DINOSAUR PROJECTS

By Carol Vaage

Abstract

Young children love studying dinosaurs and this book will share how several of my classes and I created the most amazing in-depth projects.

Carol Vaage
carolvaage@shaw.ca

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Introduction

These following dinosaur projects were some of the best times I've ever had teaching. Somehow young children are usually drawn to this topic. But apparently, not only young people.

In my retirement, I've had the chance to continue my learning and took a 3-week-long course on Paleontology through an organization for people 55+ called Edmonton Lifelong Learners Association. The course featured Dr. Phil Currie, renowned paleontologist from the U of A and associated with the Tyrell Museum in Drumheller.

In this course, Dr. Currie had invited his post-grad students to share their current research with us. As each student came to do their presentation, they were excited, but doubted that this audience could be interested in dinosaur research. But the questions that followed each presentation had each researcher coming alive with the positive response and interest.

Dr. Currie had asked each of them to share how they got into the paleontology field. Twelve of the thirteen graduate students got hooked in their field of study from loving dinosaurs as a child. The inspiration and wonder of learning about dinosaurs were fired up at a young age. There had been dinosaur books, models, birthday cakes. Some learned to read by studying the dinosaur names.

My reflection:

Interest in dinosaurs as a young child was the hook to becoming adult scientists for post-graduate university paleontology students!

The following compilation of dinosaur projects accumulated with eight different class's interests and studies. I've organized them, though, by aspects of the projects rather than by year, beginning with the inquiries, then ending with all the supportive elements that fueled the inquiries.

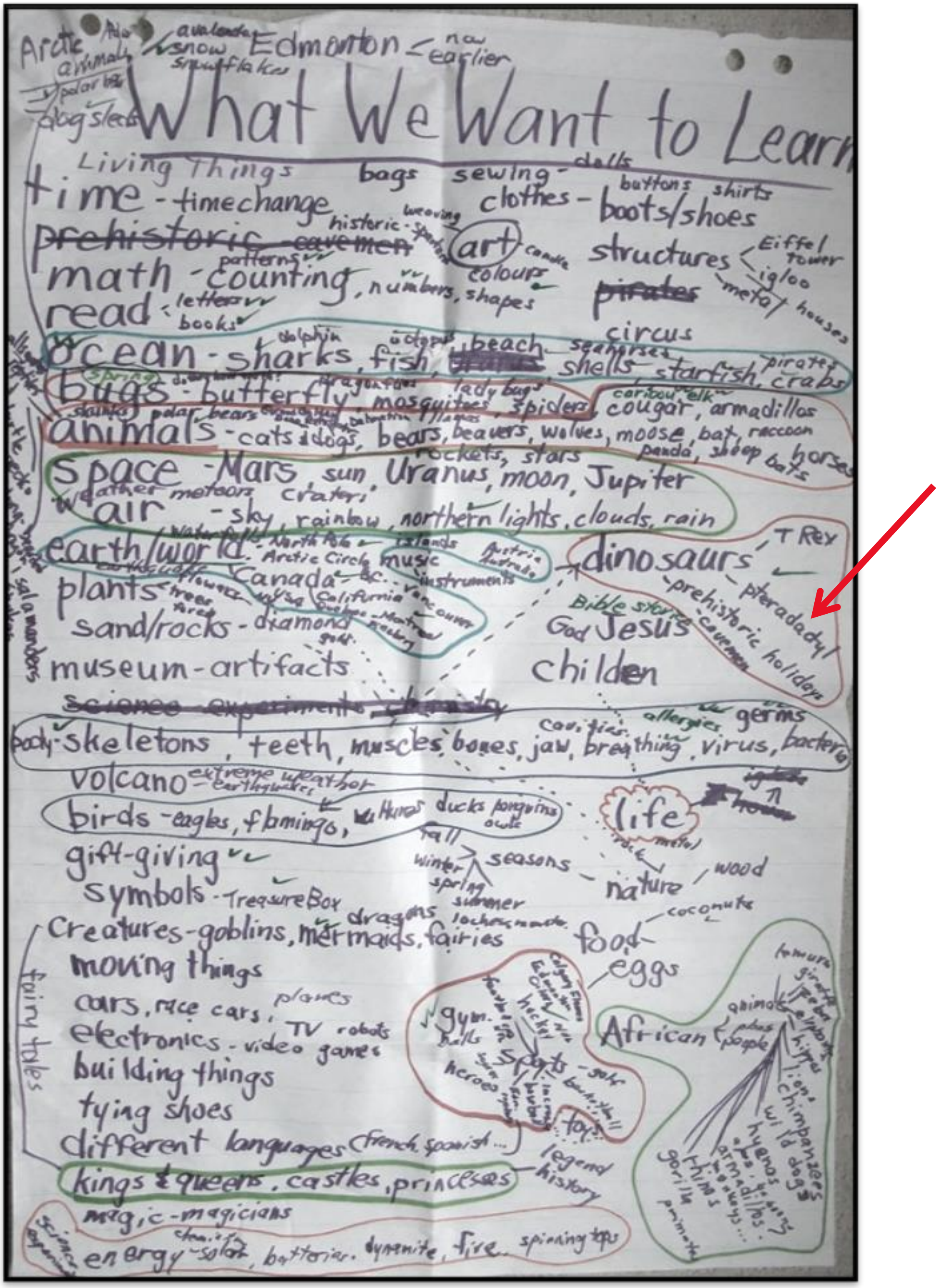
These two are my own personal dinosaurs. Even retired teachers can still love dinosaurs!

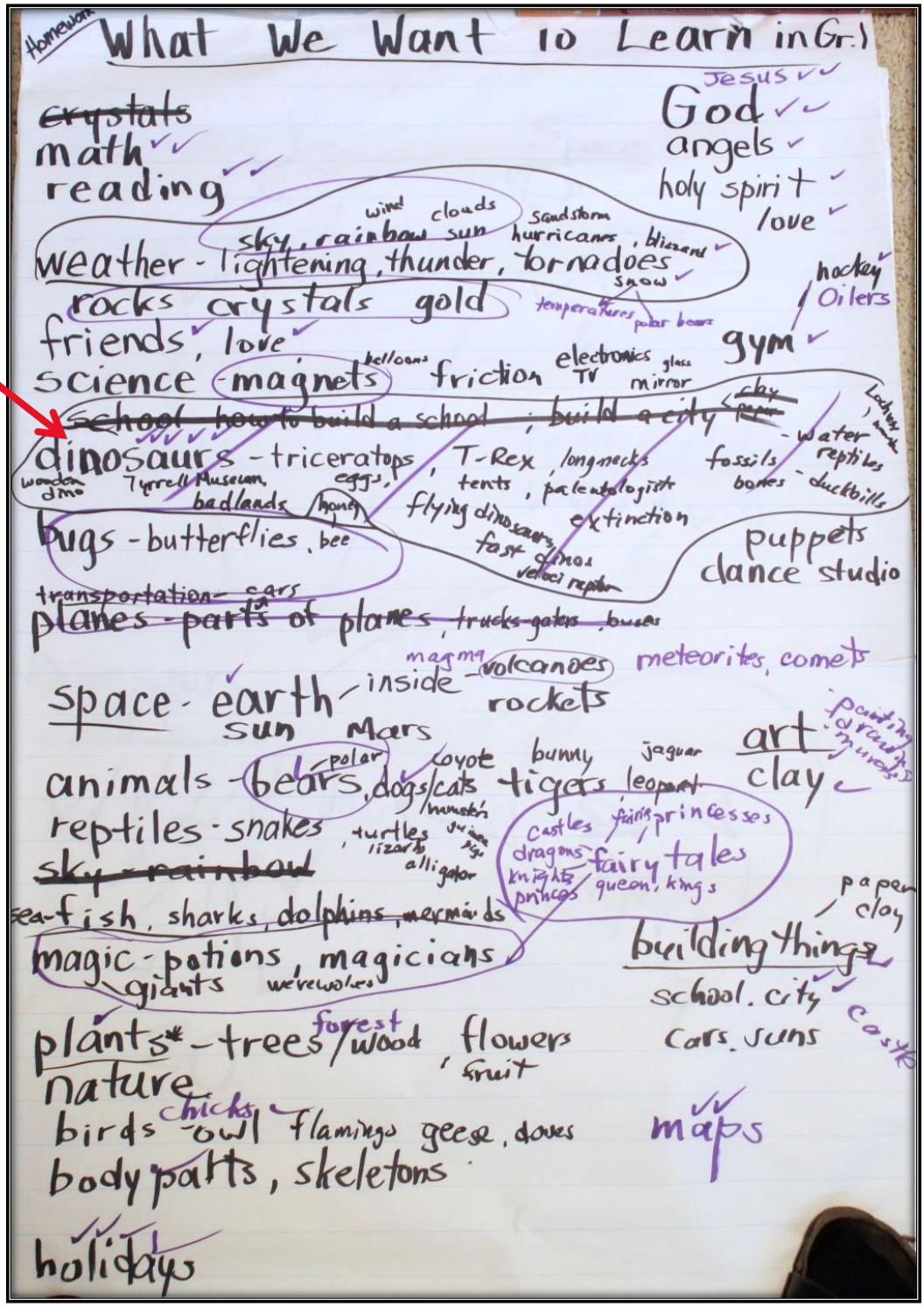
Starting a Project:

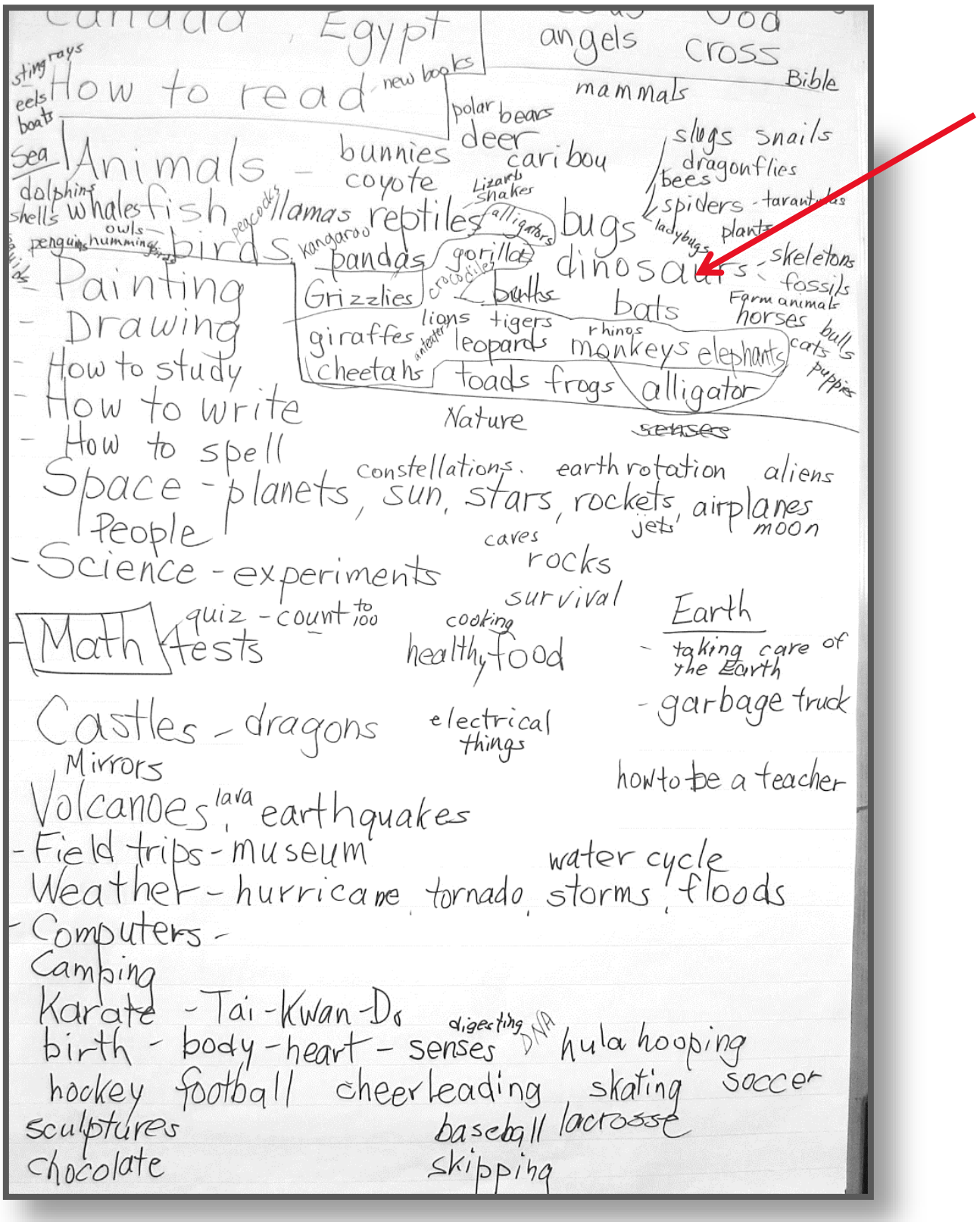
Brainstorming

Every year, on the first day of school, I began a list of what the children would like to learn. We added a lot of ideas to this chart during the first week, as well as throughout the year.

Following are three such examples of these brainstorming charts which show how the topic of dinosaurs emerged from children's interests.

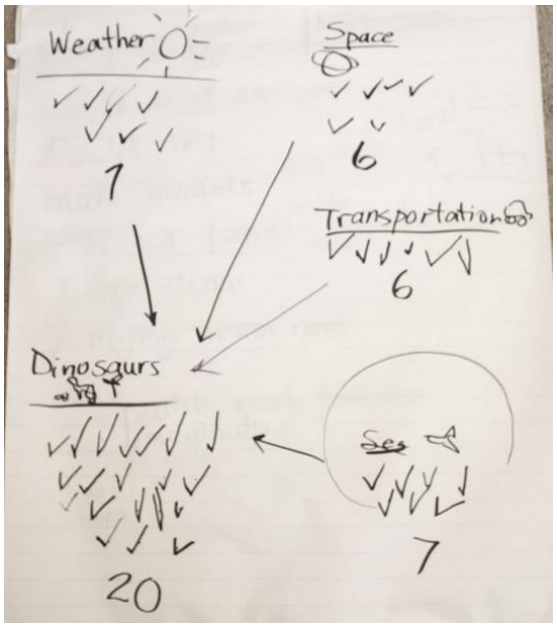

What We Want to Learn
Edmonton
Living Things
bags
sewing
clothes
boots/shoes
time - timechange
prehistoric cavemen
art
structures
math - counting, numbers, shapes
read
circus
ocean - sharks, fish, beach, shells, starfish, crabs
bugs - butterfly, mosquitoes, lady bugs, spiders
cougar, armadillos
animals - cats & dogs, bears, beavers, wolves, moose, bat, raccoon
Space - Mars, sun, Uranus, moon, Jupiter
air - sky, rainbow, northern lights, clouds, rain
earth/world
Canada
music
dinosaurs
T Rex
plants
sand/rocks - diamond
Jesus
museum - artifacts
children
science experiments
germs
skeletons, teeth, muscles, bones, jaw, breathing, virus, bacteria
volcano - extreme weather
birds - eagles, flamingo, ducks
life
gift-giving
seasons
nature
symbols - TreasureBox
Creatures - goblins, mermaids, fairies
food
eggs
moving things
cars, race cars, planes
electronics - video games
TV robots
building things
tying shoes
different languages (french, spanish ...)
African
fairy tales
kings & queens, castles, princesses
magic - magicians
energy - solar, batteries, dynamite, fire, spinning tops


What We Want to Learn in Gr.1
homework
~~crystals~~
math
reading
Jesus
God
angels
holy spirit
love
weather - lightening, thunder, tornadoes
sky, rainbow sun
wind
clouds
sandstorm
hurricanes
blizzards
snow
rocks crystals gold
temperatures
polar bears
hockey
Oilers
gym
friends, love
science - magnets
balloons
friction
electronics
TV
glass
mirror
~~school how to build a school ; build a city~~
clay
paper
Ladybug
water
reptiles
dinosaurs - triceratops, T-Rex, longnecks
fossils
bones
duckbills
wooden
dino
Tyrrell Museum
badlands
eggs
tents
paleontologists
flying dinosaurs
extinction
fast dinos
velociraptor
bugs - butterflies, bee
honey
puppets
dance studio
transportation - cars
~~planes - parts of planes, trucks, gators, buses~~
magma
volcanoes
meteorites, comets
space - earth - inside
rockets
sun
Mars
art
painting
drawing
animals - bears, polar
coyote
bunny
jaguar
tigers
leopard
clay
dogs/cats
reptiles - snakes
turtles
lizards
alligator
castles
fairies
princesses
dragons
knights
princes
fairy tales
queen, kings
sea-fish, sharks, dolphins, mermaids
~~sky - rainbow~~
paper
clay
magic - potions, magicians
giants
werewolves
building things
school, city
cars, suns
castle
plants* - trees
forest
wood
flowers
fruit
nature
chicks
birds - owl
flamingo
geese, doves
maps
body parts, skeletons
holidays

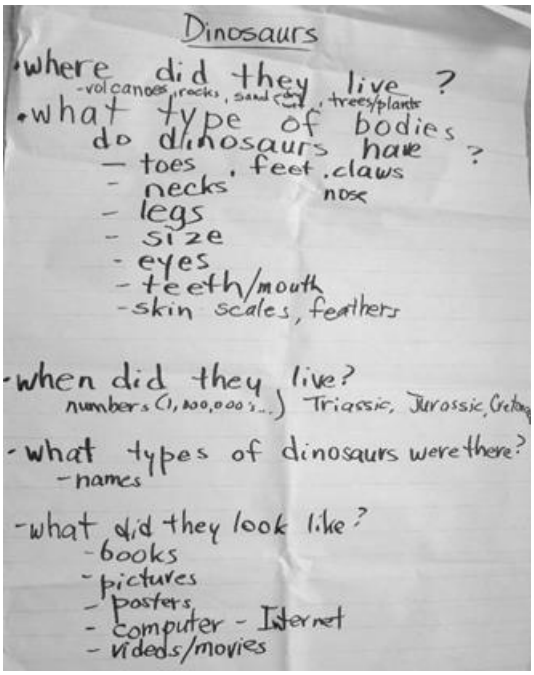

Canada
Egypt
angels
cross
Bible
stingrays
eels
boats
How to read
new books
mammals
polar bears
deer
caribou
bunnies
coyote
Animals
sea
dolphins
shells
whales
fish
peacocks
llamas
reptiles
Lizard
snakes
alligators
bugs
slugs
snails
dragonflies
bees
spiders
tarantulas
ladybugs
plants
owls
penguins
hummingbirds
birds
kangaroo
pandas
gorilla
crocodiles
dinosaurs
skeletons
fossils
Painting
Drawing
How to study
How to write
How to spell
Grizzlies
bulls
bats
Farm animals
horses
bulls
cats
puppies
giraffes
anteater
lions
tigers
leopards
rhinos
monkeys
elephants
cheetahs
toads
frogs
alligator
Nature
senses
Space - planets, sun, stars, rockets, airplanes
constellations
earth rotation
aliens
jets
moon
People
Science - experiments
caves
rocks
survival
Math
quiz - count to 100
tests
cooking
healthy food
Earth
taking care of the Earth
garbage truck
Castles - dragons
electrical things
Mirrors
how to be a teacher
Volcanoes
lava
earthquakes
Field trips - museum
water cycle
Weather - hurricane, tornado, storms, floods
Computers -
Camping
Karate - Tai-Kwan-Do
digesting
DNA
birth - body - heart - senses
hula hooping
hockey
football
cheerleading
skating
soccer
sculptures
baseball
lacrosse
chocolate
skipping

