriculum binders made them look out-of-date, unorganized and cumbersome. The consensus on the content was that no major changes were necessary except some updating, but the format was the biggest deterrent in utilizing the information. Every teacher suggested that the curriculum be accessible on a CD so that they could explore the content, and duplicate the lessons, activities and hand-outs. Teachers also suggested that online resources for students and teachers related to the content be included in the curriculum binders. Comments from teachers regarding the above conclusions are as follows;

- "I don't usually look at the binders because we follow the CORE Knowledge Curriculum. Also because I have already written my lesson plans by the time I check out the box. "

- "I do find the material helpful. However, it would be a little difficult to navigate without reading the entire thing multiple times."

- "A CD could be helpful if it had printables or interactive resources that could be used on my one classroom computer or a T.V. I could check out."

- "Lesson plans and activities on a CD or website would be helpful. I might be able to use the lessons if I could read them before the week I check out the box."

Every teacher offered suggestions for specific items they would like to see in the box, and some offered suggestions about where to order the items. It was clear that the hands-on element offered in Discovery Boxes is the driving reason behind teachers reserving them. It was not so much that the teachers wanted more materials, but they wanted current materials and resources that were directly related to the actual objects and specimens rather than the general theme of the box. For example, in the tree box there were only seed specimens from Texas, but most of the books and information were about trees from other states. Teachers wanted information, activities, and books about Texas trees so that they could get more use out of the Texas tree specimens.

Research, Order, Redesign

After compiling the data for each Discovery Box, new materials needed to be ordered. To keep the ordering information organized, I put together a purchase order that consisted of vendor names, websites, and prices. I tried my best to prioritize the teacher's suggestions for materials, and narrow down the amount of items in order to keep the boxes from becoming too heavy. After all, the teachers were interested in quality and not quantity.

Collaborating with the MMC education staff to accomplish the ordering process, I submitted a draft of the purchase orders to two education staff members and was open to

any feedback or direction they might have. I used vendors that the Mayborn Museum Complex has used in the past, though a few new vendors were explored. One of the local vendors offered a unique DVD about Native Americans in Texas. However, upon further action I found that the videos were not to be used for educational purposes on a large scale.

Each box required its own set of modifications and new materials; however, a few similarities can be noted. The common theme among the media materials was the format; in that teachers requested materials that would be accessible in DVD or CD format. The old VHS and cassette tapes were no longer useful to these classroom teachers. When possible, each VHS and cassette tape was replaced with at least one DVD and/or CD. VHS tapes that contained valuable content were kept in the boxes if no DVD replacement was available. Another common issue was accessibility; each teacher stressed the importance of properly labeling each item and providing a well-organized system allowing the boxes to be used to their full potential.

Each box had its own specific set of strengths and weaknesses as far as content and materials. The Tree Box for example was rich in specimens but lacking in media, books and other informative materials. As a result, I ordered a DVD, and several books and posters, as well as compiled an extensive set of related lessons from reliable online sources.

The Native American Box was also lacking in media, but most of the teacher issues were curriculum-related. Teachers requested that the binders incorporate more activities, lessons, and resources aimed at grades Pre-K- to 1st. They found that the information was heavily aimed toward 4th- 6th graders, with too much text and an

insufficient amount of visual images and photographs. I ordered several activity books

that offered lessons to Pre-K and elementary grade levels, illustrated story books, a DVD

and a few new objects. I also found several quality online resources for teachers that

included digital workbooks, packets, and manuals that were added to the CD.

The Japan Box was mostly lacking in content, although there were a few more

items that were desired as well. Teachers requested more resources (booklets or online)

they could duplicate for their students; such as pictures, games, activities, facts and

stories. I ordered two DVDs, a few new objects, and an activity book. Additionally,

numerous online resources for teachers and quality digital images were located and added

to the CD.

The first organizational step involved redesigning the inventory sheets for each

box and labeling every object with a description. With specimen and object descriptions

on each object, teachers and students no longer needed to refer back to the inventory

sheet. I chose to group items on the inventory sheet under two headings: "objects" and

"other related materials." Three-dimensional objects were put in the "objects" category,

and books, CDs, DVDs, posters, and any other teacher resource were put in the "other

related materials" category.

I further organized the DVDs or old VHS tapes in each box by creating a

summary and menu handout for the content. Teachers were adamant about needing a

menu or guide for the media in each box. The guide would help teachers prepare ahead

of time and save him or her the task of watching each DVD or VHS before using it with

their class. In order to make the guides, I watched each DVD and VHS and took brief

notes on the content in each chapter or each ten-minute segment if there were not

chapters. The summary guides indicate the length of each DVD or VHS as well as brief bullet point summary statements of the content (if chapters were not provided).

I also created and designed a set of mini lessons and suggestions, called Quick Tips. Quick Tips are a way for teachers to present brief overviews on a box related topic using specific objects and materials. They provide a list of the materials to use from the box, facts to share about the topic or objects, and questions to spark discussion. This is a way for teachers to access all of the objects in the box without having to put together elaborate lessons, research, or simply pass the objects around without any context or dialogue.

My goal for the content was to provide material that was easy to read and easy to adapt to any grade level K-6. There was no word limit or set vocabulary list applied to any of the text, I simply defined vocabulary words in the text if necessary and only included information that was directly relevant to the objects in the box. Having a background in creating lesson plans and teacher materials, I knew it was important to stay concrete, avoid abstract words, and create shorter sentences. With every topic I attempted to only include information that teachers could easily explain to their students since many of the teachers expressed concerns that lessons were either too advanced or too basic in the original teacher binders.

The MMC Education Coordinator edited each Quick Tips document. It was important that an experienced museum educator proof read the documents for errors, awkwardly worded sentences, or incorrect information. In addition, fellow graduate students proofread the documents.

In order to give the Discovery Boxes a unified look I created a welcome page that was titled Discovery Boxes 101. It was suggested by a couple of teachers that a brief overview of the box be provided in the form of a handout because teachers share the boxes with others who may be new to them. The welcome page is simple and straightforward. Each page uses the same style, page layout and font (See Appendix C).

To make the teacher binders, paper posters, and activity books in each box organized and accessible, they were converted into digital documents via computer. By digitizing the curriculum binders and organizing the content, teachers could quickly and easily browse through the lessons, activities and information (See Appendix C). The Riley Digitization Center on Baylor University campus provided the equipment necessary for this process and made this step possible. It took three hours to digitize over one hundred pages of text and numerous photographs and posters. Because the Mayborn Museum Complex is part of Baylor University there was no fee for the process, however, in the future the staff would need to make an appointment and reserve the equipment according to the center's policies. I was granted special access due to the short timeline of my project.

Once the documents were digitized I organized them into three categories: activities, lessons, and images. Each of these categories was uploaded into an electronic folder on the appropriate discovery box CD (Japan, Native Americans, Trees).

Post-Interviews with Teachers

The Discovery Boxes were delivered to each school at the end of the first week in November, and teachers used the boxes for two full weeks in order to ensure that each classroom had access to the box for one week each. Teachers were asked to participate in

a post interview evaluation within one week after the boxes were picked up. The post interview options consisted of a face-to-face interview, email, or a phone interview. Each team of teachers chose to email their evaluations. The post interview consisted of two guiding questions:

1) Did the modifications and/or additions prove effective? How so?

2) Was it significant enough to warrant the evaluation of other discovery boxes and possible modifications?