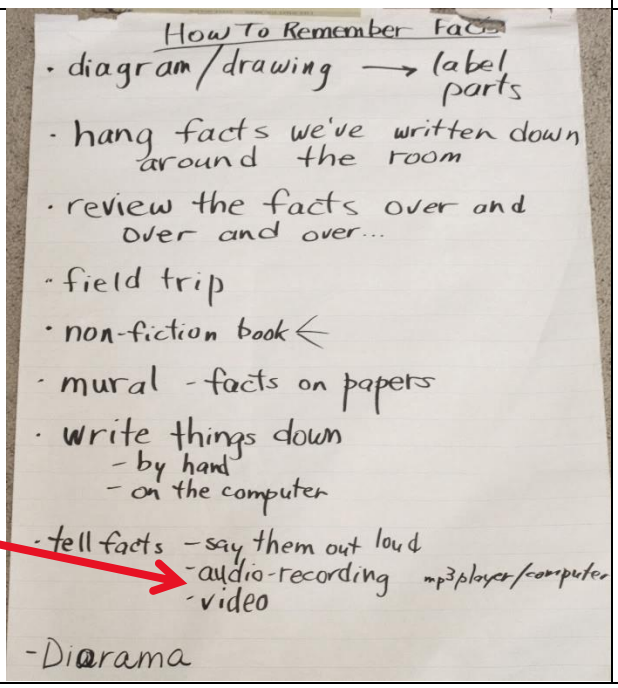
Planning a Project

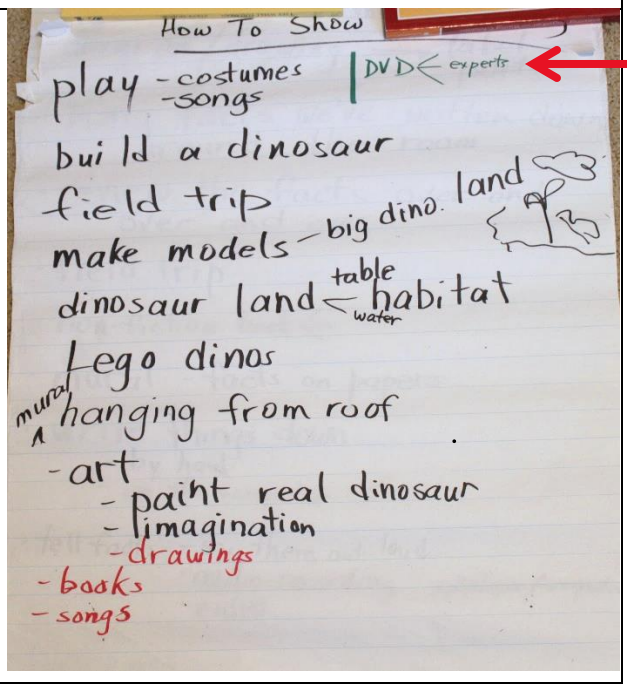
Once the main topic of interest is identified, we democratically voted to see which was the class favorite.



From that, we listed questions that we had about dinosaurs.







My reflection:

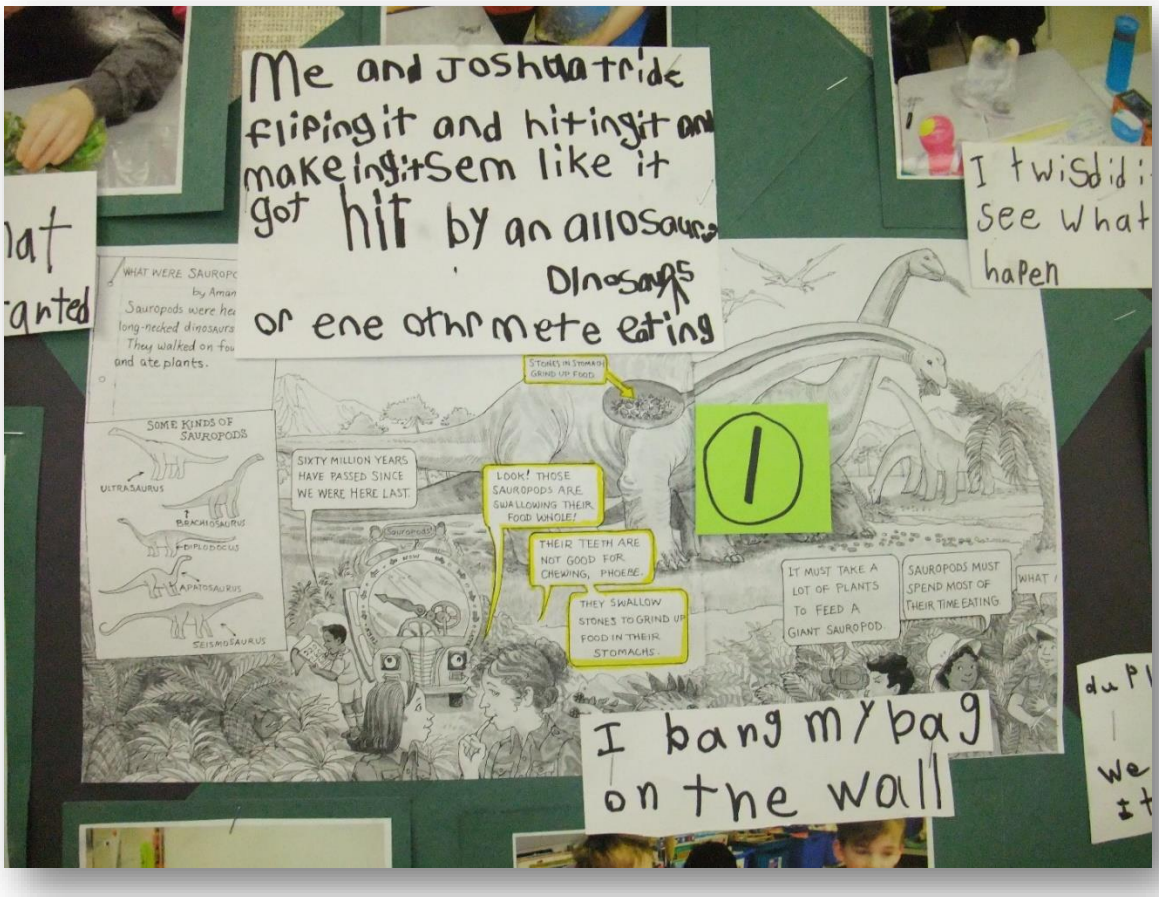
I believe that the most important aspect of the brainstorming is when we looked for ideas about how we could show our learning. What evidence could we provide so that others would know how much was learned? This is a loose form of backwards design – that if you know where you are going to end up, it's easier to take the steps along the way. Knowing that we would be doing a DVD meant certain steps needed to happen versus choosing to do a huge paper maché dinosaur. The end-product determines the process journey.

This is what was included in one newsletter to the parents: "On Monday, we finished brainstorming and planning for our study and research on dinosaurs. The children have thought of 34 different ways to show our learning – including making movies, murals, audio tapes, charts, and so on. Watching this unfold over the next months will be an adventure, for sure!"

Every class took a slightly different path to show their learning. Here are some examples.

Digestion Inquiry:

When we remain open to possibilities for exploration, the triggers for new experiments can come from anywhere. The study of Digestion came from one of the Magic School Bus books, by Joanna Cole. In her dinosaur book, there was a page that stated dinosaurs swallowed rocks to help digest the plants ingested. When I read that page during a read-aloud, I stopped and said, "That can't be right, can it? Would they really swallow rocks? How could we find out if that's really true?"



Above is the photo of the book page that initiated our experiment.

I asked the class to think of a way to test out this theory as scientists. They said, “We need leaves and rocks.” Since it was winter, and the leaves were buried under snow, I asked if there was any other source of leaves that we could use.

Some offered their house plants. But then I asked if some of our food was made of leaves? They decided that lettuce was a good leaf and that it would be easy to bring to school. So, their plan was that each person was to bring 2-3 lettuce leaves and 3 or 4 smaller rocks if they could.

We double bagged the lettuce and rocks, and I waited for then to experiment. When I asked what they thought the rocks and leaves were like in a real dinosaur stomach, children realized that there should be some movement, that the rocks would be rolling around in a dinosaur stomach. They began to rub, then jump with their bags, and some banged them on the wall.

It was so exciting when they saw the lettuce disintegrate and become bruised, then slimy. They concluded that it must be true! Dinosaurs did swallow rocks to break down the plants ingested.

Student Documentation:

<table>
<tr>
<td>  </td>
<td> 
  </td>
</tr>
<tr>
<td>  </td>
<td>Children used art supplies to represent the final digestion images.

It was difficult to find the colours and textures to represent rocks and the slimy lettuce.</td>
</tr>
</table>

With their experiment a success, they wanted to share this information with a wider audience, and so we created a documentation board outside our classroom. There were three phases and people were encouraged to look at the information in that order.

Student Observations:

Here are children's written comments about the experiment:

- Me and J tride flipping it and hiting it and makeing it sem like it got hit by an allosaurus or one othr mete eating dinosaur.
- I noties that the lodus (lettuce) started to rip.
- I shack it and shack it intill the lettis
- I tired juimping to get the peesis of lettele aprt
- We had ledus and rooks I bagd it on my chire and jumpt with it.
- I bang my bag on the wall.
- The rocks and lettuce got all mooshed and squished.
- We wr sow icsititib wen the letes levs was starting to crush.
- I bashd the rocks with the ledis.
- I sqesht the rocs.

- I was rabing rocxs juimping.
- I notice that all the leaves have broken up.
- I twisted it.
- I chrid shacking so that the rooks wud rub against the lettice.
- I rub the rok's together.
- I twisdid it to see what wood happen.
- Duplodukus stmumik. We jumt and we twesd it.
- We wor japing and the rosk swisht the letis.
- I jumpt with it and it was all sqshd up.
- I crunst it and I bangdit.
- I jupt up and dawn so the lidis bacs.
- I trid jumping to make it go up and down.
- I scrapd the lettuce.

My reflection:

This had been a teachable moment – one that had not been planned but presented itself to a very interested class. For this type of project development, the teacher allows the time for it to happen. Does it matter that what I had planned for the next couple of days would need to wait? Not compared to the richness of this exploration and testing proof with hard evidence. The experiment would fit in with the long-term objectives of the project and the curriculum literacy, problem solving, creative thinking, science.

Real-Life Heads Inquiry:

Inspiration:

Dinosaur read-alouds were part of our daily routine. There was a rotation schedule for children to have a turn to choose a non-fiction dinosaur book – it could either be a walk-through (where we examined pictures and pages) or it could be a complete read of one particular page (including all the fine print.)

During some of these read-alouds, interesting facts about the size of dinosaurs came up. For the triceratops, the text said the head was three meters long. Using our classroom meter sticks, 3 children each held a meter stick side-by-side so we could see how long that actually was.

We were in awe. When I asked if they thought other children, or their parents knew just how big an actual triceratops head was, they said no. So, I asked if we should show them. The children wanted to show a tyrannosaurus head as well, because they were usually shown in illustrations in a way that made them seem enormous. They wanted to have a comparison.

Process:

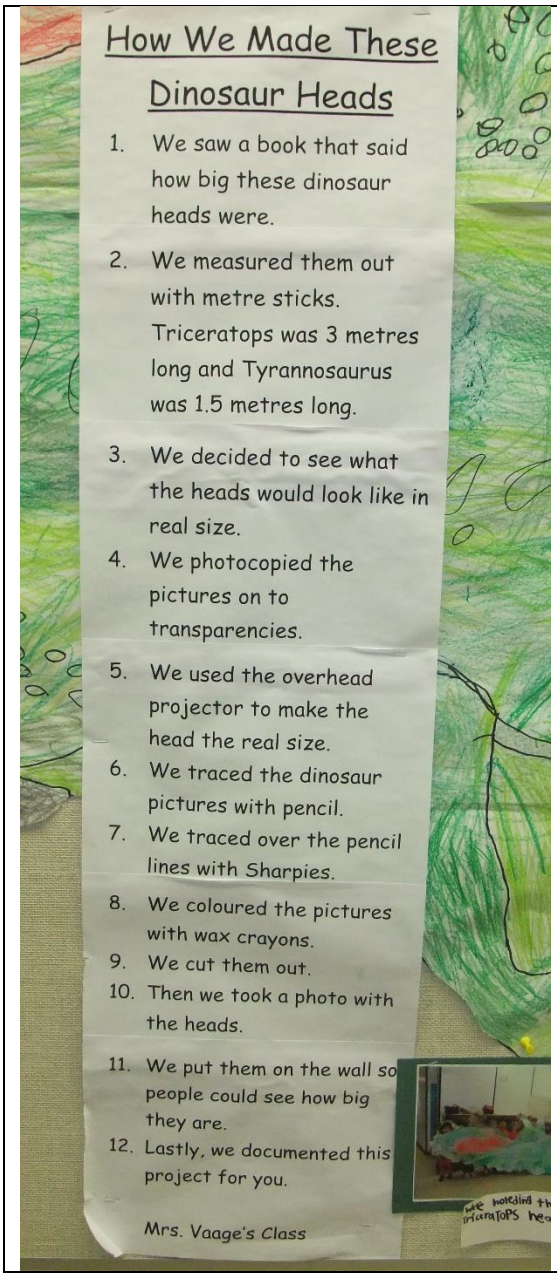
The class divided into two groups of their choice – either triceratops or tyrannosaurus.

To make the dinosaur heads more realistic, we used illustrations from books and made a transparency for an overhead projector. We used the outline from the projection on rolls of paper. Once the measurement was correct, the children drew the outline of each dinosaur head, and then coloured it.

The children doing the tyrannosaurus head finished earlier with less effort than the ones working on the triceratops head – which was incredibly bigger.

Child Created Documentation:

The class wanted to share the process of how these life size heads came to be, so they created a documentation board.



Once the documentation was up, it caused a big sensation throughout the school population. Students, teachers, and parents all stopped to gape at the triceratops head.

I overheard several comments from parents, saying, "I read about this dinosaur all this time, and didn't realize just how huge it was."

They were also surprised at the difference in head sizes between the triceratops and tyrannosaurus rex.

Measuring Dinosaurs:

Other measurements were concretized as well. We used adding-machine tape to roll out the length of a diplodocus, stegosaurus, and tyrannosaurus. We kept the tapes rolled up for reference in case anyone asked us just how long these dinosaurs were. Some of the paper stretched from one side of the school to the other.

Dinosaur Classification Inquiries:

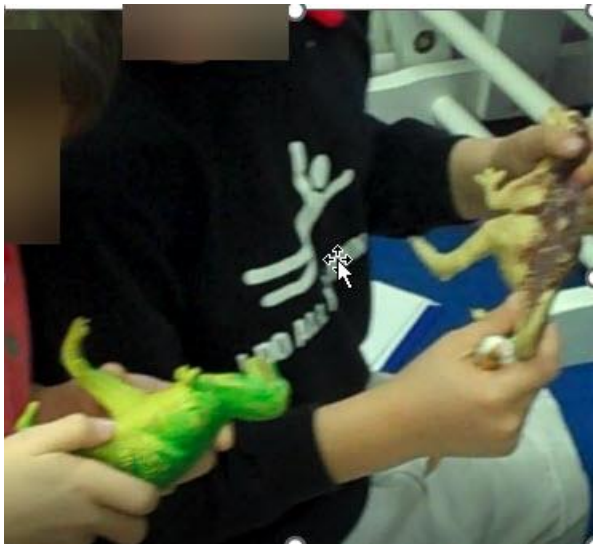
Classification by the Dinosaur Diet:

In my classroom, I had two plastic tubs of dinosaur models that I had collected from science stores, garage sales; some I received as gifts. One of the class challenges was to sort these models into meat-Eaters (carnivores), plant-eaters (herbivores), or meat and plant eaters (omnivores.)

To do the sorting, the children had to examine all the features of each model. Meat-eaters tended to walk on two legs and models showed fierce teeth while plant-eaters had four feet solid on the ground and mouths like beaks or cheeked like the duckbills. Omnivores like Ornithomimus were much harder to categorize only by using models - as their features were less identifiable.

My reflection:

The best part of this type of inquiry is the conversation and dialogue among the children as they debated the features. Often this led to research in the books to find out exactly how a particular dinosaur was classified.



Classifying by Features and Types:

One of the inquiry centers that was set up, was to sort and classify different dinosaur clip art images into different pages in their science books. The page titles were Eggs and Babies, Armored Dinosaurs (Ankylosaurus, Edmontonia), Flying Reptiles, Duckbill Dinosaurs (Parasaurolophus, Iguanodon, Corythosaurus, Lambeosaurus, Maiasaura, Anatosaurus), Ostrich Dinosaurs (Ornithomimus, Struthiomimus), Sauropods (Apatosaurus, Brachiosaurus, Diplodocus, Seismosaurus, Ultrasaurus, Supersaurus), Stegosaurus, Ceratopians (Triceratops, Styracosaurus, Protoceratops, Pentasaurus), Tyrannosaurus Rex, and Skeletons and Fossils.

Pages of varied dinosaurs were given to each child. The had to cut each one out. 	Next, they had to determine which page to glue the image on. 
 Stegosaurus page in process	 Finished page of Skeletons and Fossils

Time Period Classification:

Having a student teacher often allows for more modes of inquiry. Mrs. P worked with my kindergarten children on studying the different dinosaur periods. They decided to paint background murals and then add dinosaurs for each period.

To do so, they needed to do research about what the landscape would have looked like. They noticed the cycads and gingko plants in the Triassic, the ferns, shrubs, and trees in the Jurassic and finally the arrival of flowering plants in the Cretaceous. They have used colours that were like illustrations in the dinosaur reference books.

Three large murals were created with the appropriate backgrounds and individual dinosaurs from each period.

Classification by dinosaur periods inquiries were completed by two different classes, so you'll notice a difference in the paintings.

Cretaceous Landscape

Close up showing vegetation in Cretaceous period

<table>
<tr>
<td> 

Jurassic Landscape</td>
<td> 

Close up of hadrosaurs in water from Jurassic Period.</td>
</tr>
<tr>
<td> 

Triassic Landscape</td>
<td> 

Close up of the giant Supersaurus from the Triassic period.</td>
</tr>
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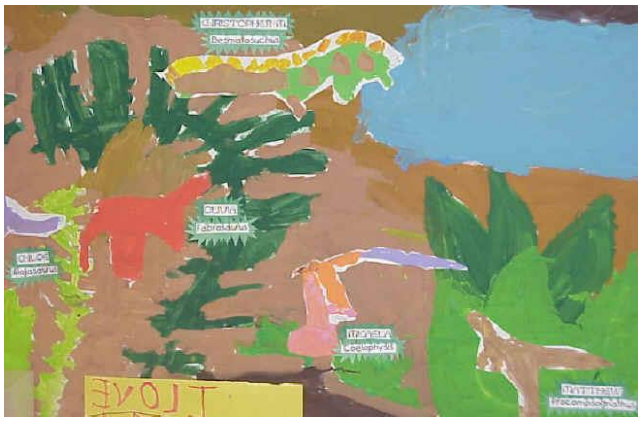
<td>  </td>
<td>  </td>
</tr>
</table>

Hip Classification:

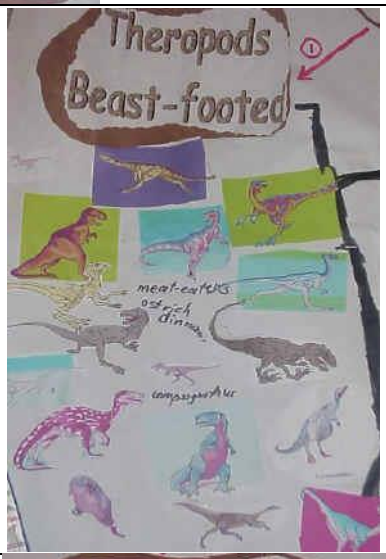
One kindergarten class had been gaining interest in the types of dinosaurs that we were studying. One of our more recent reference books described a new way of classifying them - by using the type of hip. We studied this and then attempted to show our learning by making a

huge mural. I printed off a huge collection of clip art dinosaurs for them to use for their classification.

Saurichians – Lizard Hipped

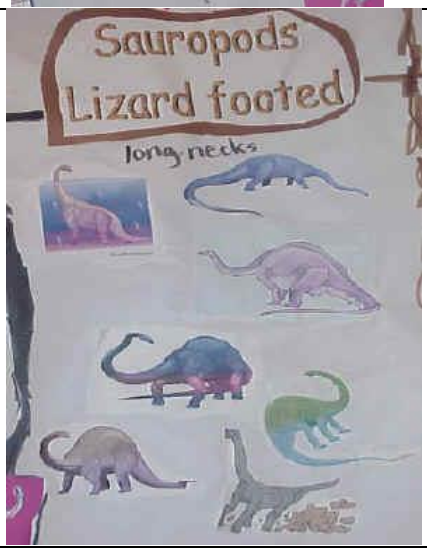
Theropods: Beast-footed

The first type of lizard hipped was the theropod group. This included the meat-eaters like T-Rex, small dinosaurs like Compsognathus, and the ostrich dinosaurs, like Struthiomimus.

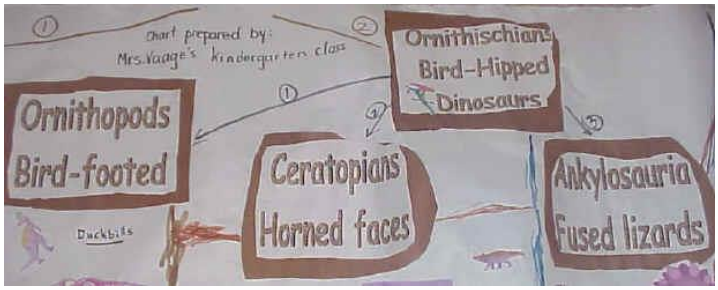


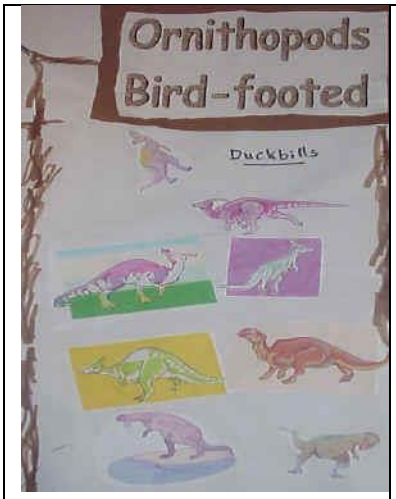
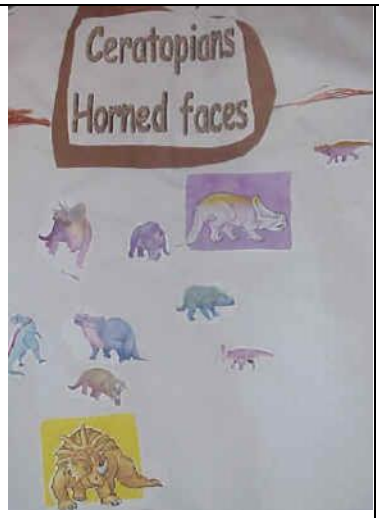
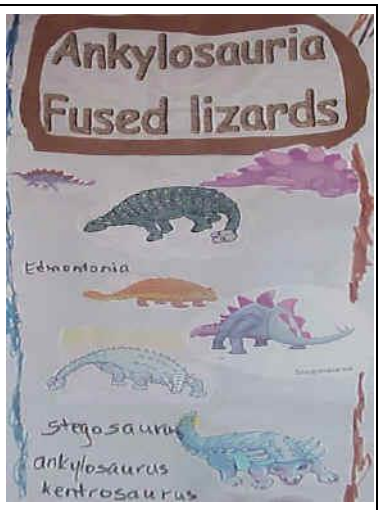
Sauropods: Lizard-footed

The second type of lizard hipped, or saurichian, was the sauropod group. This included all the "long-necked" dinosaurs, like Apatosaurus, Supersaurus, and Diplodocus.



Ornithischians – Bird Hipped



		
The first category in the Ornithischian group was the Ornithopods. This included all duckbills, like Parasaurolophus and Maiasaura.	The second category in the Ornithischian group was the Ceratopians. This includes all dinosaurs that had horns on their heads, like Triceratops and Protoceratops.	The last group of Ornithischian was the Ankylosauria, which included all the fused lizards like Ankylosaurus and Edmontonia.

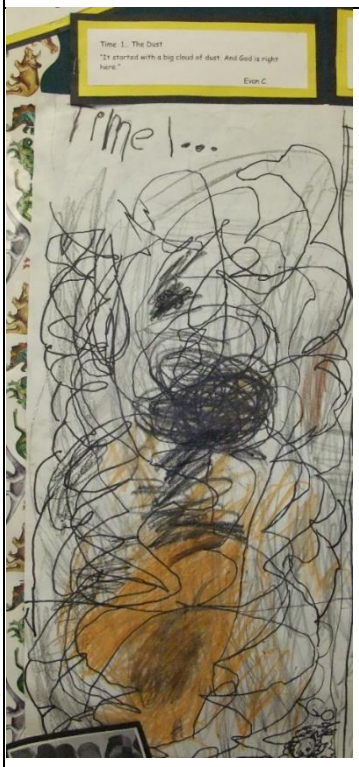
Flying and Swimming Reptiles

In some of our dinosaur books, they showed the flying reptiles and swimming reptiles from those same time periods as being dinosaurs. We learned that they are not dinosaurs at all, so we made separate categories for them.

TimeLine Classification:

One group of Grade 1's was truly fascinated by the aspect of time. Many of the non-fiction books used the first few pages to explain what preceded the dinosaurs. Working with a student teacher, , they researched the time periods and made the decision to represent what they knew by creating six distinct time periods in a mural. In collaboration with the student teacher, they documented this process on the bulletin board for a wider audience.

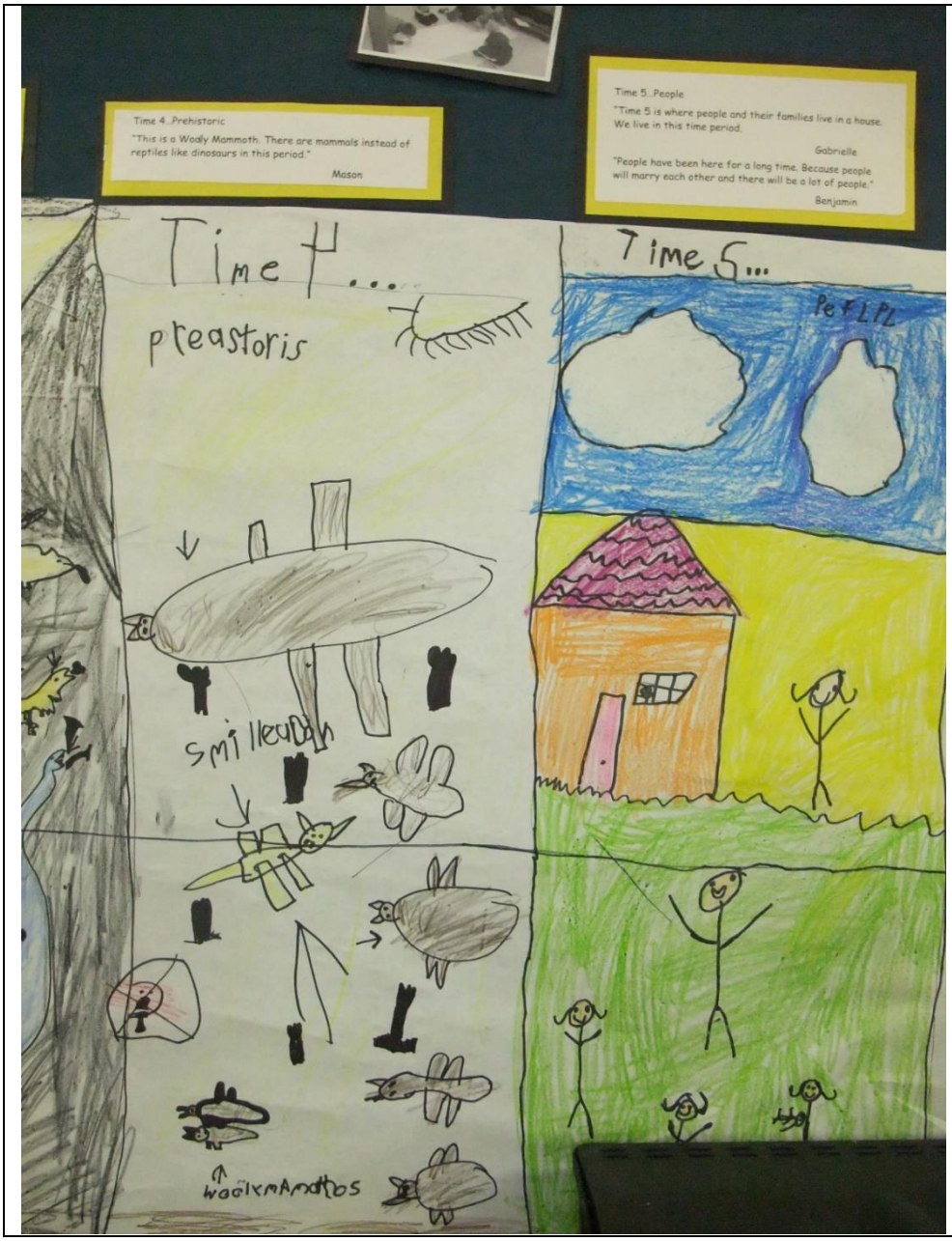
"Don't know what's next…"



Time 1: "The Dust "It started with a big cloud of dust. And God is right here."
(Note: They had a line representing God's presence that crossed through all the time periods.)

Time 2: The Earth "First the rock hit the earth and it's super-hot. It's red and black because it's so hot. The rain and lightning are bringing water to the earth."

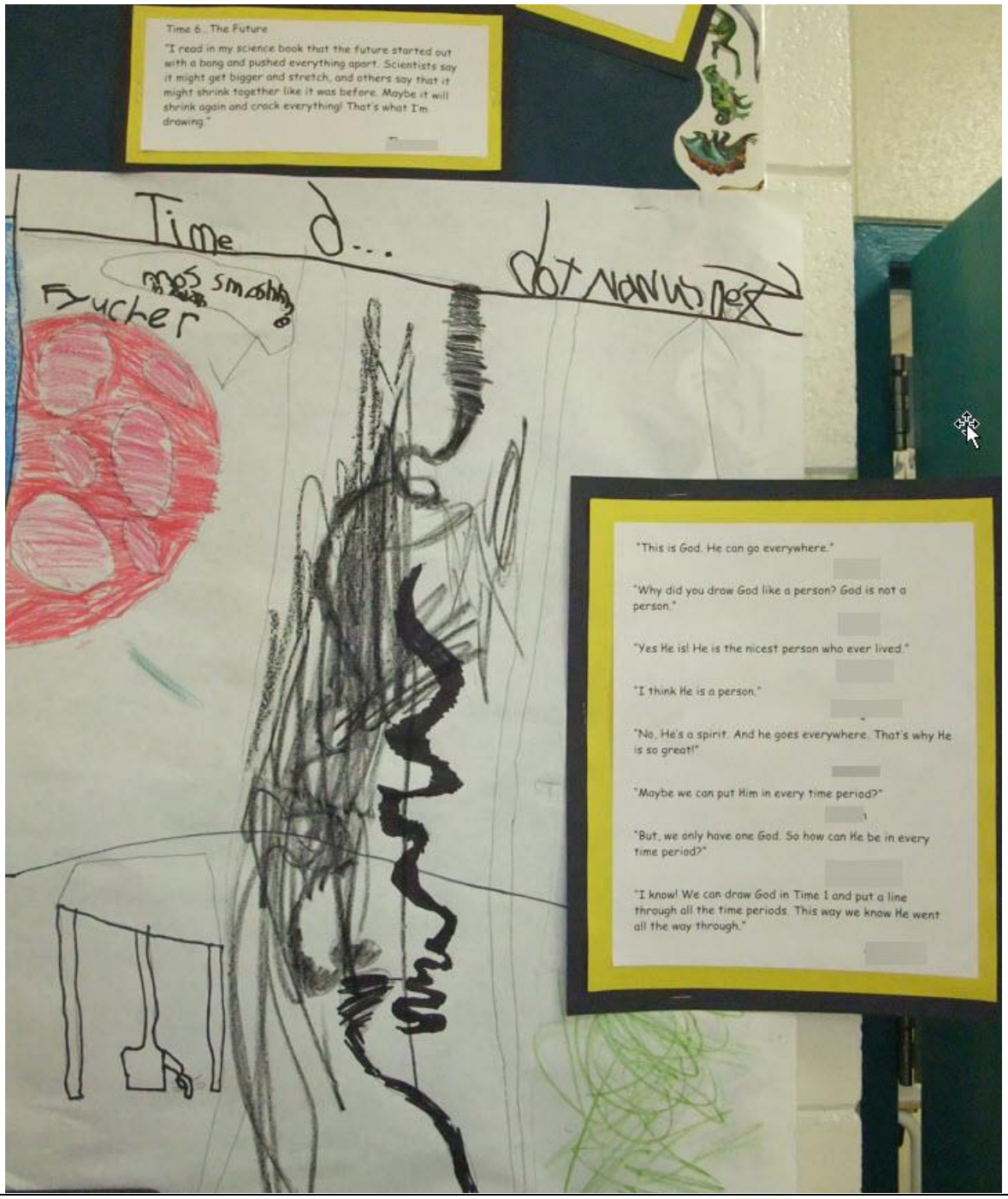
Time 3: Dinosaurs Here is pterodactyl, T-Rex, and stegosaurus and baby stegosauruses."



Time 4: Prehistoric "This is a wooly mammoth. There are mammals instead of reptiles like dinosaurs in this period."

Time 5: People "Time 5 is where people and their families live in a house. We live in this time period. People have been here for a long time. Because people will marry each other and there will be a lot of people."

Time 6: The Future”I read in my science book that the future started out with a bang and pushed everything apart. Scientists say it might get bigger and stretch, and others say that it might shrink together like it was before. Maybe it will shrink and crack everything! That’s what I’m drawing. Don’t know what’s next.”



Student Comments about God's presence as shown on yellow dialogue sheet:

"This is God. He can go everywhere."

"Why did you draw God like a person? God is not a person."

"Yes, He is! He is the nicest person who ever lived."

"I think He is a person."

"No, He's a spirit. And He goes everywhere. That's why He is so great!"

"Maybe we can put Him in every time period?"

"But, we only have one God. So how can He be in every time period?"

"I know! We can draw God in Time 1 and put a line through all the time periods. This way, we know He went all the way through."

My reflection:

These children struggled to understand very BIG ideas. The concepts of past, time, and change. They looked out the window and could imagine dinosaurs walking on the same earth as our playground and walking to the river to have a drink. They 'owned' our geographical dinosaurs – the Edmontonia and Albertasaurus. They knew which dinosaurs lived here. In this space. Some children began to project what might be… in the future.

Projects that develop from children's interests and are co-created between the children and the teacher have the potential for extraordinary learning.

Projects create a place for children to explore Big Ideas and make sense of an entirely new place, time, reality. Children are engaged and go far beyond minimum effort. They are fully invested in their learning. They believed they could find the answers to their questions. That is the true empowerment of the view of the child – that they are capable beings.

Fossil Inquiry:

Digging for Fossils

To set up a provocation for fossil inquiries, my student teacher and I set up two areas of exploration.