All six teachers agreed that the modifications and additions to each box were effective. Teacher pairs #2 and #3 particularly enjoyed the additional posters and books that allowed students to examine, classify and analyze objects further. Old posters as well as additional photos were still accessible to teachers through digital copies on each CD which teachers found helpful in case student copies were needed. Additional labels on objects in each box allowed for teachers to present materials easily and quickly. This teacher shared that,

> " It is much easier to find things in the Ziploc bags because they are
>
> labeled on the outside than it was to find the sticker and then find the
>
> coordinating item on the list."

All of the teachers appreciated the additional curriculum in the format of Quick Tips, and no one voiced complaints about the original cumbersome curriculum binders being removed from the boxes. Quick Tips were able to direct teachers to objects without sorting through pages of curriculum or having to research the objects and their context. All of the teachers valued the DVD option, even if their class was not able to view them in their entirety. Teacher comments included;

- "The Quick Tips made it a lot easier to share the objects in the box. "

- "I found it very beneficial and useful to explain the different articles in the box."

Teachers also enjoyed the CD because they could copy lessons and printables they did not have time to teach this year, but would be prepared next year when they planned to check out the box again. As one teacher shared,

> "I love the CD. The images and online resources are great. I am not sure
>
> if you intended for this or not, but I was able to save the contents of
>
> the CD onto my computer so I can plan ahead next year."

The overall new look to the materials was successful, as most of the teachers mentioned liking the style, format and layout of the inventory sheets, welcome and Quick Tips documents. Even though the box itself did not change in design, this small alteration seemed to give the boxes a more organized look and feel. One teacher wrote,

> "I also enjoyed the new look and improved organization."

The one structural element that needed tweaking was the adhesive used to attach the welcome instructions to the box. Every teacher mentioned that the adhesive was not sticky enough and they suggested a stronger one so that page protectors did not sag or fall off the box. A few of the teachers also mentioned that a sturdier box with wheels would be helpful in transporting the boxes from classroom to classroom, as the boxes weigh close to twenty pounds.

Each teacher agreed that the changes made to each box were necessary enough to warrant evaluations on other boxes. Specific boxes were even recommended by each teacher, as they had other boxes in mind that would benefit from similar modifications. The boxes frequently mentioned in the post interview were Rainforest, Space, Insects and Weather. Throughout the process I received several emails from teachers that heard

about the project from participants and wanted to suggest changes to other boxes they

checked out in previous months. These emails were another indicator that the redesign

process could benefit other boxes. Comments from teachers regarding changes to future

boxes include the following;

- "You have absolutely upgraded this discovery box across the board, and I believe

  this is good precedent for updating the other boxes similarly, if you have the time

  and interest for doing so and if Mayborn museum agrees. I know the Rainforest

  and Weather box are ones we have used and would benefit updates"

- "It's been great. If similar things happen to the other boxes, that will

  make them so much better. Space, Rainforest and Insect box would be great to

  update."

- "The improvements made in the box would be an advantage to the rest of the

  boxes like the insect box for example."

Special Considerations

Teachers are extremely busy professionals, and in order for redesign to be

successful, multiple forms of communication needed to be implemented throughout the

entire redesign process. I communicated with teachers in person, on the phone, and

through email; however, each of these forms of communication had their own set of

challenges. Setting up the face-to-face initial interviews was not an easy task, several

teachers who were interested at first were no longer interested when they realized there

was a forty-five minute hands-on initial interview involved.

Measures were taken in order to make this interview time-efficient, however that

was not always possible. For example, each participant was given ahead of time a

summary of the project, a condensed timeline, sample interview questions, and a copy of the consent form they would need to sign in person. Although the teachers were grateful to receive all of this information in advance, only a few teachers had the time to read through the information by the time of the initial interview. This made for a lengthy initial interview with two teacher pairs, which involved going through each of these documents together and answering questions that were already answered in the documents sent earlier.

Flexibility was required in determining the time, place and date of the initial interview. Having teaching experience myself, I anticipated the teacher's overloaded schedules, and suggested an interview between 3:30-5:00 pm. As far as location, I also anticipated that teachers would appreciate meeting in their classrooms versus coming to the museum. One pair of teachers came to the museum because of an unexpected scheduling issue, however this location ran just as smoothly as the classroom visits because both parties were willing to make last minute adjustments.

It should be noted however that this communication, scheduling, and interview process ran smoothly (despite obstacles) because of the strong relationships the staff at the Mayborn Museum Complex already established with local area schools. Teacher participants had years of previous exposure to the museum that allowed them to gain a solid understanding of the staff, program and facilities. It was obvious by the consistently displayed patience and consideration that teacher participants had a strong sense of belonging and loyalty to the MMC that overflowed into the project.

Recommendations

There are several areas to consider if the MMC education staff continues in the collaborative redesign process. For staff to gain insight into ever-evolving teacher needs an evaluation should be created and given to teachers who frequently check out boxes. Clearly a forty-five minute person-to-person evaluation is not a feasible option for full-time museum staff or teachers, however a written evaluation might prove successful. Because some boxes are checked out more frequently than others, it might be strategic to begin offering evaluations with those that are frequently checked out. Additionally it might be effective to invite long standing participant teachers of the program to evaluate materials and make recommendations.

Another possible option could be to invite local area teachers or graduate students in the School of Education or Museum Studies to write and edit. These participants would need to be passionate about teaching and the project and committed to communicating with staff in the Education Department who had experience working with collection objects. Perhaps summer sessions could be a way to begin recruiting local teachers to evaluate boxes and edit text, as they are on vacation and programming at the museum is flexible. Input from local area teachers on content and materials in each box would ensure that the boxes stay current, focused, uncluttered, and meet the needs of learners. Over the years it is clear that these boxes accumulate a considerable amount of suggested materials from staff or volunteers that check the boxes in and out. Some of the added materials or resources might be beneficial to teachers, but it also might overwhelm or distract them as interviews indicated.

Utilizing the experienced teaching staff at the museum to write and edit more

"Quick Tips" documents for popular boxes would also contribute to the boxes overall usefulness. Post interviews revealed that teachers appreciated having the option to easily present the objects and share about them through Quick Tips versus feeling that they had to follow a formal lesson. As one teacher indicated,

> "As a teacher I loved the convenience of the CD from which to print selected worksheets, as well as the Quick Tips. For example, there is one about "Indian corn": I made copies of this page and placed them on a tray with a couple of real ears of multicolored Indian corn; the children were encouraged to shade with colored pencils their own version of what Indian corn looks like."

This task would clearly require a framework and procedural outline in order to create quality documents and keep the staff from feeling overwhelmed.

Even without more teacher input the staff can move forward in two areas that data shows important to teachers, the first area being design. In order to create continuity within the boxes I used the same document layout, design and format within a program called Microsoft Pages offered through Apple. This program provides the user with numerous professional templates that are simple to access and format. After testing the quality of the documents and program accessibility, it was chosen as the main software for the Discovery Boxes. The positive response from teachers about the new "look" of the materials suggests that purchasing this type of program would be a wise decision for the staff in order to create a professional and unified look for the boxes. It would also provide a sustainable design versus the hodge-podge of styles that each box has acquired over the past decade.