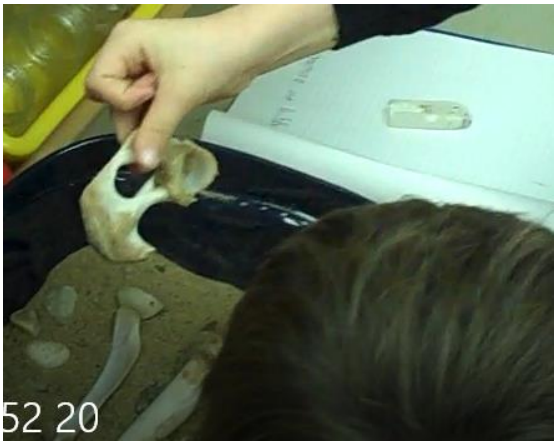
One was Digging for Fossils, in which students could use brushes to discover bones under sand. The bones had been boiled and baked, so were clean to use. Children were to draw the bones and theorize what part of a dinosaur or animal the bone came from.

Following are images and children's comments from their explorations.

"I think this is from a head. It's the crest of a head. There is a big space here."

"This is for a small brain."

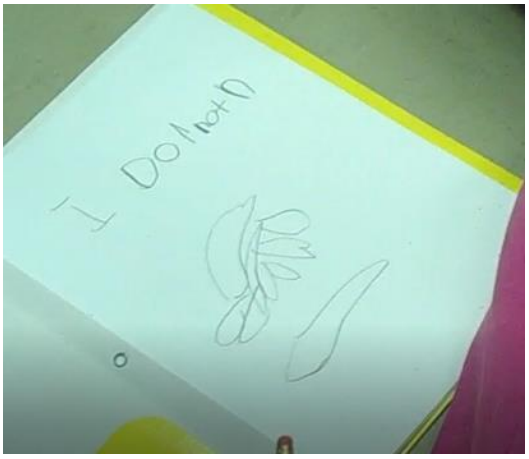
"Maybe it's like a duckbill crest."

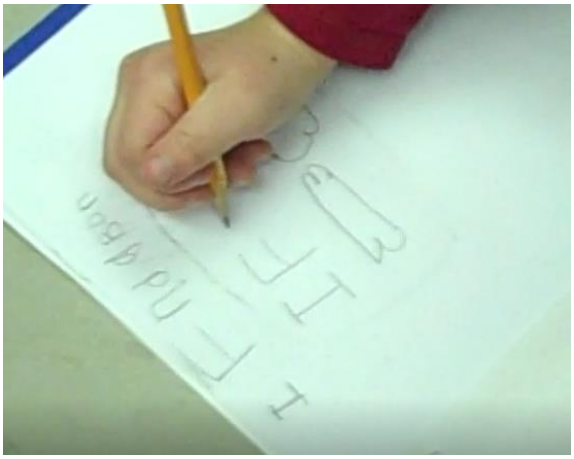


"Oh, I know what it is, (and turns it around). It's a claw! It goes like this (movement). From a T-Rex!"

"An arm or a leg bone"

Child is connecting 2 bones together at joints. "This is a claw. It's attached to here."



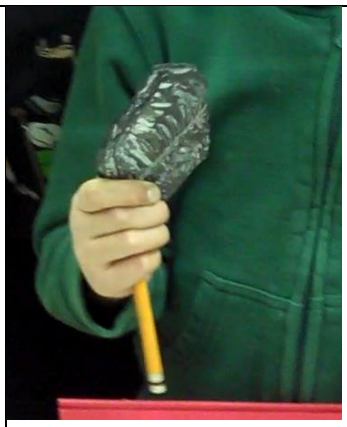


Fossil Table

The second area for exploration was the Fossil Table on which there were real fossils and models of fossils. Over the years, I collected a variety of fossils. The children's task was to determine which were the authentic dinosaur fossils.

Following are images and children's comments from their investigations.

"This one is kind of fake gold" – about amber.
"This one looks like glass."



"This one looks like a plant."
"How do you know that?"
"Because there's lines and curvy things on the stems."

"And this is a shell."
"How do you know?"
"Because there's circles of it, and there's an opening of it."

"This side looks like a shell and this side looks like a rock."

One trio began weighing the fossils in their hands to feel the heft or weight to them (fossils = rocks) so are heavier.

My reflection:

These two types of centers encouraged children to be scientists, to look at the evidence and to theorize, then to document their ideas. They experienced, then represented their learning. As I documented their learning process, I noticed how the children incorporated their thoughts into their previous knowledge base and experiences. Learning is all about making connections.

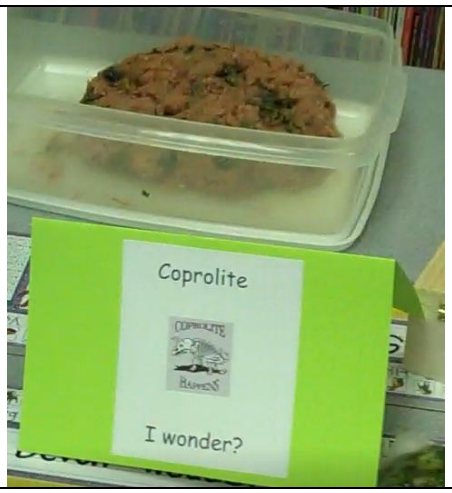
 A different year – a different way to dig for fossils. This time in the sand table.	 A different year again, this time experience with bones and creating fossils.	 A different year again, this time with dinosaur models hidden in Plaster of Paris casts.

Coprolite Inquiry

In the non-fiction books we were reading, there were often references to coprolite, or dinosaur poop as the children referred to it, that helped scientists find clues to how dinosaurs lived and what they ate. One of my student teachers responded to one class's strong interest in this topic.

She prepared brown coloured play dough and displayed in different formats with different clues for the young scientists to investigate.

Following are images and children's statements as part of their discovery and inquiry.

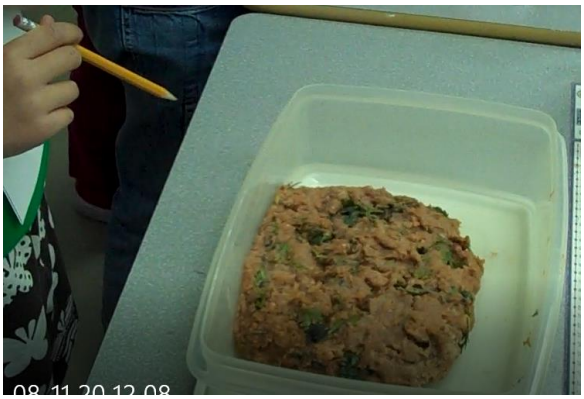


"I found bones in here."

"It's poop. Ewww. With bones. I notice that that is little. And there's pokey things in here. That's Mussasaurus (little one). This one could only be a meat eater, because I see white bits in there that are bones."

"I think both of these are plant eaters. Yah, me too.
That one could be Diplodocus. Or it could be Seismosaurus. That might be an Ultrasaurus."

"This one could only be a meat eater because I see bones."



"I think this is a Diplodocus."

“Could anyone tell me why they think this is a Diplodocus? “

“Because a Diplodocus has ‘that much.”(referring to the volume of the sample) “It’s flat and it’s big. Because it goes from high up and drops to the ground. (drops hands and claps). And then splat.”

“That’s what it looked like when it pooped in Dinosaurs Alive! Yes, it went plop right onto the ground.”

*Note: *Dinosaurs Alive* was an IMAX movie that the class had seen.

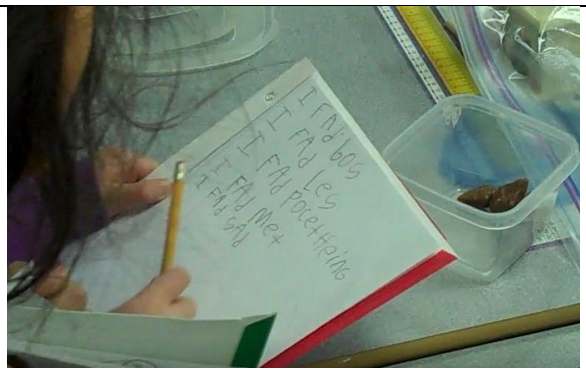
“It has bones and meat in it. I think that’s from a T-Rex – because he has bone-crushing teeth. Because it’s big.”

Child demonstrating actions for bone crushing teeth.

"Let's pretend that this pencil is a bone in his mouth, and it goes crush like this. The bone breaks."

"The smaller coprolite has to be from a smaller dinosaur."

"I'm going to write down that I found grass. Oh, I found sand!
That looks like grass or leaves. "



"I found met."
Another child says "that says met. Put an 'a' at the end."
"No that doesn't look right. Put it at the end – with a capital letter. Use a little 'a'."
(Peer collaboration and construction in literacy.)

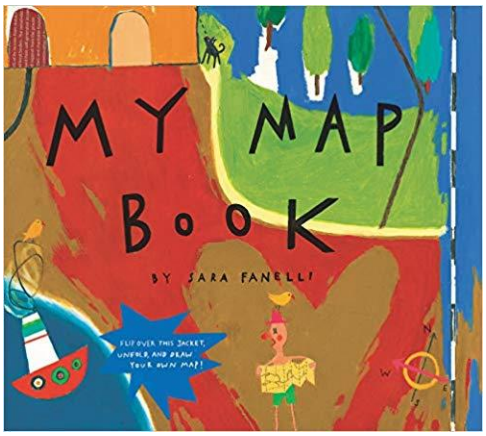
My reflection:

This inquiry was captured on video which highlighted the exuberance and wonder of children realizing they had discovered something profound. While they were pondering the coprolite samples, T had realized what the shape of the 'Diplodocus' coprolite meant. He started to explain in gestures exactly how the coprolite was formed into the cow pie shape. From up high, and dropping, it would create the plop.

Children were absolutely quiet while they processed his statement, till M called out that it was just like they had seen in the IMAX presentation of Dinosaurs Alive. In the movie they had shown an animation of Diplodocus emptying his bowels and it dropping into a cow pie shape. Then all the children began to copy the gestures and tell each other the theory. Their faces were bright with wonder, as was mine! To capture the discovery of a theory breakthrough was incredible!

Inquiry Through Mapping

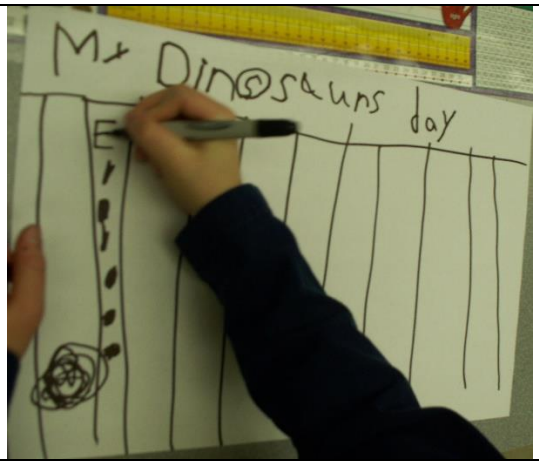
Sara Fanelli wrote the most inspiring children's book, entitled My Map Book.



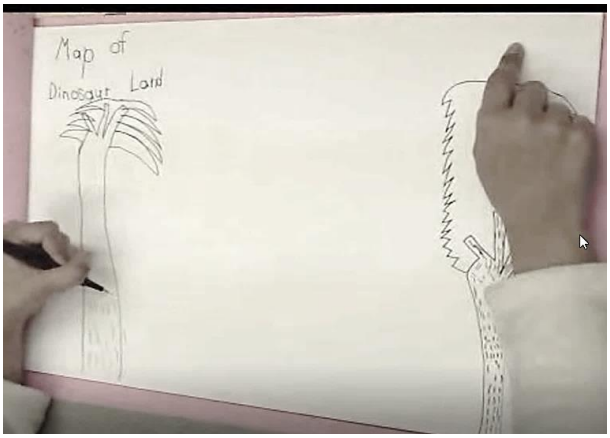
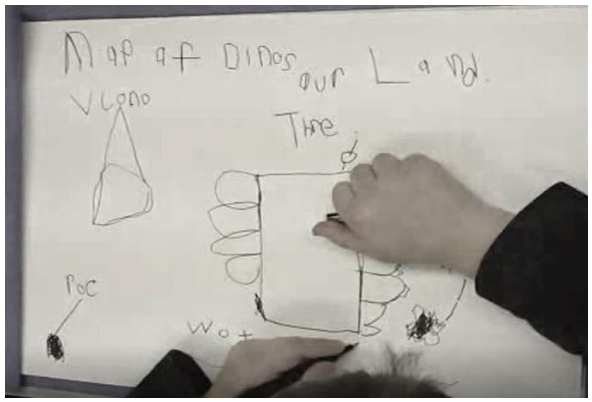
In the book are illustrations of how a child might have represented, through mapping, the elements of his/her world – both tangible and intangible. It inspired my classes to represent very challenging ideas through mapping.

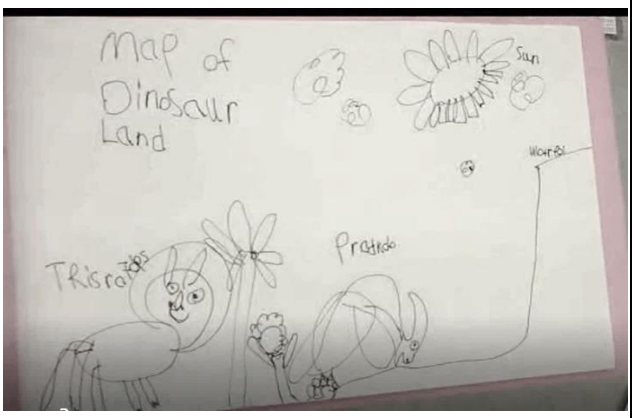
For the dinosaur projects, there were three individual maps: a dinosaur day, dinosaur land, and dinosaur features.

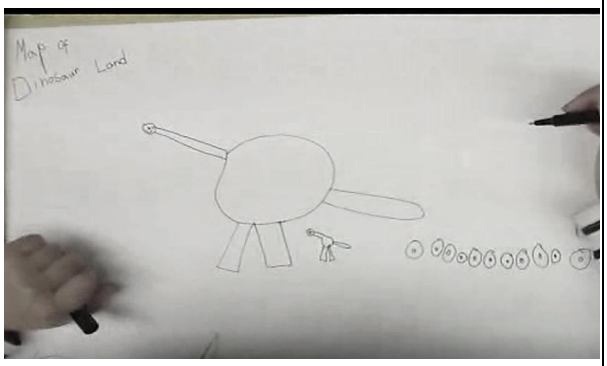
Dinosaur Day Mapping Book

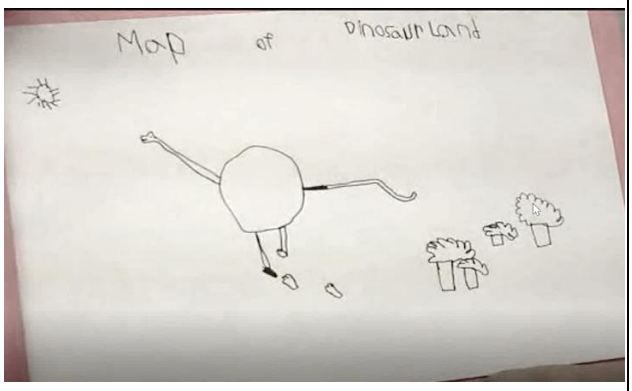
Dinosaur Day based on Jim Murphy's Dinosaur for a Day book (mapping time)	
	

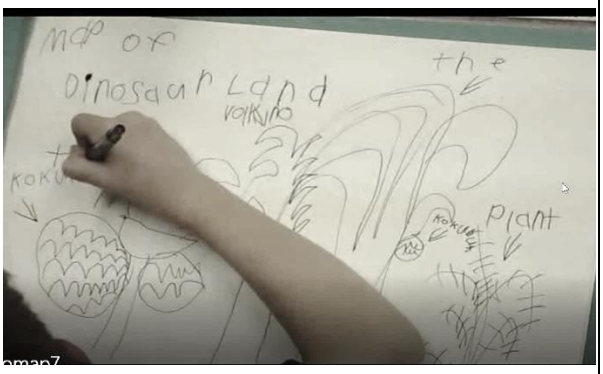
Dinoland Book – Mapping the Environment

DinoLand (mapping environment)	
	


Map of
Dinosaur
Land
Sun
Triceratops
Pradido

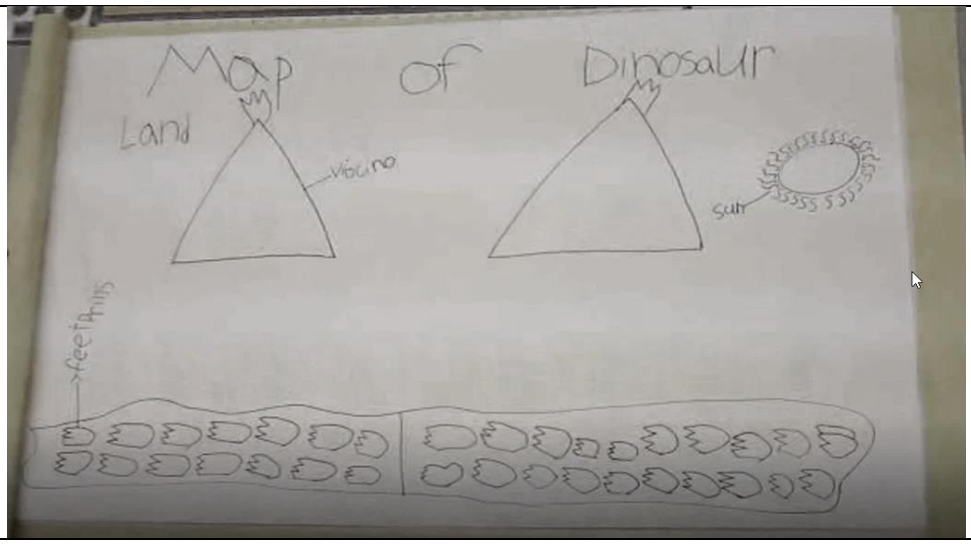

Map of
Dinosaur Land


Map of Dinosaur Land


map of
Dinosaur Land
the
Plant


Map of Dinosaur Land.
Trees
Ponds


Dinosaur
FANPR

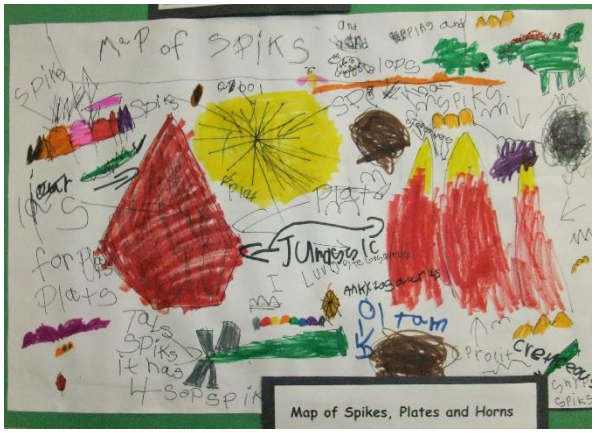


Dinosaur Map Book – Map of Features

Children worked in pairs to research and then represent their learning.

Map of Footprints

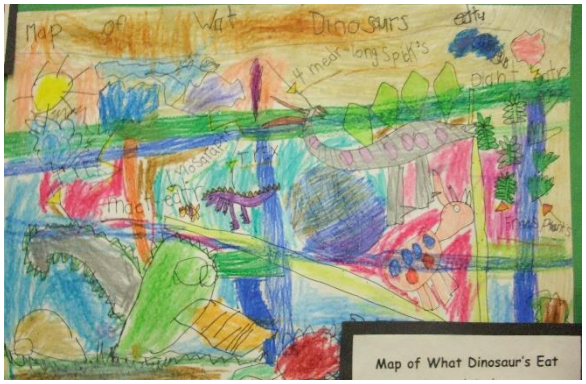
Map of Pangaea



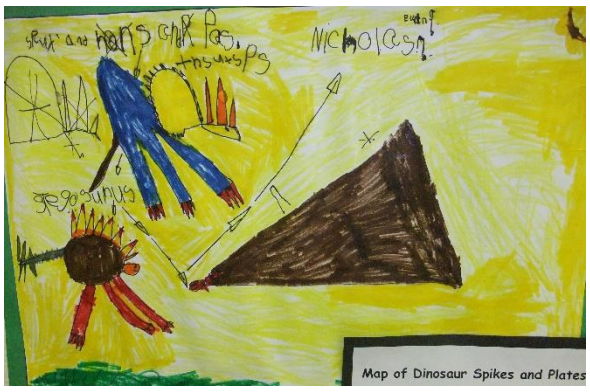
Map of Spikes, Plates and Horns

Map of Big and Small Dinosaurs

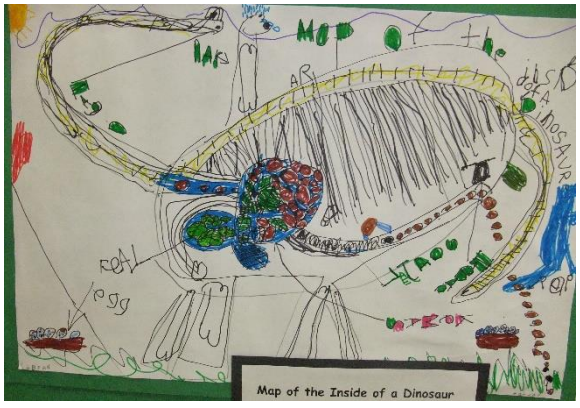
Map of the Land



Map of What the Dinosaurs Eat



Map of Spikes and Plates



Map of the Inside of a Dinosaur

My reflection:

By trying to represent their understanding, I believe these children reached beyond the norms in the depth of comprehension. By being open to 'The 100 Languages', as described in the Reggio Emilia philosophy, it enables children to express a breadth of knowing that constantly amazes adults. Atypical ways of representing by exploring new media and then using them to express their knowledge is the new normal.

Dinosaur Documentary Inquiry

Documenting Dinosaur Facts in a Movie Format

One of the most challenging inquiries was this dinosaur documentary that the children wanted to produce to give evidence of what they had learned in their study of dinosaurs.

They set their own goals for what topics should be included in the dinosaur video. The task for everyone was to get three facts each, write them down, and then orally practice it with their team before doing the recording. Here are some stills of the video with the dialogue that was memorized and delivered.

"Scientists have found fossils of dinosaurs all around the world. Australia, Africa, Europe, North America, South America, Antarctica, Asia, Arctic."

"The dinosaurs are different in many ways. Apatosaurus is very big, and eats plants, and has a long tail. Apatosaurus stretches his neck to get food. Apatosaurus has a very long neck."

“We’re going to tell you some facts about Triceratops. Triceratops is a big dinosaur and is an armored dinosaur. Triceratops has a 3-meter-long head. Triceratops was named after his three horns. Triceratops means three horns on the head. Triceratops lived in the Cretaceous Period. They ate plants like ferns and leaves. His defenses were the horns and the frill around his neck.”

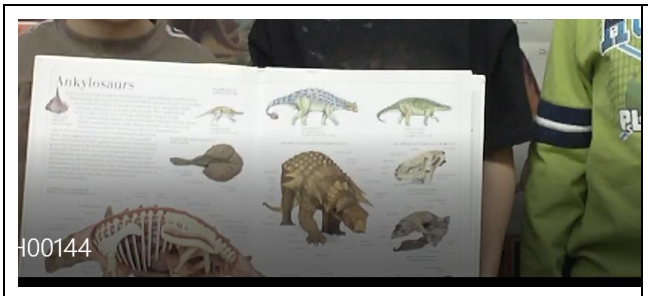
“We’re going to tell you some facts about T-Rex. He was cold and hot blooded. He swallowed his prey whole. He had short arms. T-Rex’s brain was smaller than an elephant’s brain. T-Rex means tyrannosaurus rex. That means tyrant king. T-Rex had bone-crushing teeth. He was one of the greatest carnivores. T-Rex had a small body for his size.”

”We’re going to tell you some facts about duckbills. A duckbill has hundreds of teeth in its mouth. The duckbill has a hard head. Duckbills have little arms like T-Rex. Duckbills make different sounds with their heads. They have a beak. Also, they’re herbivores.”

”We’re going to tell you some facts about Deinonychus. Deinonychus was extremely dangerous. Deinonychus was only 10 or 11 feet tall. Deinonychus had a terrible claw. Deinonychus hunted with a pack. Deinonychus had a hard skull. Deinonychus means terrible claw. Deinonychus had 3 toes on each foot. Deinonychus was a theropod.”

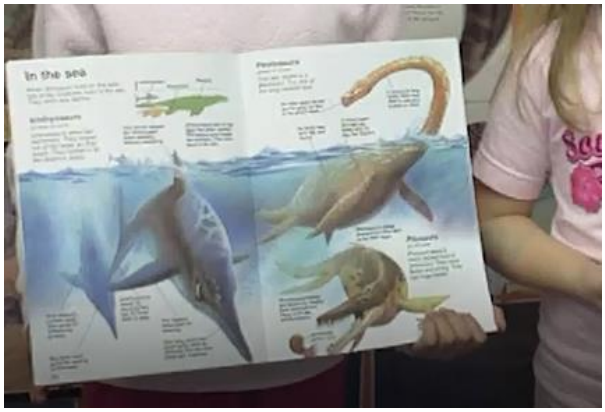
“We’re going to tell you some facts about Stegosaurus. Stegosaurus had plates on his back and spikes on his tail. Stegosaurus lived in the Jurassic period. Stegosaurus is cold-blooded. Stegosaurus has 4-meter-long spikes on his tail. Stegosaurus has a small head. Stegosaurus eats plants.”

“Here’s some facts about little dinosaurs. Compsognathus runs around the forest floor. Compsognathus eats meat. Compsognathus catches bugs. Compsognathus is as small as a chicken. Some dinosaurs are as small as our legs, and some are as small as our feet. Compsognathus was not dangerous. Compsognathus was fast. Compsognathus eats lizards.”

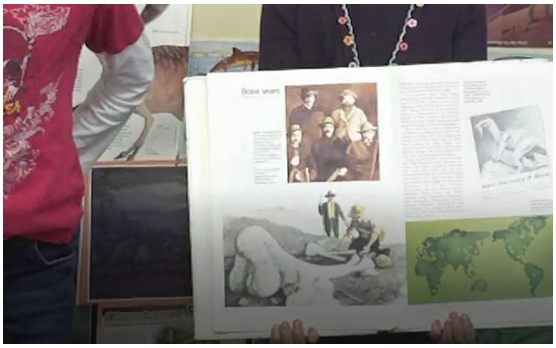


“We’re going to tell you about Ankylosaurus. Ankylosaurus had heavy armor. Some Ankylosaurus didn’t have a clubbed tail. Ankylosaurus had plates on his back. Some Ankylosaurus had spikes. Ankylosaurus used his club tail to knock down trees or to hit other dinosaurs”.

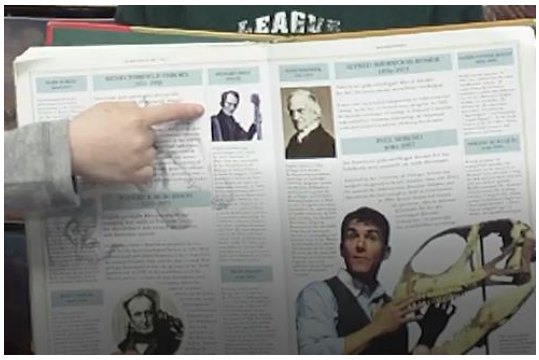
”We’re going to talk about ostrich dinosaurs. Ornithomimus had a sharp claw to hit Tyrannosaurus Rex. He had a flexible shoulder joint and sharp claws. Ornithomimus had hollow bones. Ornithomimus had a long neck.”



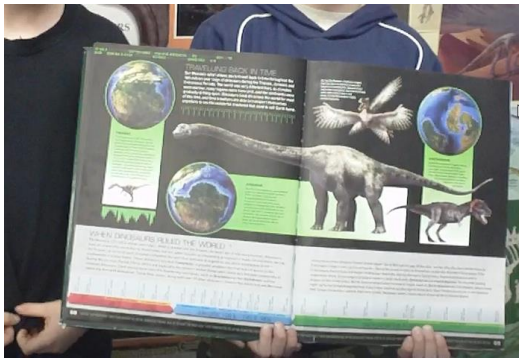
"Water reptiles weren't dinosaurs. They were just animals that lived in the sea. Plesiosaurus ate fish. Plesiosaurus was the biggest reptile."



"Paleontologists have been digging for dinosaurs. Paleontologists are very smart. Archaeologists were very tough and often worked under tough conditions."



"Sir Richard Owens named the dinosaurs in 1841."



"The dinosaurs were spread out over three time periods. This is the Triassic, Jurassic, and Cretaceous."

"We're going to tell you about the dinosaur sounds. Squawk and snort, growl and squeak, and honk."

"Some dinosaurs could have been red, orange, blue, green, brown, white, yellow. Dinosaurs could be any colour."

"Some dinosaurs had feathers. Theropod dinosaurs evolved to birds."

"Flying Reptiles weren't dinosaurs. Flying reptiles would chirp and bleat. The mother would build the nest up high to protect it from predators. She would bring food for the babies. They are fish eaters."

"Paleontologists are finding fossils. A meteorite crashed into South America. The meteor caused the extinction of the dinosaurs."

"Footprints show how fast the dinosaurs were. Footprints showed how big the dinosaurs were. Was he big? Was he small? Was he fast? Was he slow?"

"When dinosaur babies hatch, they're not fierce. Some baby dinosaurs run off."

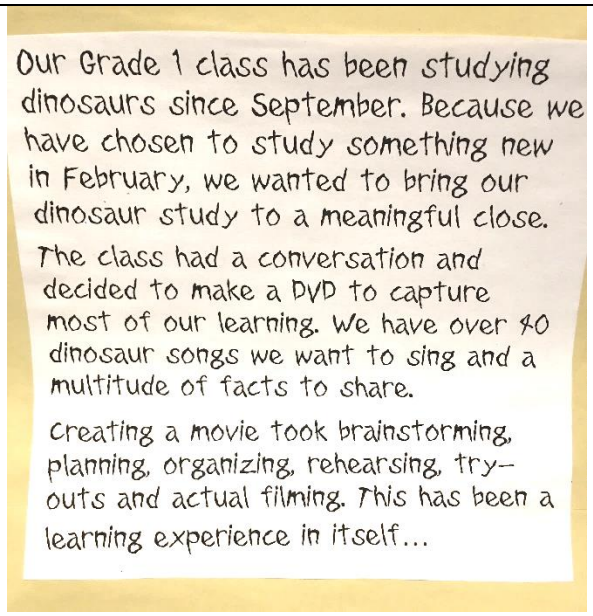
My reflection:

Sometimes the reality of having the red light on the video camera go on indicating recording had started, bumped the rehearsed scripts from their memories, so a few retakes were needed as children gained confidence.

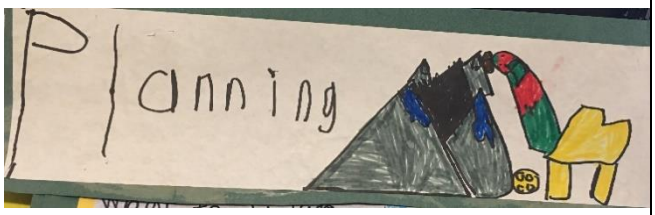
It was also interesting to see which memory device they used: a repeated pattern structure or a flowing narrative.

Student Documentation of the Process of Making a Documentary Movie

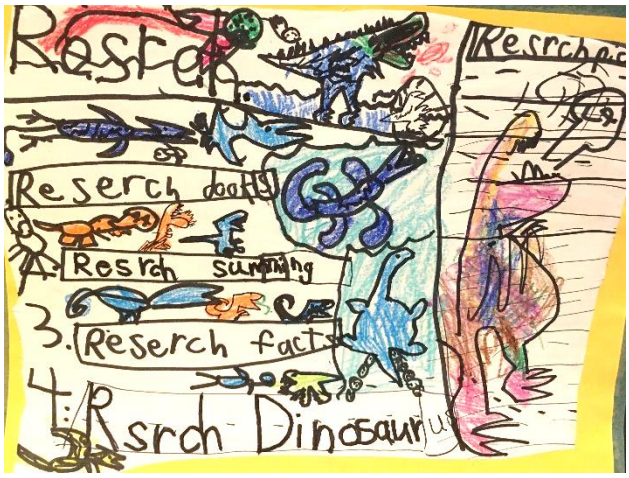
The entire process of making a Dinosaur Documentary was worthy of sharing with the public, the children thought. So, they created their own documentation board of *How to Make a Movie.*



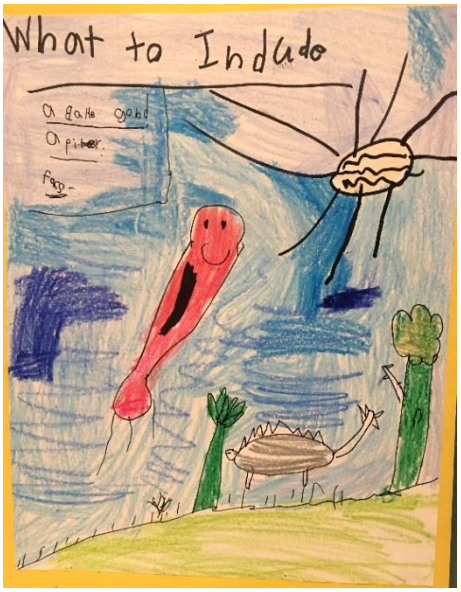
Teacher Statement – to provide background information for viewers.



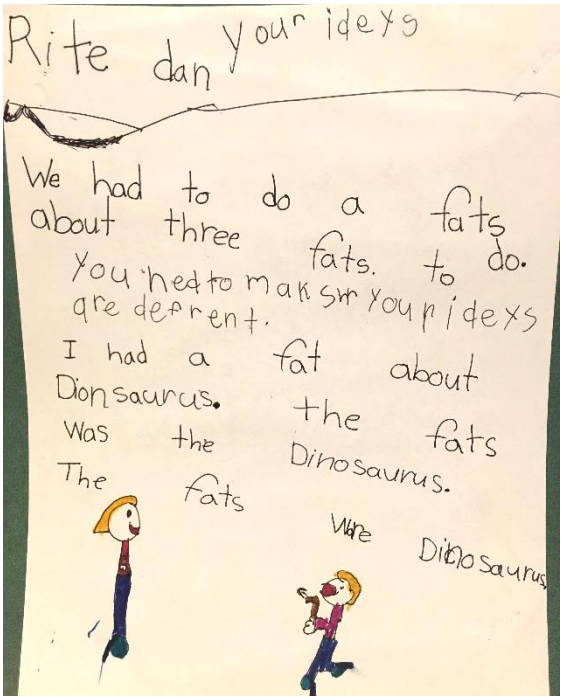
Songs and Facts: Divide your ideas into categories.



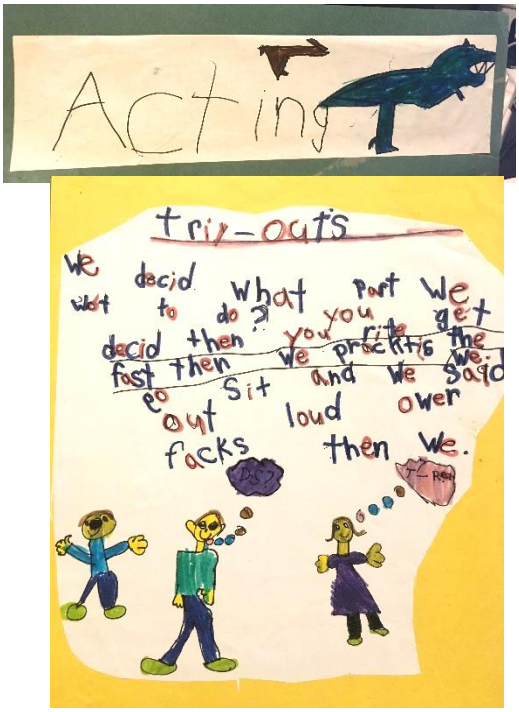
Research books, research something, research facts, research dinosaur, research pictures.



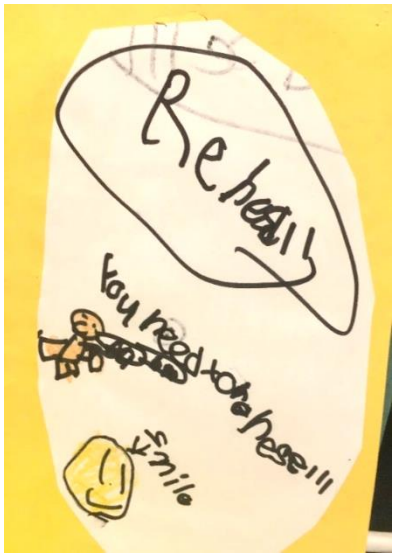
A good book, a picture, facts.