The primary interview indicated that each teacher desired a dynamic and functional Discovery Box website. The current MMC website has a link that provides teachers with rental procedures, basic information about what each box will provide, a list of the boxes available, and a few image examples of the contents inside of boxes. Teachers suggested that each box have a link to an image of its contents or the inventory sheet. Theme related online resources, packets, and activities were also items teachers desired on the website. Preparation was the driving force behind these suggestions. Teachers want to feel prepared before the box is in their classroom, so that they can get the most use out of the materials and artifacts. With online resources and extensive information pertaining to the boxes, teachers have the opportunity to prepare and plan ahead of time.

Discovery Boxes seem to be a museum outreach program that teachers will always find helpful, especially if public school budgets continue to shrink. As Tamar Lewin noted in a *New York Times* article on April 21, 2010,

> Over the last few years, many schools have eliminated or cut back on museum
> trips, partly because of tight budgets that make it hard to pay for a bus and
> museum admission, and partly because of the growing emphasis on "seat time" to
> cover all the material on state tests. To make up for the decline in visits, many
> museums are taking their lessons to the classroom, through traveling programs,
> videoconferencing or computer-based lessons that use their collections as a
> teaching tool (Lewin 2010).

Improving and developing outreach will prove beneficial to museums that want to maintain and strengthen their school partnerships. This is true regardless of good

economic times where field trips are plentiful or times of budget cuts and fuel restraints. The literature review confirms that these cycles are inevitable and good outreach programs help meet needs as they arise.

Conclusion

In order for the museum-school relationship to thrive through outreach programs, museum educators must respond to the constantly changing economic and educational landscape. As history has proven, educational programming is affected by everything from curriculum reform to economic downturns. Though the concept of Discovery Boxes is timeless, its value is contingent upon appropriate implementation that correlates with these changes. Genuine collaboration between museum educators and teachers is a way to achieve this implementation, and enhanced learning experiences for students are the result (Griffin 2007, 40).

Collaborations require that several individuals and organizations unite in order to strengthen programming and create something neither could establish independently (Wojton, 206). This project proved that teachers are both willing and excited to give suggestions and feedback in order to make a long-standing program even better. Of course, obstacles and challenges did present themselves during the process but the end result of a strengthened program was worth the hard work.

This project was limited to one museum outreach program; however, lessons learned could benefit other museums, which have existing outreach programs involving trunks, kits, or boxes. The findings can help readers to better understand the process involved in collaborating with educators to better meet their needs in the classroom. Defined in this project are possible options when partnering with the public to evaluate

programs, as well as logistics such as scheduling, interviewing, and working with staff and teachers to achieve learning goals. The interview data summary can be of particular value to museum educators gauging teachers' needs in the 21st century classroom. Additionally, the variety of redesigned materials can serve as a catalyst in brainstorming sessions to get staff thinking about new design styles or options to replace outdated ones. A roadmap is always useful when exploring uncharted territory, and this project serves as a viable guide to any museum educator attempting to take on a similar venture.

APPENDICES

Teacher Interview Questions (Prior to Redesign)

Name of School: Date:

<u>Past Discovery Box Experience</u>

Which Discovery Boxes do you check out most frequently?

Is the check out and check in process efficient? If not, what suggestions might you have?

In which curriculum unit (s) have you integrated the boxes?

Did you plan on integrating Discovery Boxes into your curriculum this year? When?

What did you find helpful about the Discovery Boxes?

What do you remember your students enjoying the most about Discovery Boxes?

Did 3-D objects enhance student learning? How?

In what capacity were Discovery Boxes used in the classroom (ex. Small groups, centers, whole group)?

<u>Recommendations</u>

What elements do you feel are essential to these boxes?

What elements do you feel are missing from the boxes?

In regard to the curriculum binders included in some of the boxes; do you find the material helpful? If not, what would you suggest to replace it?

Would related or suggested activities in the format of a CD be useful?

Teacher Interview Questions (Post Redesign)

Did the modifications and/or additions prove effective? How so?

Was it significant enough to warrant the evaluation of other discovery boxes and possible modifications?

Discovery Box History Interview

Date:

<u>Inception</u>

What role did you play in the creation of Discovery Boxes?

Can you describe the process/steps involved in creating the Discovery Boxes at the Mayborn Museum Complex?

What were the original reasons behind creating this type of outreach program?

Which models or resources were consulted to create the boxes?

Teacher Pre Interview Conclusions

What is helpful about the Discovery boxes?	Campus A	Campus B	Campus C
Hands on elements (artifacts, specimens etc)	✓	✓	✓
Visual Aids (posters, pictures)	✓		✓
Curriculum in Binders	✓		
Videos	✓	✓	✓
Cassettes or CDs			
Packaging (how items are protected/organized)	✓	✓	✓
Books	✓	✓	✓
Free Access to the boxes	✓	✓	✓

Suggestions regarding check in/out process	Campus A	Campus B	Campus C
More information on procedures (or clearer)	✓	✓	✓
Pictures of what is inside each box on the website	✓	✓	✓
Cart to wheel boxes to car	✓		
More assistance	✓		✓
More information per grade level on the website	✓	✓	✓
A rating system on the website		✓	

What elements do you feel are missing from the boxes?	Campus A	Campus B	Campus C

	Campus A	Campus B	Campus C
Videos that are in DVD format	✓	✓	
First time user information	✓		
Labels on all 3-D objects	✓	✓	✓
Online Resources	✓		✓
Quick activities that go with specimens	✓		✓
Newer Posters	✓		✓
Magnets for Posters	✓		
On level materials for prek and K	✓	✓	
Updated Books/ Materials	✓	✓	✓
Various examples of artifacts or specimens to compare and contrast regionally	✓	✓	✓
Accurate descriptions of objects		✓	✓

In regard to the curriculum binders included in some of the boxes; do you find the material helpful?	**Campus A**	**Campus B**	**Campus C**
	Somewhat	Somewhat	Somewhat

If not, what would you suggest to replace it?	**Campus A**	**Campus B**	**Campus C**
Continuity among the organization of each binder	✓		✓
An index that is aligned with activities to do with materials in the box	✓		✓
Organize binder by grade level	✓	✓	✓
More handouts and diagrams that teachers could duplicate	✓	✓	✓
Convert the binder to something accessible on a computer	✓	✓	✓

Other Suggestions	**Campus A**	**Campus B**	**Campus C**
	New design for the box- possibly plastic?	More complete fur skins of animals so that students can see that is came from a specific animal	More artifacts
		More pictures of buffalo	

APPENDIX C
Created Discovery Box Materials

MAYBORN MUSEUM
DISCOVERY BOXES 101

■ hands on ■ interactive ■ experiential

In this box you will find...

■ 3D objects
■ activities and lessons
■ Quick Tips (ways to share materials with your students)
■ books
■ media
■ CD

(all items are listed and numbered on the inventory sheet)

On the CD...

Activities

If you are looking for informal printable handouts, games, or activities that are related to the theme of this box open the file labeled "Activities". A copy of "Quick Tips" will also be in this area if you want to make copies for students.

Lessons

If you are looking for formal (structured) lessons related to the theme of this box, open the file labeled "Lessons".
**For lessons that are labeled in "binders" be sure to select the page that you want printed to avoid printing more pages than desired.

Images

If you are looking for images that relate to the theme of this box, open the file labeled "images". These are images that can be easily printed or put into a powerpoint slideshow.

Online Resources

If you are looking for teaching resources related to the theme of this box or kid friendly websites open the file labeled "Online Resources"

EXPLORING OUR PAST—DVD

On this DVD you will find...