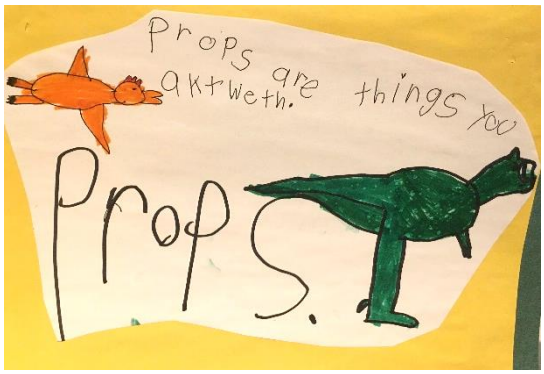
Write down your ideas. We had to do about 3 facts. You need to make sure your ideas are different. I had a fact about dinosaurs. The facts were the dinosaurs.



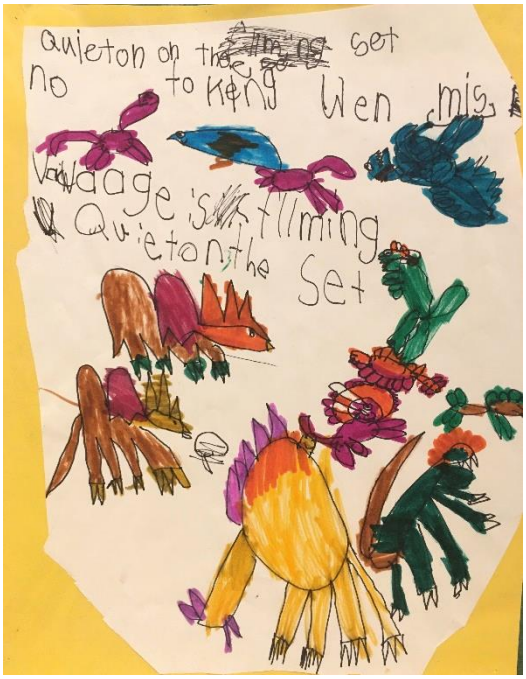
Try-outs. We decided what part we wanted to do. You get to decide, then you write facts. Then we practice the facts. Then we go sit and we said out loud our facts then we acted.



Rehearsal: You need to rehearse. Smile!

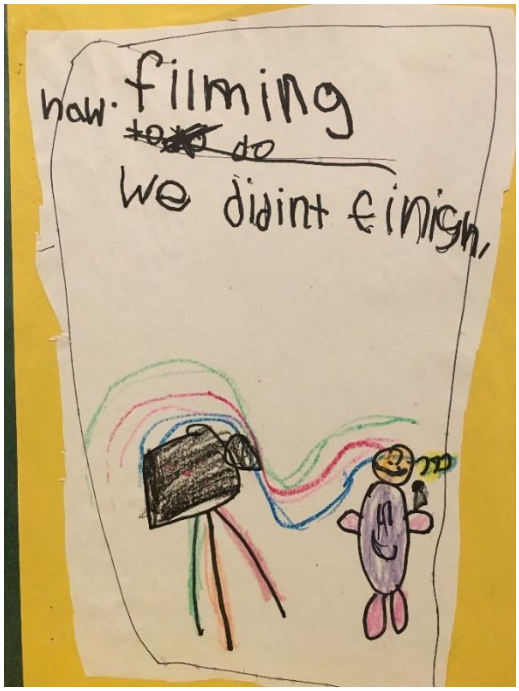


Props: Props are things you act with.



Quiet on the set. No talking when Mrs. Vaage's filming. Quiet on the set.

Lights Action Camera
Can you be quietest in the back.



Filming:
How to film. We didn't finish.

My reflection:

Not all projects get to the end vision and goal for several factors. Interests change, school demands, or the class becomes saturated with the task. It was an ambitious project, and we nearly completed it collaboratively. We got all the filming done - fact clips, dramatizations, and class songs.

As the children fatigued with the task, the final movie editing fell to me.

Copies of the movie were shared with the children on year end DVD's.

Dinosaur Models:

Many classes wanted to create their own dinosaur or dinosaur land. Following are projects that illustrate the different models.

Apatosaurus:

The first model co-created with a class was the Apatosaurus. Children were enthralled with the size of the apatosaurus and wanted to make a huge dinosaur themselves. It became a Kindergarten Project display for the school.

Stegosaurus:

The Junior Kindergarten class chose to construct a Stegosaurus, primarily because it was their favorite song (*My name is Stegosaurus, I'm a funny looking dinosaur, for on my back are many bony plates and on my tail's there's more. My front two legs are very short, my back two legs are long. My body's big, my head is very small, I'm put together wrong…*)

We collected large pieces of cardboard with parents' help.

Rolling the long pieces of cardboard to round out and soften the cardboard so we could form legs.

My front two legs are very short, my back two legs are long…

Roughed-in neck and head.

Fun meeting place under the dinosaur.

Covering with paper before maché

The first few pieces of paper maché.

underside first

piece by piece

The texture of the wallpaper paste is difficult for some children to handle.

nearly finished

My name is Stegosaurus, I'm a funny looking dinosaur, for on my back are many bony plates and on my tail's there's more. My front two legs are very short, my back two legs are long. My body's big, my head is very small, I'm put together wrong…

As the dinosaur study began to close, we needed to find a home for our dear Stegosaurus. Here is the letter home to the parents:

Dear Parents,

*It's the time of year to talk about the **Stegosaurus** that the children created. If you have a place for him at your home and would like to have him come and live with you, please sign the permission slip below. We will draw from any slips returned. Please return the slips by Wednesday, June 22nd. We will have the draw Wed. afternoon.*

Other years, the class creations have been tied on the roof of the minivan or separated into big parts and reattached at home. Where there is a will, there is a way!

Yes, my child _____ (name) has my permission to enter his/her name for the draw for the Stegosaurus dinosaur. I agree to take the Stegosaurus home before Tuesday, June 28th.

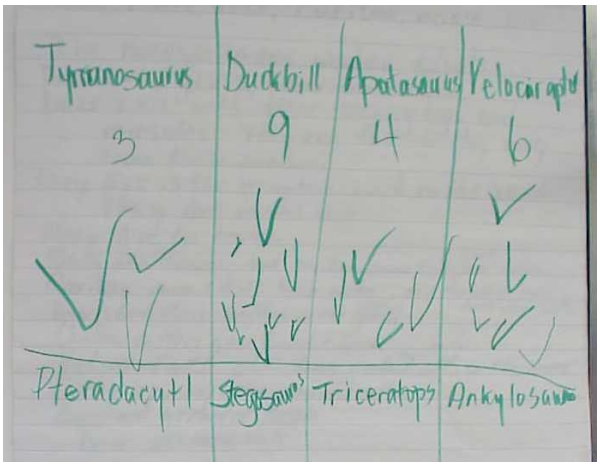
_____ (Parent Signature)

My reflection:

Another earlier class had created a stegosaurus as well, unfortunately at that time I didn't realize the value of documentation with photos. This stegosaurus was so popular that one of the parents from the school asked if they could use it in one of the downtown Bay window displays. I'd love to have a photo of that to share with you!

Parasaurolophus Model:

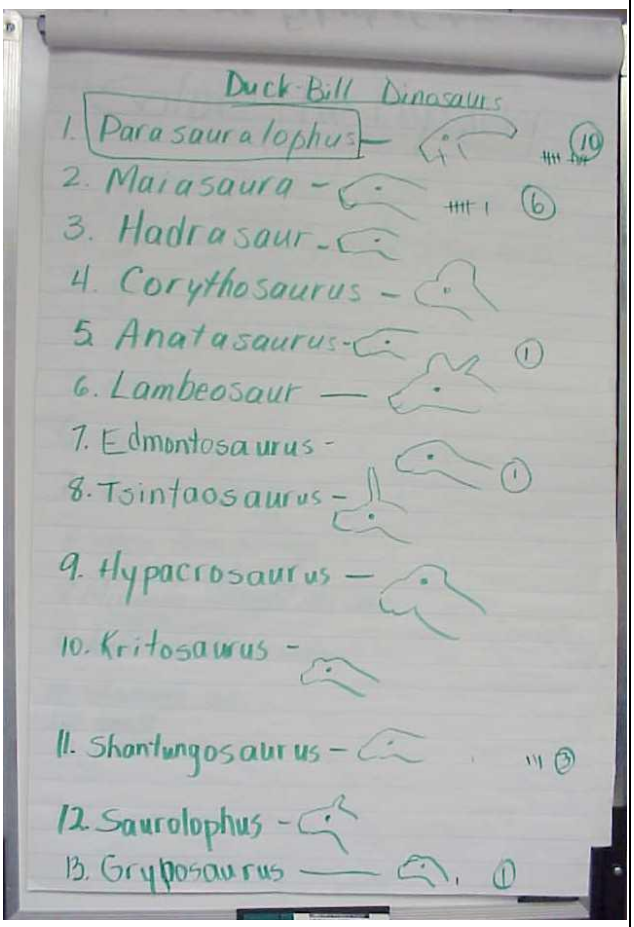
One kindergarten class was exceptionally interested in constructing things. Earlier in the year, they built a 2-metre leatherback turtle. After Christmas, they built a Franklin (see my memoire on this) house. Now they decided they would like to build a dinosaur.



Our first step was to decide which dinosaur to build. We collected data to help us make the decision. The duckbill dinosaur was the most popular choice.

In the chart to the right, I added a bit of a drawing of the duckbill dinosaurs just to help differentiate them for authentic voting. Many of those listed were new discoveries as they brainstormed to find as many duckbill dinosaurs for the list as possible.

The Parasaurolophus was the favorite duckbill.



We started with a wood skeletal framework and began to measure out the chicken wire for forming the body shape.

It took the big tin snips and several children holding down the chicken wire to make cuts. Each cut was labor intensive.

Then we wrapped the wire around the frame and made a rounded shape.

Rebar twist ties held the chicken wire together.

We wrapped the chicken wire with plastic wrap to help hold the shape while we did the paper maché. It looks like the dinosaur has skin.

We used newspaper for the base coat of paper maché.

Unfortunately, we did not finish this dinosaur before the kindergarten year was over, but I kept it over the summer as I was moving up with my class to Grade 1.

The photos of the finished Parasaurolophus are missing. However, the pictures of our dear dinosaur going home with one family are delightful, and you can see just how colourful and dominant it became.

Play Clay Models with Dioramas

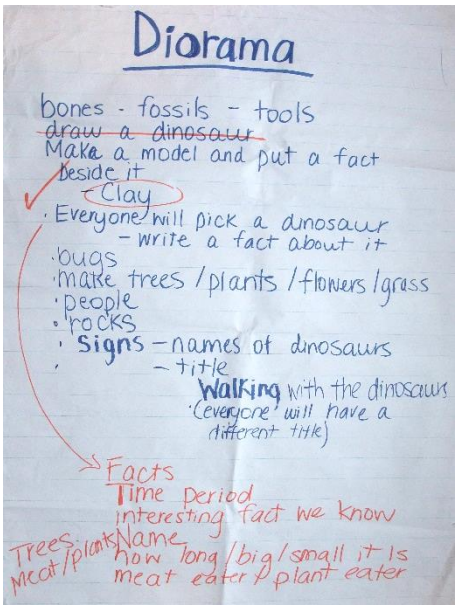
Another class made the decision to replicate the classroom dinosaur plastic models using play clay. Each child selected their favorite model to use as their inspiration as well as selecting the colour of play clay to use.

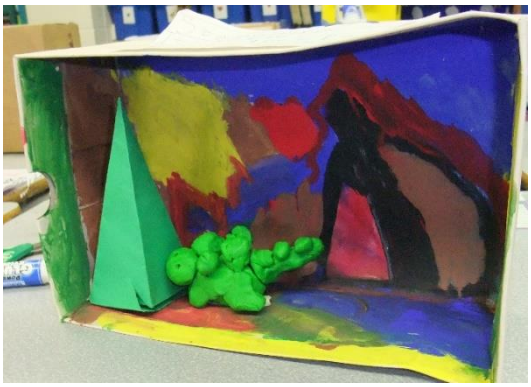
Habitat Dioramas

The children also wanted to create habitats for their play clay dinosaurs and began to work on their dioramas. Working with a student teacher, they brainstormed and planned what was needed for their diorama.

They began with a drawing of their dinosaur with appropriate background before they began painting.

The dioramas were displayed in the library.





Dinosaur Land Models

Not all classes were interested in creating a large dinosaur model. Others wanted to build a play space for the little dinosaurs I'd collected.

Using a map modelling recipe, children were able to participate in the mixing, spreading, and molding of the surface.

Map Modeling Recipe

1-part salt
1-part flour
2/3 - 1-part water
paints
heavy cardboard or wood

Mix salt and flour and add enough water until like thick frosting. Stir. Mold and paint when dry. Spread mixture on wood or cardboard, adding hills and valleys. Let dry and paint if desired. Will dry within 1-2 days.

This mixture was spread over a piece of plywood that sat on one of the class tables. Children painted the landscape collaboratively paying close attention to specific components - like the eggs in the nests and the volcanoes.

My reflection:

This play space was used daily in a variety of ways. For instance, one day children added some sand to the nests. The next couple of days, children tried to sweep the sand off. Sometimes bugs came to play in Dino Land. Occasionally, children sorted and grouped the small dinosaurs. Other times, the large dinosaur models come over and raided the nests. Imaginative play and creativity flourished.

Research Inquiries in the Community

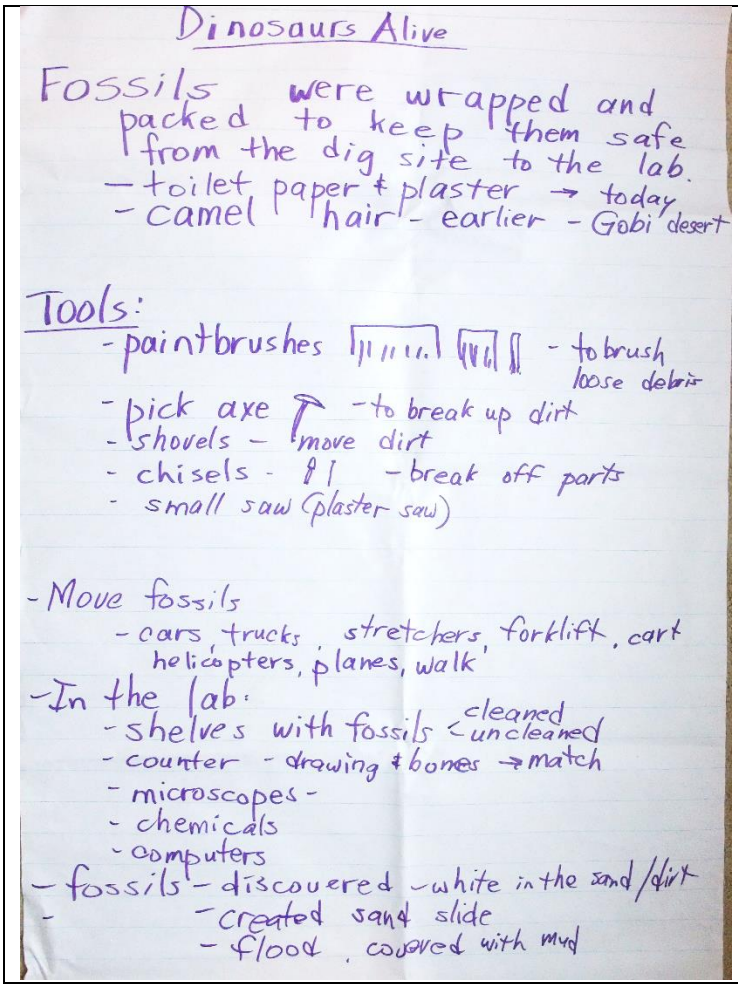
Tyrell Museum in Drumheller

As often as possible, we used community resources for research. One year it was possible for us to do a road trip by bus to the Tyrell Museum in Drumheller.

Royal Alberta Museum

More commonly, we visited the Royal Alberta Museum.

IMAX Dinosaurs Alive



Dinosaurs Alive

Fossils were wrapped and packed to keep them safe from the dig site to the lab.
- toilet paper & plaster → today
- camel hair - earlier - Gobi desert

Tools:
- paintbrushes - to brush loose debris
- pick axe - to break up dirt
- shovels - move dirt
- chisels - break off parts
- small saw (plaster saw)

- Move fossils
  - cars, trucks, stretchers, forklift, cart helicopters, planes, walk
- In the lab:
  - shelves with fossils < cleaned uncleaned
  - counter - drawing & bones → match
  - microscopes
  - chemicals
  - computers
- fossils - discovered - white in the sand/dirt
  - created sand slide
  - flood, covered with mud

Dinosaurs Alive was a film being shown at the IMAX theatre.

I had asked the children to remember **3** things from the movie so that we could remember the research facts from watching this program.

This chart shows a culmination of recollections from the IMAX movie.

Going Back in Time – A BBC video

With amazing animation through technology, this film, *Going Back in Time*, showed the regression from modern times back through to the Triassic period. Geology, climate, vegetation, and dinosaurs were all illustrated.

Me: "How do they know what it looked like back then? Did they have cameras back then?"

B: "They're trying to figure out how it was they were here."

Me: "Well, how could they make a movie like this? "

Class responses: Different backgrounds, mountains going up and down. Light was flashing.

M (excited to have figured out the flashing lights): "It was day and night, day and night! So, if it went back 65 mya, that was a lot of day and nights*!"*

The video went back to the Triassic, then to one giant land mass called Pangea.
"It was a little small land, and it broke up. It broke up from volcanoes."

Me: "I'm wondering if that's the way it divided. We might need to research that a bit more."

In this section, I noticed the class was beginning to be 'zoned out' just watching the video, until I started asking questions.

Me: "What was different about this animal than the rest?"
Their ideas: skin, bones, meat/plant eater, that he could bend over (tilt), arms

I replayed that section of the film again, and this time they were listening with intent and attention and called out "hips and ankles*"* when the heard the answer. The first dinosaurs did not have lizard hips.

The moderator said that the change to dinosaurs helped them to survive.

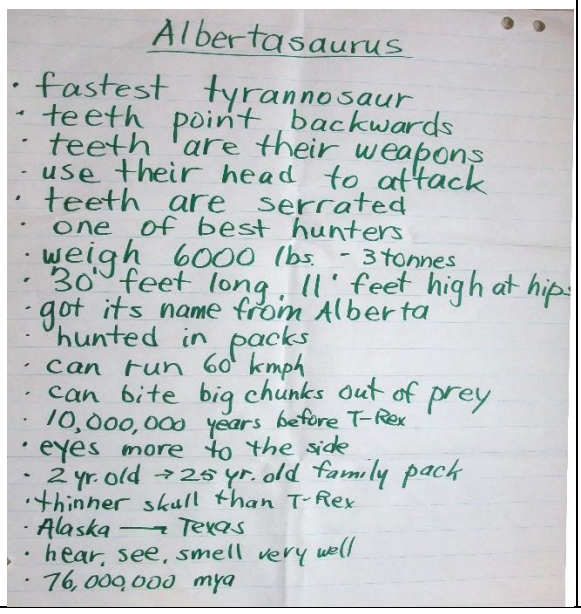
Someone quipped, "But not forever, though!" setting off chuckles for the whole group.

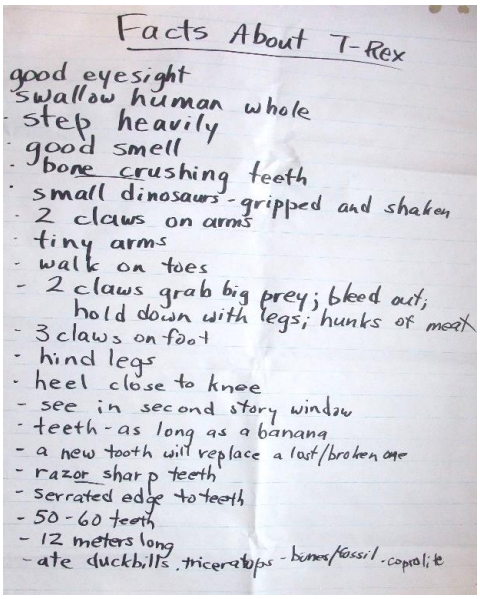
My reflection:
With modern animations, history can be made to come alive, and changes over time can become 'real'. The knowledge that was gained from viewing these films stayed with us throughout our project inquiries.

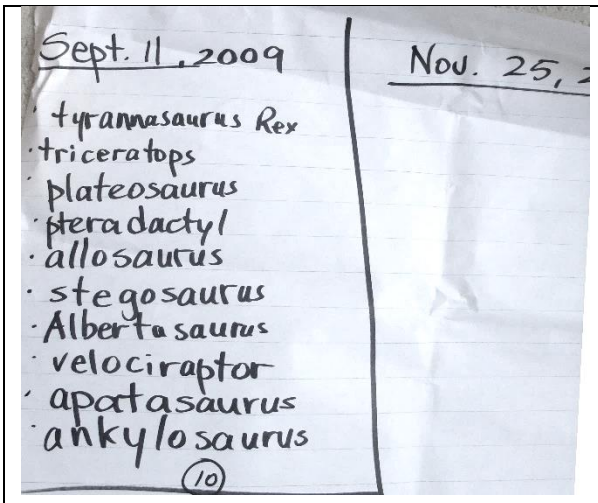
Two strong examples were the coprolite connection to the Diplodocus, and the reference back to the IMAX film while we were watching BBC dinosaur videos.

Class Collaborated Research:

When a class has *windfire*, an exhilaration and excitement to learn about something, it's almost hard to keep up the momentum. Here's a few examples of just how fast children can bring research together collaboratively.





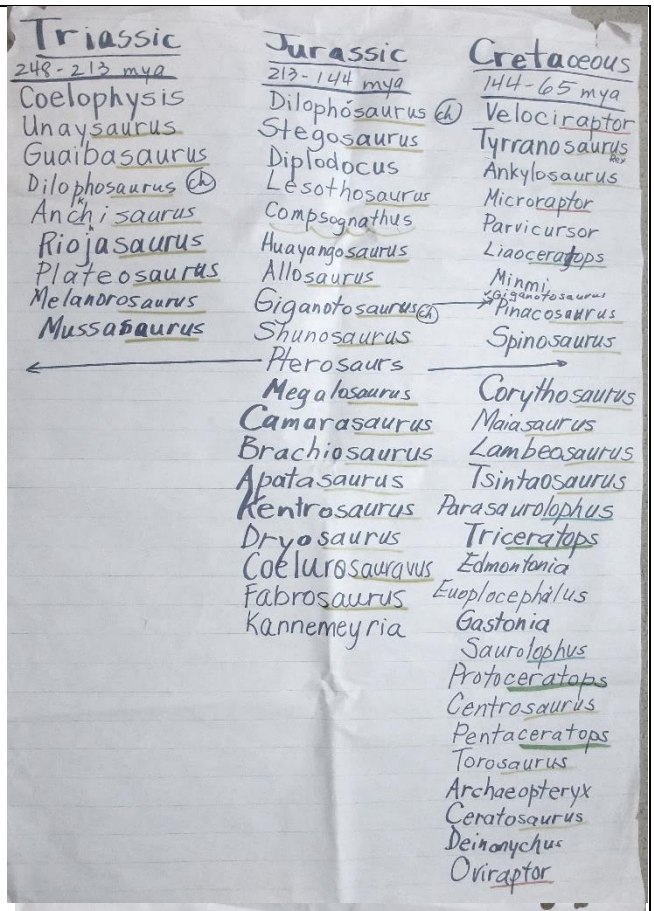


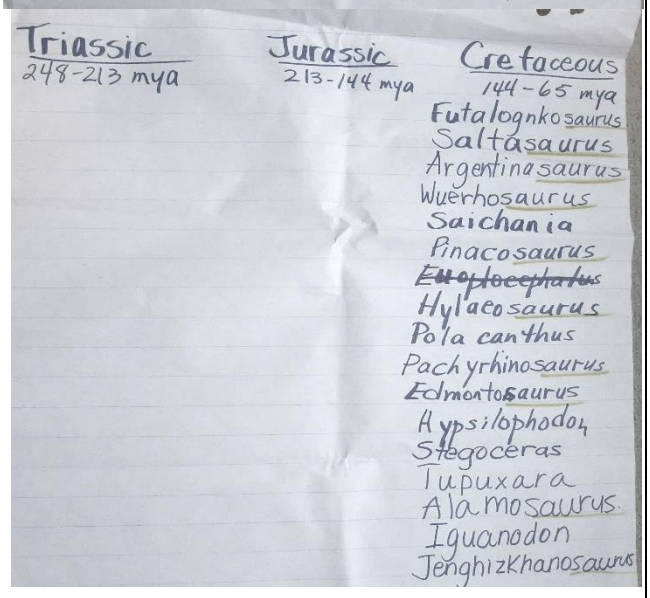
The number of dinosaurs that the children could list at the beginning of our project.

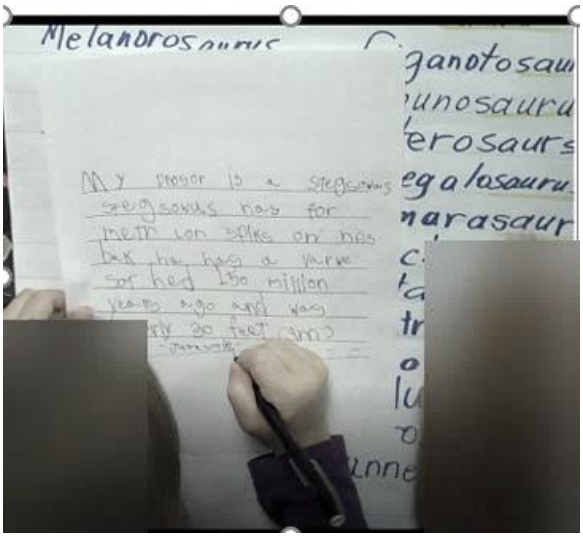
As you can see on the right, the list grew and grew. Every time a new dinosaur was found, it had to be listed in the correct time period.

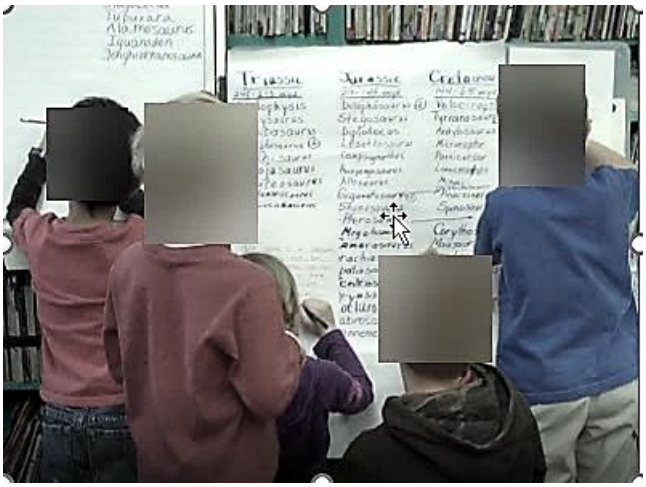
You may notice underlined segments under most of the dinosaur names. The yellow underlines for *saurus,* the red lines under *raptor,* the green lines under *ceratops.*

These word segments became so well-known and easily read, that it was one of the ways into early reading for the Gr. 1 class.







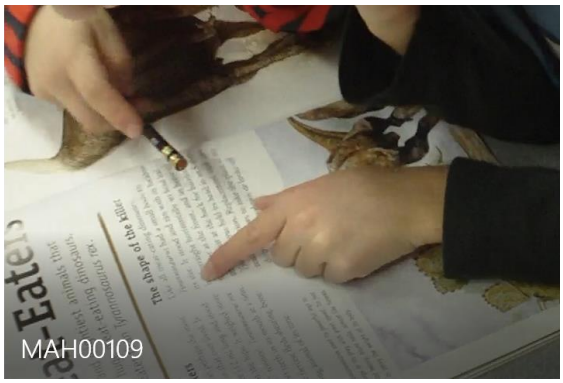


These two photos show how the community generated list has become a primary source for children when they need a quick reference for their independent research.

Research from Books:

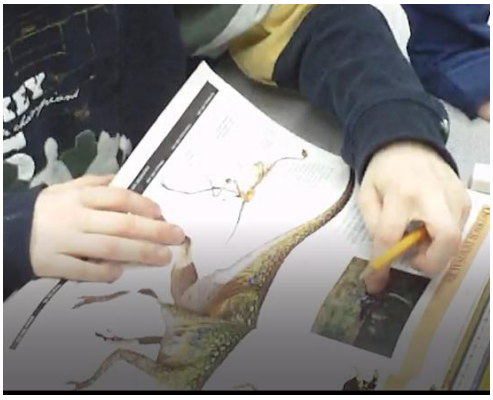
Children loved doing independent research – sometimes the information was gleaned by visual literacy, i.e., studying the pictures, but often they challenged themselves to read text beyond their grade level.

Recording the locations of dinosaurs around the world

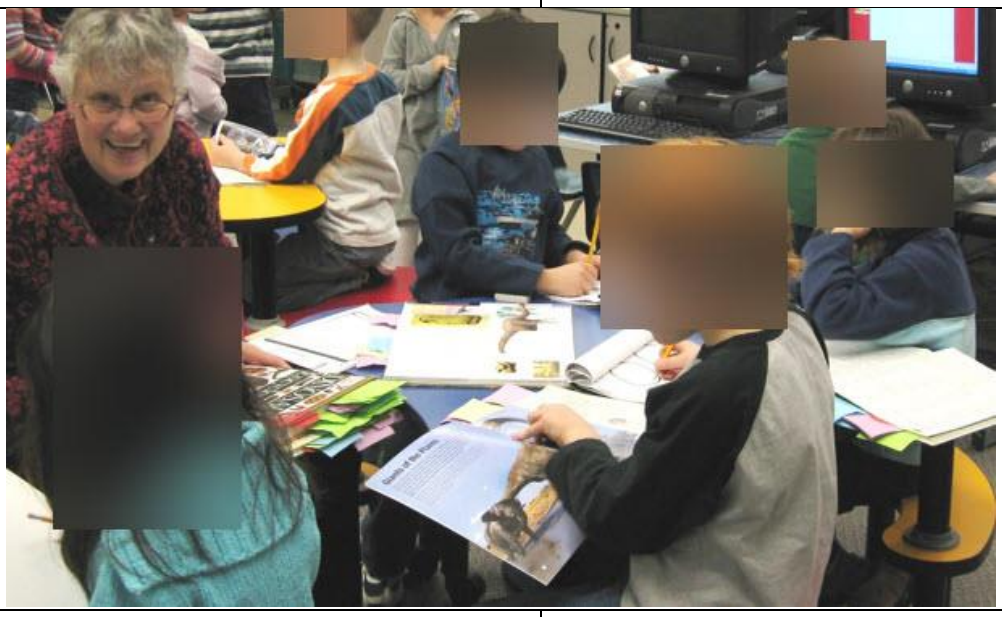


Tyrannosaurus had a small body.

duckbill dinosaurs



"You can see that the ostrich dinosaurs have a long neck like the ostriches, but the most common thing is running."



Children's Independent Dinosaur Research Fun Facts:

Fun Facts: Triassic Period

- Dinosaurs first appeared during the late Triassic Period. Herds of prosauropod dinosaurs such as Plateosaurus were common at this time.
- Plesiosaurus was 7 meters long and was one of the top predators. He was a close relative to the plesiosaur.
- Eurhinosaurus was a 2-meter-long Ichthyosaur.
- Pistosaurus was the first plesiosaurus. It was 3 meters long.
- The Triassic Period was from 245 mya to 205 mya. (millions of years ago)
- Elasmosaurus was 14 meters long.
- Nothosaurus. This slender animal was a typical Nothosaurus – reptiles that lived in shallow Triassic seas and fed mainly on fish. Unlike many marine reptiles, they probably bred on beaches, like seals.

Fun Facts: Jurassic Period

- In the Jurassic, there were huge plant-eaters like Diplodocus because they had lots of plants to eat. There were meat-eaters like Compsognathus and Allosaurus.
- There were ammonites in the Jurassic Period.
- The Jurassic Period was from 206 mya to 144 mya.
- The Jurassic Period was warm and moist.
- In the Jurassic Period, there were 2 super continents: Gondwanaland and Laurasia.
- Heterodontosaurus, Pterodactyls, Allosaurus, Supersaurus
- Stegosaurus, Seismosaurus, Diplodocus, Apatosaurus, Compsognathus

Fun Facts: Cretaceous Period

- Duckbills, Tyrannosaurus Rex, Velociraptor, Torosaurus, Triceratops, Edmontosaurus, Deinonychus
- Elasmosaurus, Iguanodon, Microraptor, Nigersaurus, Olorotitan, Quetzalcoatlus, Raptor, Stygimoloch, Suanomimus, Tarchia, Triceratops, Tylosaurus
- The Lambeosaurus is about 9 – 15 m
- The Seismosaurus is a plant-eater
- The Saurolophus was a duck-billed dinosaur
- The Xiqurus is about 5 feet to 1.5 m long.
- Dinosaurs became extinct in the cretaceous.
- In the Cretaceous Period, the Rocky Mountains were formed.
- Flowers came and new bugs came in the Cretaceous.
- There were plan-eaters with armor like Ankylosaurus.
- The Microraptor had bright feathers.
- The Microraptor is the smallest dinosaur that ever lived.
- There were small mammals and reptiles like snakes and crocodiles.
- Microraptor had 4 wings.

Art Projects

Integrating art into a project helps reinforce a new way to share what children have learned; it's another trace, another piece of evidence of documentation.

Watercolours

In the following photos, show examples of children creating original watercolour paintings in their multimedia books. At the time the photos were taken, children were comfortable with the medium of watercolour and had learned about painting with the tip of the brush and keeping their palette colours reasonably pure.

Paper Construction Models

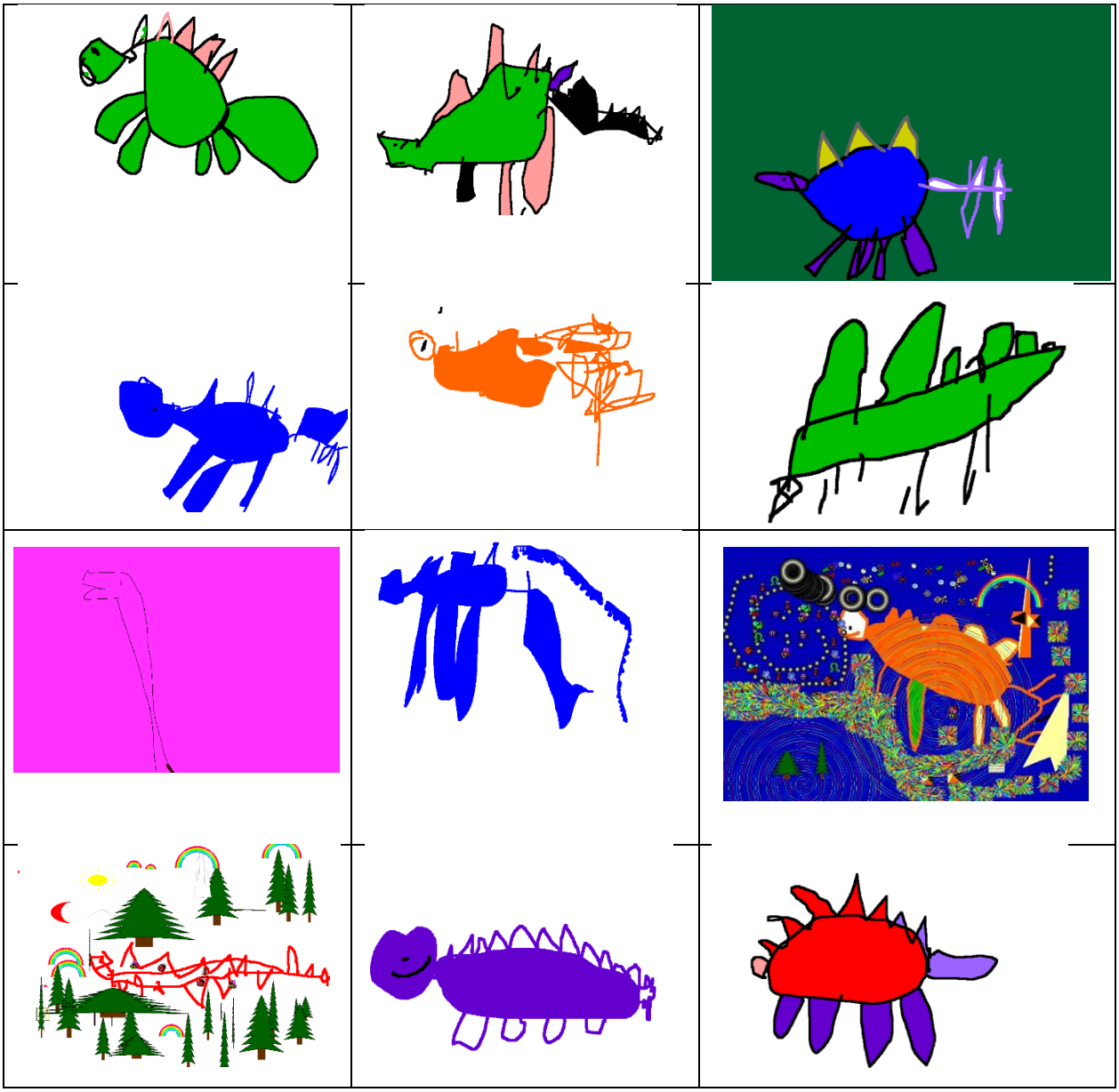
For our display case which will be documented later in this book, a few children wanted to suspend pterosaurs. These photos show their creativity.