■ **23 minutes** of straight foreword summaries (in simple terms) that explain how different Native American tribes lived. Rich with visuals and footage of various tribes.

■ You have the choice of playing each chapter separately, with or without captions and or audio descriptions of each picture or image.

■ When you insert the disk you will be brought to a screen with options to turn on captions and descriptions.

■ You must choose one to get to the next screen which will show you the different chapters.

Overview:

Entire DVD is about 23 minutes long

■ **Chapter 1:**   The First Americans (2 minutes)

- Gives an overview of all of the tribes
    - How they dressed
    - Special customs
    - What their homes were like
    - What crops they grew/ animals hunted

■ **Chapter 2:**   The Native People of the Woodlands (5 minutes)

■ **Chapter 3:**   The Native Peoples of the Southwest (5 minutes)

■ **Chapter 4:**   The Native People of the Northwest (5 minutes)

■ **Chapter 5:**   The Native Peoples of the Great Plains (5 minutes)

M A Y B O R N   M U S E U M

EYEWITNESS PLANT-DVD

On this DVD you will find...

■ A **28 minute** overview of how plants grow, are used by humans and how certain people/ cultures have used and discovered plant life throughout history.

■ Although this DVD does not specifically address trees, it gives the same general information about plants that can be applied to trees. Also, when discussing forests, plantlife is very applicable.

■ You DO NOT have the choice of playing each chapter separately. Below is the breakdown of the DVD by increments of 10 minutes- which will allow you to fast foreword to a specific section.

Overview:

Entire DVD is about 28 minutes long

■ **First ten minutes discusses**

- How seeds begin growing and the cultures around the world that celebrate the growth of plants and harvest
- Gardens and images of the oldest gardens on earth, and different types of gardens that communities grow.
- Photosynthesis
- Rain and waters effect on plants
- The environments plants thrive within
- Power of plants
- Legends, myths and stories behind plants from different cultures

■ **Minutes 10 to 20**

- Enemies of Plants
- How plants are used to make other materials
- How plants protect themselves
- Flowers and pollination
- How flowers became popular
- Specific strange flowers

■ **Final 8 minutes**

- How plants and trees are used to make other materials
- How the first explorers charted out new plants and herbs
- How seeds are spread from one place to another
- How plants can nourish animals and humans

M A Y B O R N   M U S E U M

JAPAN REVEALED-DVD

On this DVD you will find...

■ A **52 minute** overview of Japanese culture throughout the main islands and major cities. Also included are several autobiographical interviews of japanese people who are various ages and hold various jobs. .

■ You DO NOT have the choice of playing each chapter separately- below is the breakdown of the DVD by increments of 10-12 minutes- which will allow you to fast foreword to a specific section.

***Pay attention to areas that show brief nudity in correlation with cultural practices**

Overview:

Entire DVD is about 52 minutes long

■ **First 12 minutes discusses**
  - Geography of Japan and different islands
  - Tokyo overview- transportation,
  - Mt. Fuji - Natural Disasters- Ring of Fire, Earthquakes
  - Seasons in Japan
  - Modern Geisha training for teenage girls (interview with a 15 yr. old Geisha in training)
■ **Minutes 12 to 20**
  - The typical modern day teenager (interviews with two teenage school girls)
  - Japanese Festivals
  - Geography of subtropical Islands in the south of Japan (focus on Yonaguni underwater city)
■ **Minutes 20-30**
  - Northern Islands of Japan
  - History of culture- traditions and religions of the people
  - New Technologies- The first android robot , footage from a "robo-1" competition
■ **Minutes 30-40**
  - Autumn in Japan
  - Geisha Kyoto dance festival
  - ***32 34- minutes- brief NUDITY when discussing tattoos**
  - The Island of Toba- Focus on Women who shell fish for a living
  - Winter in Japan
  - Earthquakes
  - Hot springs **(No visual nudity but men are in the hot spring unclothed)**
 - Japanese Snow Monkeys
■ **Minutes 40-52**
  - Honchu Island - The life of a Tuna Fisherman
  - Return to Kyoto and Dance Festival

TRAVEL TO JAPAN-DVD

On this DVD you will find...

■ A **47 minute** narrative overview of Japanese culture throughout the main islands and major cities. This video

■ You have the choice of playing each chapter separately- below is the chapter by chapter summary available through "Scene Select"
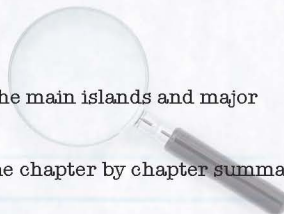
Overview:

Entire DVD is about 47 minutes long

- ■ Chapter 1:   Introduction (0:00-3:28)
- ■ Chapter 2:   Sumo Wrestling (3:28-8:44)
- ■ Chapter 3:   Kannon Temple (8:44- 12:39)
- ■ Chapter 4:   Hokkaido and Ainu (12:39- 18:23)
- ■ Chapter 5:   Hot Springs (18:23-21:39)
- ■ Chapter 6:   Central Japan (21:39- 25:23)
- ■ Chapter 7:   Religion (25:23- 27-23)
- ■ Chapter 8:   Gion Matsuri (27:23- 32:03)
- ■ Chapter 9:   Japanese Gardens (32:03-39:28)
- ■ Chapter 10:   Shikoku (39:28-41:08)
- ■ Chapter 11:   Rice (41:08-45:21)
- ■ Chapter 12:   Aiya Valley (45:21-47 or END)

M A Y B O R N   M U S E U M
TREE BOX INVENTORY

Objects/Specimens

7 samples of lumber
1. Birch (hardwood)
2. Maple (hardwood)
3. White Oak (hardwood)
4. Walnut (hardwood)
5. Yellow Pine (softwood)
6. Sugar Pine (softwood)
7. Red Wood (softwood)

8 samples of bark
8. Oak
9. Hackberry
10. Pecan
11. Mesquite
12. China Tree (China Berry)
13. Arizona Ash
14. Juniper

15. Tree Cross Sections
16. Acorn (bur oak)
19. Pine cone
21. Pine seeds
22. Magnolia seeds
23. Juniper cones (cedar)
24. Sweet gum
25. Sycamore
26. Elm seeds
27. Chestnut
28. Black walnut
29. Apple seeds
30. Pecans
34. Leaf and Seeds (20 pieces)
36. Leaves (6 pieces)
37. Eastern Red Cedar
38. American Elm
39. White Oak

40. Sweet Gum
41. Sugarberry
42. Red Mulberry
43. Box Elder
44. Sassafras
45. Black Cherry
46. Yellow- Popular
47. Shortleaf-pine
48. Black Tupelo
49. Bald Cypress
50. Flowering Dogwood
51. American Beech
52. Eastern Redbud
55. Coconut

Other Related Materials

16. a. Parts of Tree Poster
    b. Why Trees are Necessary Poster
    c. Tree Growth and Development Poster
    d. Types of Trees Poster
    e. Plant Kingdom Poster
17. Magnifying Glass (4)
20. Book: Tree Finder
31. Leaf Rubbing Plates
32. a. Eyewitness Video: Tree
    b. Eyewitness DVD- Plant
33. Book: Winter Tree Finder
35. Book: How Leaves Change
56. a. Book: A Field Guide to Texas Trees
    b. Book: Texas Trees- A Friendly Guide
    c. Book: Trees of Texas
    d. Texas Trees and Wildflowers Pocket Guide
57. Teacher Resource CD

M A Y B O R N   M U S E U M
JAPAN BOX INVENTORY

Objects

1. Red Sash
2. Flowered Kimono (girl)
3. Navy Blue Kimono (boy)
4. origami paper
6. Set of 2 pairs of geta (shoes)
7. Tabby (Sock)
8. Small Japanese Flag
9. Chopstick set
10. Japanese doll
11. Bento Box
13. Tea Leaves and Tea Pot
14. Wooden Japanese Dolls (2)
15. Umbrella
16. Stacking rice bowls
18. Silk Fan
20. Large Japanese Flag
21. Large encased Japanese Doll (in box 2 of 2)
22. Fish Kite

Other Related Materials

5. Book: Origami
12. Book: Lets Learn Japanese Picture Dictionary
17. Book: Passport to Japan
19. a. VHS- Japanese- American Heritage
    b. Travel to Japan
23. I Live in Tokyo
24. Japan: A Picture Book to Remember Her By
25. a. - i Photos of Japan and its culture

26. Bulletin board set
27. a., b., c., origami examples
28. a., b., c., Wooden Japanese Figures
29. Teacher Resource CD
30. a. Japan Arts and Crafts Activity Book
    b. World of Recipes Activity Book
    c. Discovering Japan Activity Book
    d. Travel through Japan Activity Book
31. Bag of Rice
32. Book- We're From Japan

M A Y B O R N   M U S E U M
NATIVE AMERICAN BOX INVENTORY

Objects

1. Three Projectile Points
2. Flint scraper
3. Small axe head
4. Mano
5. Metate
6. Pounding Rock
7. Mussel shell
8. Corn
9. Rabbit skin
10. Deer skin
11. Buckskin
12. Beans
13. Tipi Model
14. Totem Pole
15. Deer antler
16. Moccasin
17. a. Squash mat b. weaved basket
18. Drum and Drumstick
19. Weaving Sample
20. Dream Catcher
32. Rattle

Other Related Materials

21. Songs About Native Americans- CD
22. Authentic Indian Dances and Folklore- CD
23. More Than Moccasins : Book
24. If You Lived with the Hopi
25. If You Lived with the Cherokee
26. Draw, Write, Now: Native Americans- Activity Book
27. Primary: Native American Arts and Cultures- Activity Book
28. Native Americans: Thematic Unit
29. Native Americans: Projects, Games, Activities K-3
30. Regional Native American Poster
31. a. Parts of a Buffalo small handout
    b. Traditional Parts of a Buffalo small handout
    c. Grass house small handout
32. Teacher Resource CD
33. DVD

Quick Tips: Japanese Food

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different objects and have students observe how these items might be similar or different to anything they own.

○ Explain that Japan has many different kinds of food, but the main food served wherever you go is rice.

○ Chopsticks will also be found at every restaurant or home in Japan.

○ Another popular food item is fish- in many different ways. Sushi, boiled, fried, baked, raw.

○ Japanese Tea sets always have either three or six cups, but never four- because four is an unlucky number in Japan.

○ Share the following facts while students examine the objects.

ENGAGE

○ Compare and contrast the chopsticks to forks, the bento box to a lunch box or bag.

○ Look at a map of Japan and ask students why they think fish is such a popular food.

Materials

1.	Bento Box (#29)
2.	Tea Cup (#13)
3.	Chop sticks (#9)
4.	Bag of Rice (#31)
5.	Travel Through Japan (pgs 22 and 23)
6.	Noodle Shop Picture (#25)
7.	World of Recipes (#30b)

JAPANESE FOOD FACTS

- The Japanese eat with chopsticks known as hashi.

- The Japanese will shop daily for their meat, fish and vegetable requirements, as they like all their food fresh and unpreserved.

- This is one of the prime reasons that small and medium sized refrigerators are sold the most in Japan.

- Tea is served with practically all meals.

- Rice is a staple food and served at almost every meal.

- Sticky, short-grained rice is the staple food in Japan. Uncooked rice is called **kome**.

- Rice is grown in paddy fields and there are several thousand kinds of rice grown in japan.

- Miso soup is an all time favorite and could be served for breakfast, lunch or dinner. Its main ingredients are a soybean paste dissolved in a seaweed stock.

- A traditional Japanese breakfast is steamed rice topped with natto (fermented soy beans).

- In Japan you are expected to slurp while having liquids such as soups. If you do not, it is considered that you do not like the food and the host may feel offended.

60

Quick Tips: Japanese Traditional Clothing

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different objects and have students observe how these items might be similar or different to anything they own.

○ Explain that just like our clothing has changed over the past hundred years, so have the Japanese culture's.

○ The Kimono, Hakama and Geta are a few examples of types of clothing that were mainly worn in Ancient times.

○ Share the following facts while students examine the objects.

ENGAGE

○ Compare and contrast the kimono, hakama and Geta sandals with clothing we wear in America.

○ Think of the different types of clothing and types of shoes Americans wear for special events.

○ Clothing in Ancient Japan communicated how wealthy or poor a family was- how can clothing do this? What types of clothing do you think wealthy and poor families wore?

Suggested Materials

1.	fan (#18)
2.	umbrella (#15)
3.	Geta shoes (#6)
4.	kimono (#2, #3)
5.	picture of shinto costume (#25)
6.	Tabby Socks (#7)
7.	Japanese Doll (#10,#14)

JAPANESE TRADITIONAL CLOTHING FACTS

Kimono

- The word Kimono actually referred to all types of clothing. It also remains to be the national costume of Japan.
- Some of the earliest designs of the kimono were hugely influenced by the Hanfu, which is a part of Chinese clothing.
- During the 8th century, Chinese fashion trends gained popularity amongst the Japanese.
- This form of Japanese traditional clothing is always worn by women and particularly for special occasions.
- Today, kimonos come in a variety of styles and forms and designs.

Hakama

- This type of Japanese traditional clothing consists of a wide pleated skirt.
- Today, men as well as women wear the hakama but in the earlier days, the hakama was worn only by men.
- In the ancient times, the hakama was worn by the samurai so that the opponent would not be able to see the footwork.
- A hakama has around 7 pleats, which are a representation of certain virtues.

Geta (footwear)

- Geta are a form of traditional Japanese footwear that look like clogs and flip flips.
- They are a kind of sandal with an elevated wooden base held onto the foot with a fabric thong to keep the foot above the ground.
- They are worn with traditional clothing such as the kimono.
- Sometimes these shoes are worn in the rain or snow to keep feet dry.

Japanese Fans-

Made of paper on a bamboo frame, usually with a design printed on them.

The fan symbolizes friendship, respect and good wishes.

Umbrella-

Paper Japanese umbrellas (also referred to as "Washi" - "wa" meaning Japanese and "shi" paper) are typically made from the inner barks of three types plants mulberry, Mitsumata and Gampi.

Quick Tips: Japanese Origami

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

○ Have students try to create their own folded creatures without using a pattern.
○ Use your created origami creatures to tell a story. Create small groups, or work together as a class.

INTRODUCE
○ Have students sit in a circle and explain any procedures for handling paper/objects.
○ Ask students if they have ever folded paper to make creatures or animals?
○ Share quick facts while students look at examples and paper.

ENGAGE
○ Use the origami patterns to create your own!

JAPANESE ORIGAMI

- The word Origami comes from "ori" meaning folding and "kami" meaning paper.
- It is the traditional folk art of paper folding, which stated in the 17th century AD.
- The goal of this art is to transform a flat sheet of material into a finished sculpture through folding and sculpting techniques.
- Using glue or cutting the paper is not considered to be origami.
- The most well known origami model is the Japanese paper crane.

- Paper folding traditions can also be found in China, Germany and Spain.
- Origami is used during traditional wedding celebrations to represent the bride and groom.
- In Japan, origami is a sport, every year, an origami tournament called Yaru Sano Origami is held in Kyoto.
- Origami is traditionally made out of a square piece of origami paper, which can be white, colorful or boasting unique designs.
- Origami can also be made from coarse cloth, foil and even food.

Quick Tips: Buffalo

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different objects that demonstrate how the buffalo provided every day materials for the Native Americans.

○ Hold up the Buffalo picture and ask students if they can name what animal is in the picture.

○ Explain that this animal was hunted by most Native American Tribes. Also another name they have is Bison.

○ Share quick facts about the Buffalo as students are examining the different objects (or have students share them)

ENGAGE

○Have students name different objects, clothes, or items that come from animals.

○Ask students to think about what life would be like for the tribes without the objects that came from the buffalo. (Ex. What would it be like without blankets?)

	Suggested Materials
1.	Moccasins (#16)
2.	Tipi Model (#13)
3.	Drum and Drum Sticks (#18)
5.	Traditional Uses of the buffalo handouts (#31a.b)
6.	Small Axe head (#3)
7.	Native Americans: K-3 (pg.37)
8.	Pictures of Native Items (#34)

Check the CD for various printables on the buffalo under "Activities" and "Images".

BUFFALO FACTS

- Bison are the largest land animal in North America
- Bison live to be 12-15 years old, when living in the wild
- Bison calves are born in late spring.
- Bison calves weigh between 30-40 pounds at birth
- Calves stay with the mother for two years and then become independent
- Adult bison can run at a speed of 35 miles per hour
- An estimated 20 - 60 million bison roamed the plains during the early
- 1800's
- Due to slaughter by white hunters, approximately 500 bison remained in North America in late 1889.
- The Plains Indian tribes depended on the bison, and traveled wherever the herds went throughout the year.
- When the buffalo moved in search of greener grass, the Indians picked up all their possessions and moved with them.
- The buffalo was the central feature of Plains Indian culture.
- The Indians believed the Great Spirit put buffalo on the Earth to provide for them.
- Buffalo provided food, shelter, clothing, fuel, toys, ceremonial objects, and weapons among other things.
- Almost all the parts of the buffalo were used including the bones, teeth, tail, hair, skin, muscle fiber, tendons, horns, skull, meat, fat, tongue, dung, hooves, intestines, and brain.
- Tipis were made from buffalo skin as were clothes and moccasins; warm robes for the cold months were made from the hide and its thick wool.
- Even small boats called bull boats were made from buffalo skin.

Quick Tips: Hunting

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different objects that are related to hunting and have students try to guess what animals the Hunting Tribes hunted.

○ Hold up the arrow heads and have students touch and feel them carefully.

○ Explain that the arrow head was what attached to the end of a bow and arrow and allowed for Native American tribes to hunt for animals

○ Share quick facts about hunting techniques as students are examining the different objects (or have students share them)

○ Students can trace their own buffalo, hunter, using Draw, Write, Now)

Suggested Materials

|	
1.	**Three Projectile Points (#1)**
2.	**Rabbit Skin (#9)**
3.	**Deer Skin(#10)**
3.	**Buckskin(#11)**
4.	**Draw, Write, Now (pg 21, 15,)**
5.	**Pictures of Native Items (#34)**

HUNTING FACTS

- Bow and arrows come in different sizes and shapes, as well as materials used to contruct them.
- The Waco Indians hunted with bow and arrow, spears, clubs and skin covered shields.
- The shields were made of thick leather and decorated with feathers that would fly in every direction during battle.
- Some bows were 3-5 feet in length- taller than a man, in some cases.
- This weapon gave hunters accuracy, distance and speed in their shots.
- It allowed hunters to be more secretive. They could move up on and shoot their prey while crouching behind a bush or in tall grass
- Hunting was a man's responsibility.
- The task of butchering fell either to men or women, depending upon the tribe.

- The meat was usually distributed according to the regulations of the tribe.
- As a result, no one went hungry. The women and young girls were responsible for tanning the hides and preparing the meat.
- Most of the meat taken during the hunt was preserved for the future, dried as jerky or made into pemmican, a pulverized jerky soaked through with buffalo bone marrow fat.
- Before the Indians used horses, they hunted buffalo on foot, disguising themselves under the pelts of wolves, animals the buffalo did not fear.
- They also used a technique called the "surround" where they would surround a herd of buffalo until they got close enough to shoot their arrows and spears.
- They used a technique called the "impound" where they would chase buffalo into closed corrals, then kill them at a close distance.

- Hunting was an important part of the survival of the tribe.
- Animal hides could be used to make clothing, blankets, and glue.
- Animal bones were used to make needles, fishhooks, and knives.
- Animal tendons were used to make sinew rope.
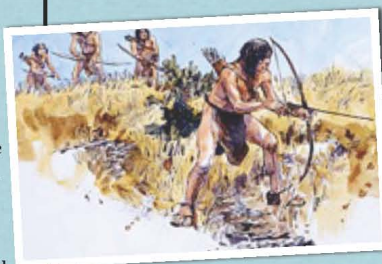
Quick Tips: Texas Native Americans

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Explain to students that there were many different types of Native American Tribes in Texas.

○An easy way to classify the types is by the different kinds of food they ate.

○Ask students if they can name different types of food they eat.

○Explain that there were fisherman, plant gatherers, farmers and hunters.

ENGAGE

○ Read through the general descriptions below of different tribes.

○You can assign each student a different group (farmer, fisherman etc) and have them stand up and make a motion when you describe them.

○Choose a book or DVD to show that describes(general) tribes in greater detail.

○Use the drum and drum sticks to show students the instruments that many tribes used to celebrate.

○The dream catcher can be used to talk about other kinds of common cultural objects that Native Americans made. Pass it around and share different dreams you can remember.

○Create a totem pole as a class and record the important events of the school year so far.

Suggested Materials

1.	**If You Lived with the Hopi Indians**
2.	**If You Lived with the Cherokees**
3.	**Exploring Our Past Comparing the Lives of Native People (DVD)**
4.	**Drum and drum sticks (#18)**
5.	**Dream Catcher (#20)**
6.	**Totem Pole (#14)**
7.	**Totem Pole Picture (#34)**
8.	**Draw, Write , Now (pg 23,**
6.	**Pictures of Native Items (#34)**

TEXAS NATIVE AMERICAN FACTS

Fisherman

- Fisherman tribes ate seafood, seeds, nuts- even locusts if hungry.
- They used alligator fat for bug repellans
- Used canoes for moving and fishing

Karankawa

- Lived near coast in winter/ moved inland during the summer

Plant Gatherers

- **Coahuiltecans**
  - Gathered nuts, seeds; pecans and acorns, mesquite beans.

Farmers

Waco or Hueco-

- corn was their main crop, and they also grew beans, squash, and watermelons.

- The Wacos were called "kidikittashe people (raccoon eyed people) because of the tattoo patterns around their eyes.

Hunters

Comanche

- Hunted buffalo, deer, bear, wild turkey, and other small animals that were abundant along and near rivers.

Drums

- There are four types of drums
- small hand drum- could be carried into battle
- larger drum- made from a hollowed log
- water drum
- basket drum
- The drum heads are usually made from animal hides.
- The drums are decorated with painted symbols and designs that have special meanings.
- The Native American never plays

the hide drums by tapping his hands- this is an African style. A drumstick is always used.

Dream Catchers

- Many tribes created spider web charms, or dream catchers.
- They are believed to trap bad or unimportant dreams that are floating in the air, much like a spider's web snares the insects that fly into it.

Totem Poles

- Native Americans used totem poles to record a families history, and they usually used an animal to represent important events.

Picture Writing

- Native Americans wrote with pictures using symbols. Often times they would draw on tanned pieces of animal hides.

Check the CD for various printables about totem poles, dream catchers and more, under "Activities" and "Images".

Quick Tips: Housing

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different objects that are related to Native American "housing" and have students try to guess why there were different kinds of houses.

○ Explain that the two main types of houses for the tribes in Texas were tipi and the grass house.

○ The hunting tribes used tipis because they were easy to move. The farming tribes used grass houses because they stayed in one place and the grass houses were more stable.

○ Share the following facts while students examine the housing.

ENGAGE

○ Map out a circle with tape on the floor, or have students create a circle (15 ft wide max) Discuss how this was the size of some of the Native American homes.

○ Think of what could fit inside of this are and what could not. What types of things would you have in your home if it were this small?

Check the CD for various printables about Native American housing under "Activities" and "Images".

HOUSING FACTS

- **Tepees** (also spelled **Teepees** or **Tipis**) are tent-like American Indian houses used by Plains tribes.
- The texas tribe that built Tepees were the Comanches.
- Tipi comes from two words "ti" means to dwell and "pi" means used for.
- A tepee is made of a cone-shaped wooden frame with a covering of buffalo hide.
- They are designed to set up and break down quickly.
- They are also built to stay warm in the winter and cool in the summer.
- They could stand up to very strong winds and severe rainstorms.

- Originally, tepees were about 12 feet high, but once the Plains Indian tribes acquired horses, they began building them twice as high.
- Tepees are good houses for people who are always on the move. Plains Indians migrated frequently to follow the movements of the buffalo herds.
- An entire Plains Indian village could have their tepees packed up and ready to move within an hour.
- **Grass houses** are American Indian homes used in the Southern Plains by tribes such as the Caddos.
- Grass houses are made with a wooden frame bent into a beehive shape and thatched with long prairie grass.

- These were large buildings, sometimes more than 40 feet tall.
- Building a house was a special event in the Caddo village.
- Both men and women, directed by several overseers, worked together in the construction.
- The thatch covering served as insulation as well, keeping the interior warm in freezing weather and cool on a hot summer day.

Quick Tips: Farming

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different objects that are related to Native American "farming" and have students tell you what they think Native Americans grew.

○ Explain they ate corn, beans, squash, pumpkins, and trapped animals.

• They also traded frequently with other kinds of natives.

○ The Mano, Metate, Pounding Rock and Mussel Shell were all used to scape, clean and grind the different grains.

ENGAGE

○ Show students how to use the Mano and Metate and grind corn. Have them demonstrate.

○ Pass around the different animal furs. How are the similar, and how are they different? Brainstorm what types of things could be made out of the fur.

○ Talk about the different tasks a farmer has to do each day. (Taking care of animals, watering crops, pulling weeds, planting new crops)

Suggested Materials

1.	corn (#8)
2.	animal furs(#9, #10, #11)
3.	Mano and Metate(#4, #5)
4.	Pounding Rock (#6)
5.	Mussel Shell (#7)
6.	Beans and Peas (#12)
7.	CD- (#22) Authentic Indian Dances &Folklore (listen to song #4)
8.	Pictures of Native Items (#34)

Check the CD for various printables about Native American farming under "Activities" and "Images".

FARMING FACTS

- Some of the Native American tribes like the Caddo and Witchita were farmers. That means they were more likely to stay in the same place to take care of their land.

- Farmers would store up their grains and it was common for some tribes to have 2 years worth of corn saved.

- Corn,maize beans, and squash were the most widely used plants in all of North America.

- These three plants were such important food staples that they became known as the "three sisters."

- Corn was ground into meal and baked, or soaked in ashes from the fire and boiled until the kernels softened into "hominy."

- Beans were mashed and baked into cakes, or mixed in stews with squash and corn kernels.

- Wild foods such as wild yams, blackberries, strawberries, acorns, chestnuts, and many more were gathered to add to the food stores.

- The foods we eat today would be very different if it hadn't been for thousands of years of plant knowledge and agricultural innovation passed down from the tribal people of the Americas.

- Over half of the current world food supply consists of food first grown in the New World!

Quick Tips: Tree Parts

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE
○ Have students sit in a circle and explain any procedures for handling objects.
○ Lay out the different parts of a tree.
○ Ask students to name as many parts as they can think of before you explain the poster.

○ Point out that these objects all represent the most common parts of every tree.
○ Share quick facts about tree parts as students are examining the different objects (or have students share them).
○ Pick sections of the poster set to read if the class wants to know more details about trees.

ENGAGE
○ Compare and contrast the texture, thickness, smell, and consistency of each piece of bark and lumber.
○ Compare parts of a tree to parts of the body. (Ex. The human body "core" is much like a tree trunk, the branches of a tree are much like arms on a human body).

○ Examine the samples of lumber and leaves and determine which you would use to make a tree fort or house based on their different qualities.

Suggested Materials

1.	Leaves (#36)
2.	7 samples of lumber (#1-#7)
3.	8 samples of bark (#8-#14)
4.	Parts of a Tree Poster
5.	Pine Cone (#21)
6.	Tree Cross Sections (#15)
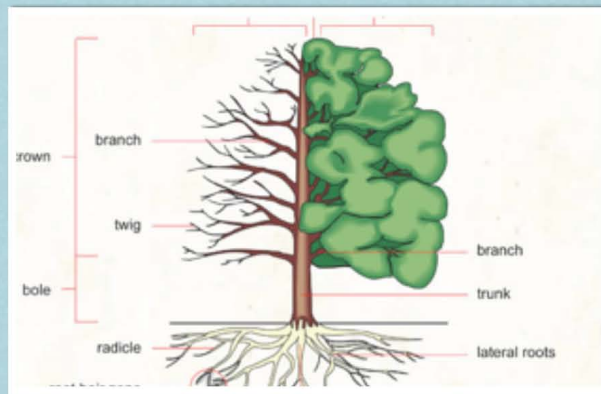
PARTS OF A TREE FACTS

- There are about 20,000 different kinds of trees
- Trees come in various shapes and sizes but all have the same basic structure.
- They have a central column called the trunk.

- The bark-covered trunk supports a framework of branches and twigs.
- This framework is called the crown.
- Branches in turn bear an outside covering layer of leaves.
- A tree is anchored in the ground using a network of roots, which spread and grow thicker in proportion to the growth of the tree above the ground.
- In a mature tree, most of the cells of the trunk, roots, and branches are dead or inactive.
- All growth of new tissue takes place at only a few points on the tree, by the division of specialized cells.
- These actively growing areas are located at the tips of branches and roots and in a thin layer just inside the bark.
- Trees have reproductive structures; either flowers or cones.
- Leaves, bark, twigs and fruit can make quick work of tree identification.

Quick Tips: All about Leaves

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different types of leaves and other materials.

○ Ask students why leaves are an important part of a tree.

○ Point out that each type of tree has a different type of leaf. (Refer to Poster)

○ Share quick facts about leaves as students are examining the different objects (or have students share them).

ENGAGE

○ Create your own leaves using the Leaf Rubbing Plates.

○ Look through Trees of Texas to identify some leaves that are on Texas trees. Match them with the leaves in the sets.

○ Find more details to share in How Leaves Change

○ Compare and contrast the different shapes, textures and colors of leaves.

○ Use the poster to define the shapes of leaves in the sets.

Suggested Materials

1.	Leaves (#36)
2.	Leaf and Seeds (#34)
3.	Leaf Rubbing Plates (#31)
4.	Parts of a Tree Poster (#16)
5.	How Leaves Change (#35)
6.	Trees of Texas: An Easy Guide to Leaf Identification (#56a)

LEAF FACTS

- Leaves are food factories of the tree.
- The typical leaf consists of a stalk (the petiole) and a blade—the thin, flat, expanded portion (needlelike in most conifers) that is normally green in color because of the presence of the pigment chlorophyll.
- Powered by sunlight, the green substance in leaves, called chlorophyll, uses carbon dioxide and water to produce life-sustaining carbohydrates.
- The entire process is called photosynthesis.
- Leaves are also responsible for respiration and transpiration.

- A tree's leaf is one major marker that helps in keying out and identifying any species of tree.
- Some leaves are flat and wide; others are spiky and thin. Plant spines (like cactus spines) are actually modified leaves.
- Most trees can be identified by the leaf alone.
- A leaf can either be simple (no extra leaflets) or compound (three or more leaflets).
- This leaf structure is always a help with tree identification because of each tree species' leaf structure.
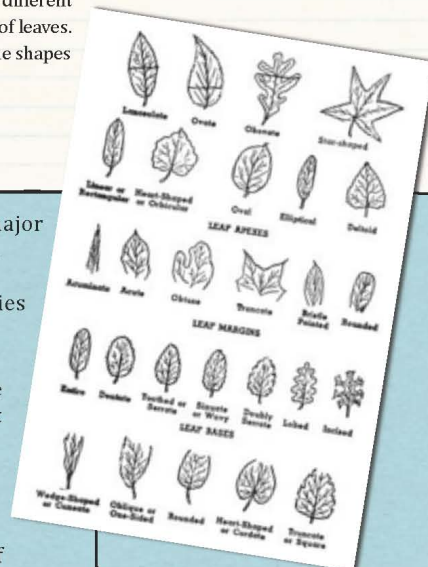
- On a simple leaf, the leaf blade is singly attached to a twig or twig stem.
- On a compound leaf, all leaflets are attached to a single leafstem or rachis.
- Veins support the leaf and are filled with vessels that transport food, water, and minerals to the plant.

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Quick Tips: Seeds

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different types of seeds and other materials.

○ Ask students if they can identify which seeds came from certain trees.

○ Point out that each type of tree has a different type of seed. The seeds are the beginning of the life of a tree.

○ Explain that seeds are produced from structures like the "pine cone" or any other seed pod, cone or flower.

ENGAGE

○ Compare the sizes of different seeds and group together similar ones. Look up pictures of the trees in the Identification books to see how the seed fully grows.

○ How is the life cycle of a seed similar to an animals or even humans? What types of things do each need to grow?

○ Use Tree and Leaf

Identification book to match the types of seeds that go with certain trees.

SEED FACTS

- Seeds come in hundreds of shapes and sizes, they all have the same purpose- to reproduce.
- The outer covering of a seed is called the **seed coat**.
- Seed coats help protect the embryo from injury and also from drying out.
- Seed coats can be thin and soft as in beans or thick and hard as in locust or coconut seeds.
- **Cotyledon** -They look like leaves and they are the first plant part you see when a seedling pokes its head out of the ground.
- Cotyledons help keep the new seedling fed until it can make its own food.
- Sometimes cotyledons are called seed leaves.

- **Monocot**- A plant that has only one cotyledon. Corn is an example.
- **Dicots** are plants that have two cotyledons.
- In a good year, an oak tree produces between 70,000 - 150,000 acorns per tree.
- Seeds remain dormant or inactive until conditions are right for germination.
- All seeds need water, oxygen, and proper temperature in order to germinate.
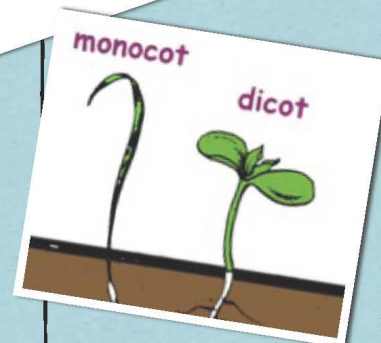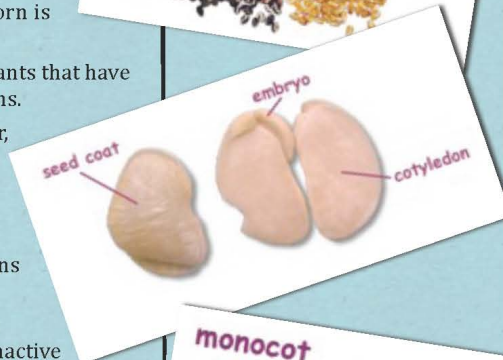
Quick Tips: Forests

These quick tips are suggestions for "quick" mini discussions or ways to share the items in the box with your students during a whole group or small group time.

INTRODUCE

○ Have students sit in a circle and explain any procedures for handling objects.

○ Lay out the different types of leaves, bark, "cookies" and other materials.

○ Explain that all of these objects help us to understand the parts of a tree, and lots of trees and plants make up forests.

○ Point out that there are specific types of trees that grow in each county of our state.

○ Example: McLennan County, there are mainly Live Oak trees.

○ Explain that seeds are produced from structures like the "pine cone" or any other seed pod, cone or flower.

ENGAGE

○ Examine the tree cookies and count the tree rings to find out its age. Line up the rings oldest to youngest.

○ Find out what year the year was cut down by pretending it was cut down today.

○ Figure out how many more years it would have to grow unit it had 30 rings.

○ Make a list of items in your classroom that were created from trees.

○ Discuss different ways forests allow us to do recreational activities.

○ Discuss how forests protect wildlife and provide homes for them.

FOREST FACTS

- The US Forest Service takes care of more than 193 million acres of the nation's forests and grasslands.

- These public lands include mountain tops and valley bottoms, temperate rain forests and high deserts

- They are home to a diverse number of species of animals, and countless species of plants.

- They also provide critical resources to the United States, such as wood products, grazing for livestock, wilderness and recreational opportunities.

- Forests affect nearly every aspect of our lives.

- Forest resources provide the raw materials for our homes, our workplaces, the books and newspapers we read, and the packaging that contains our food and other products of our labor.

- Forest ecosystems supply our water, maintain our climate, help purify the air, protect soils, and provide for wilderness experiences.

- Forests provide habitat for wildlife, and serve as preserves of biological diversity and as sources of food, fuel, and medicine for people throughout the world.

- They shape the recreational landscape, help stabilize our farms, and enhance our cities.

- Three main types of forests are tropical, temperate, boreal (refer to poster).

- Each of these forests grow at different parts of the earth and contain different species.

- Today, forests occupy approximately one-third of Earth's land area, account for over two-thirds of the leaf area of land plants, and contain about 70% of carbon present in living things.

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