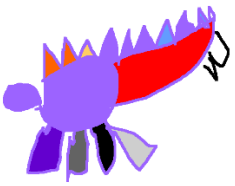
Murals

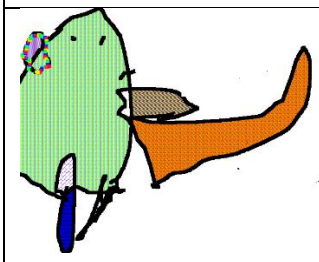
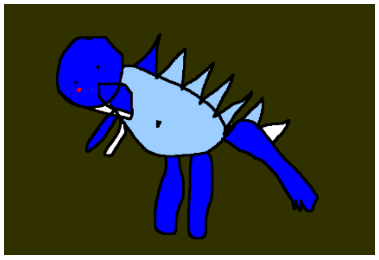
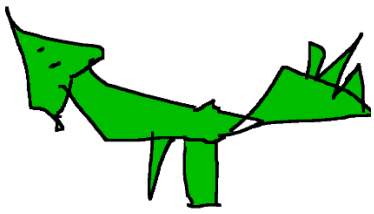
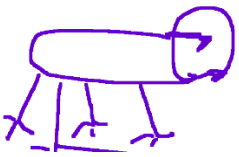
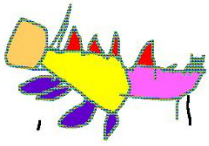
Murals are perfect display backgrounds for any project work. Part of the finesse of a successful mural is planning the subject, sketching a drawing, preparing paints, and then painting with small groups of children.

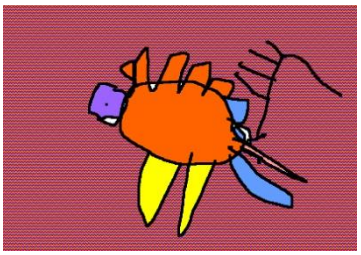
KidPix Art

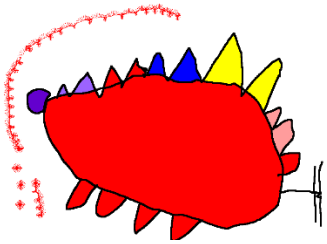
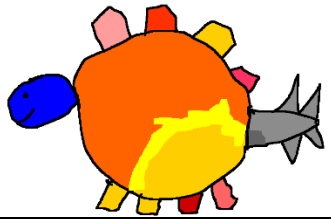
Technology is incorporated into projects as another tool for researching, exploring, and representing. The examples below show 3- and 4-year old's experimenting with KidPix software as well as trying to represent a dinosaur. Their first task was to use the pencil tool to draw the dinosaur, then the paint tool to color it. The last task was to add decorations for the drawing. Drawing the dinosaur was fret with challenges as every single line had to touch another to create closed spaces, or the paint would leak out over the entire page. These are the finished products for the two classes.



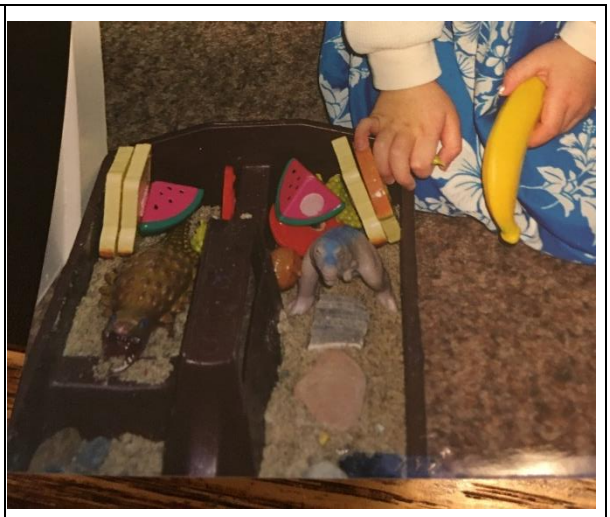
My reflection:

From my teacher point of view, I was not assessing the 'product' but the process. These KidPix examples gave me insight and information on hand-eye coordination, ability to follow instructions, flexibility in learning a new medium, and creativity. This information showed me where teaching was needed. It's an example of assessment **for** learning, not an assessment **of** learning. It didn't escape my notice that many of these dinosaurs were Stegosaurus, which these classes were building as a big model.

Blocks:

Part of my classroom materials available to my classes were two big tubs of dinosaurs, which were usually kept near my large hollow blocks. As you can see by the photos below, children liked to build mountains for the dinosaurs, or enclosures with plants and/or rocks.

The following photos show the creativity and engagement of children with the dinosaur models and other open-ended materials.



Dinosaur Environment

Following is documentation of the process of one group of children as they created a dinosaur environment.

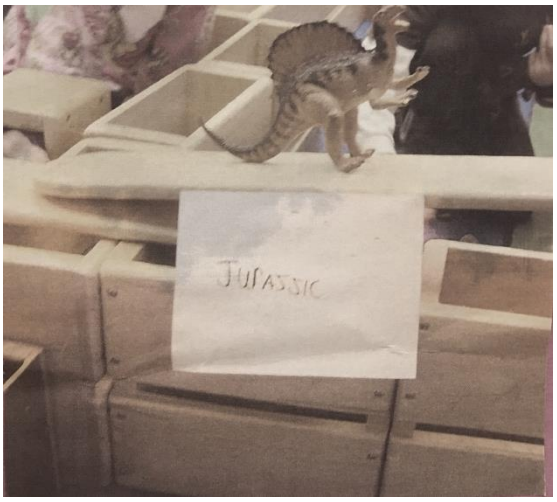
A: “We’re going to have different periods – Triassic, Cretaceous, and Jurassic. We have dinosaurs to put them in different periods.”

S: “We need grass and trees for the Cretaceous period. We put a mountain and an asteroid and we made a volcano. Then we put dinosaurs in it.”

*C: "*This part of the carpet can be the water part because it's blue."

*C: "*The Triassic volcano, I took 2 long wooden blocks and put a red piece of paper to make it look like it was exploding.*"*

*T: "*I'm in Jurassic so… I'm making a long neck dinosaur that needs to be in the Jurassic period. So, you see the long neck and remember it needs to go in Jurassic."

Children made the construction more complicated by adding on to other ideas. In the photo above the Spinosaurus has the challenge of an incline.

My reflection:

When we consider the development of the whole child, we look at 5 areas: Social, Physical, Intellectual, Creative, and Emotional. Block play addresses all 5 areas.

Socially: Blocks encourage children to cooperate, create, and manipulate objects in systems they can understand. Bigger structures involve collaboration and sharing ideas to build common goals.

Physically: The movement of carrying the unit blocks and large hollow blocks, fitting them together, and restacking them help develop muscle strength in both large and small muscle groups. Block play can help children develop skills in design, structure, representation, balance, and stability.

Intellectually: Blocks help children learn mathematical, scientific, language and social skills. Children learn to describe sizes, shapes, and positions. Math skills like grouping, adding, and subtracting are developed hands on – as blocks are ¼, ½, and full sized. Children also experience gravity, balance, and geometry.

Creatively: Blocks offer children the chance to use their imaginations to make their own designs with blocks and additional manipulatives to create dramas in miniature landscapes.

Emotionally: Children are engaged, happy and involved in the process. They feel success of creating their structures and patterns, which helps self-esteem.

Environment as a Third Teacher:

My reflection:

Having studied the Reggio approach to learning, I appreciated that the environment is considered the "third teacher." The first teacher is the parent, second the schoolteacher, and third the environment around the child.

Teachers carefully organize the space so there is room for individual, small group, and large group projects.

This wall of dinosaur images provides opportunity for visual literacy.

Part of the environment for learning is allowing time for dialogue, questions, thinking and brainstorming.

Hands on manipulatives or models and resources of non-fiction as well as fiction books are important. Keeping them sorted is a learned skill throughout the year. It's not as satisfying an experience if you must dig through things to find all the dinosaurs, for example.

The group block play you read about earlier is important, but equally important is the opportunity for individual construction and creativity. These small dinosaurs and a bit of a background provided the provocation to engage.

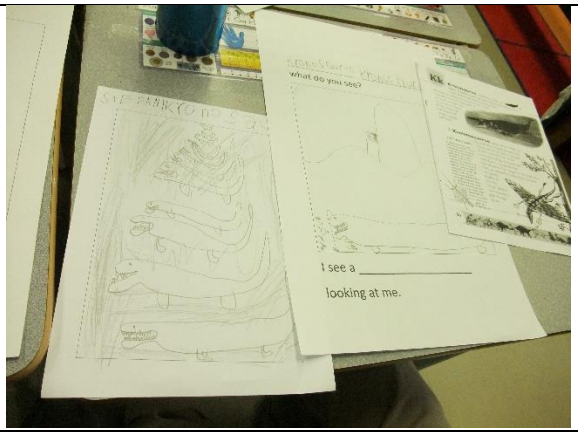
Documentation of children's work shows children that their work and creativity is valued. Their ideas are honored and treated respectfully.

Plants, mirrors, tactile objects all assist children to develop concepts and increase in-depth learning.

Literacy:

Class Created Books:

Starting with the easiest to create was the pattern book based on the book *Brown Bear, Brown Bear, What Do You See?* By Bill Martin, Jr. Here is a sample of our book *Dinosaur, Dinosaur, What Do You See?*



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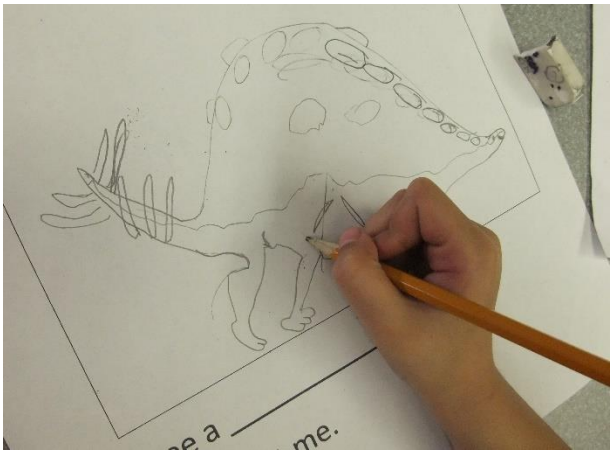
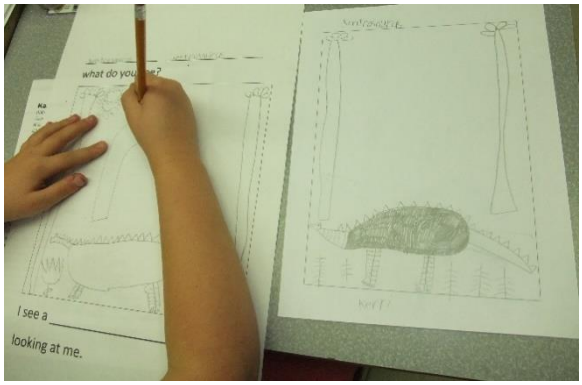
<td>  </td>
<td> 
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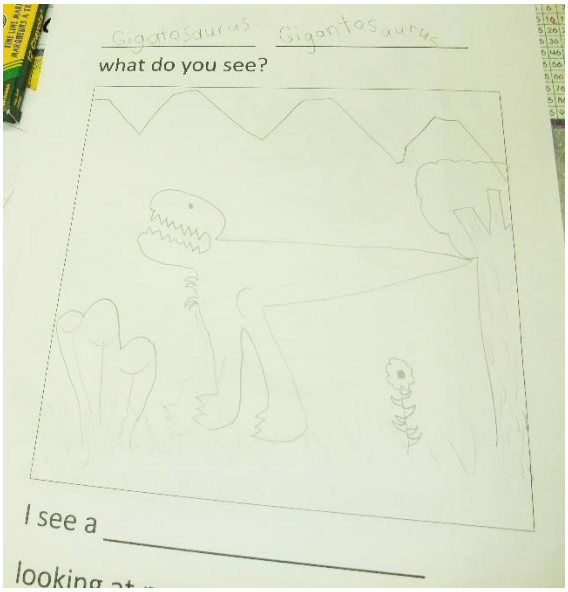
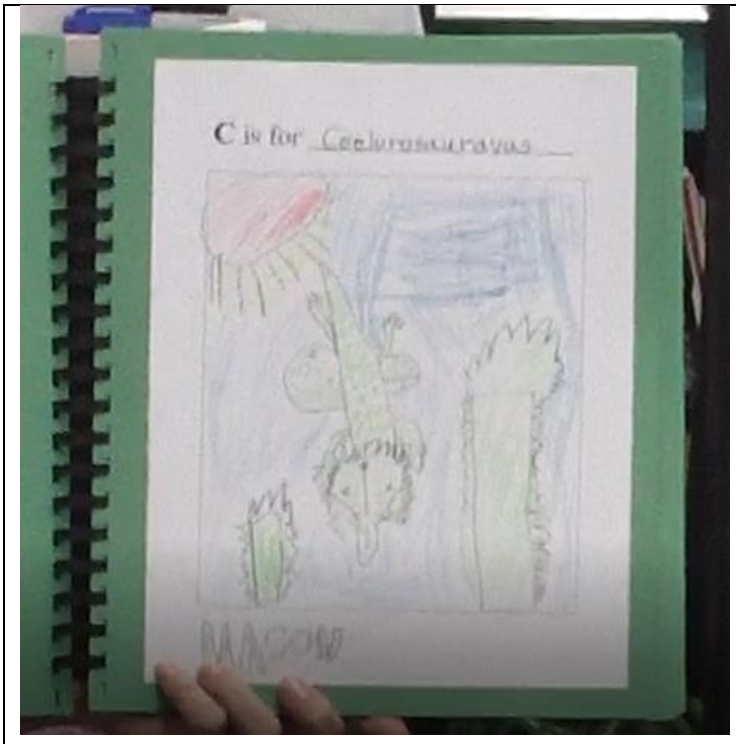
<td> 
</td>
<td>From the examples you can see that the children chose their own dinosaur to draw and illustrate. So with every child completing their page, we then had to connect the pages in an orderly fashion, so that the name of the next dinosaur could be entered at the bottom.

This completed book created hours of literacy as children could read their own dinosaur name, but the other ones were new and unknown. So each child became an expert on their page, and helped the others read it.</td>
</tr>
</table>

ABC Pattern Book

The *ABC Dinosaur Book* was another pattern book. This one required a lot of research through our non-fiction collection. Children learned it was faster to look at the index to find dinosaurs whose name began with a specific letter than to skim the full book!



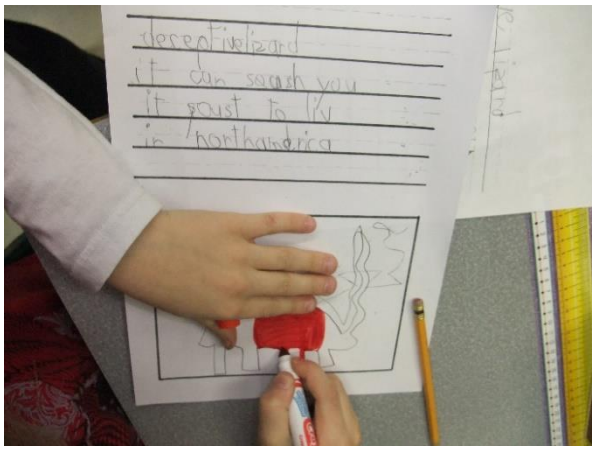
This book became a book of humor.

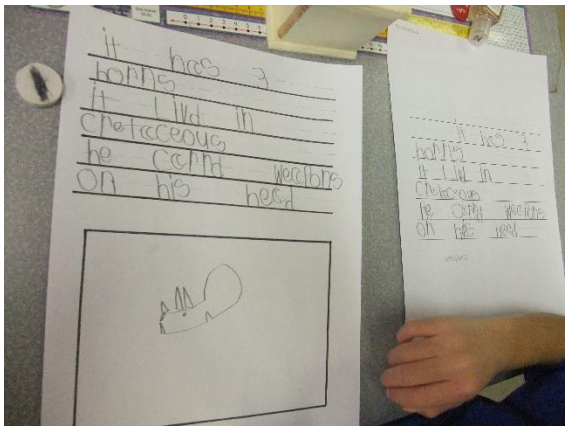
First, the teacher would do a read aloud. Usually, for complicated dinosaur names, the pronunciation guide was directly following the word. This wasn't the case here. So, for this dinosaur, Coelurosaurus, one adult would read it with a hard *c,* and another would read it with a soft *c.*

Usually with a predictable book, I would pause before saying the name to let the children predict/read the word themselves. They got goofy and invented all kinds of words for *C*. It was so much fun.

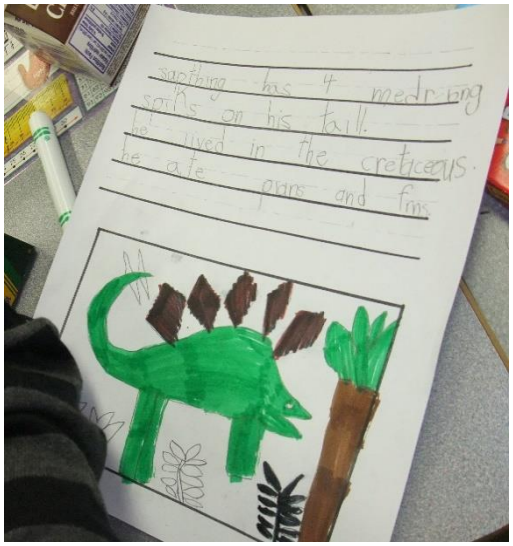
Mystery Fact Book

The children wanted to create a fact book based on an idea they'd seen from one of our read-alouds. The page would tell the facts about a dinosaur, and when you lifted a flap, you would see the drawing and identification of the dinosaur. They used a half sheet taped to the middle of the page to cover the drawing in the actual book. Children took this very seriously and used secrecy as much as they could.


deceptive lizard
it can scare you
it used to liv
in northamerica


it has 3
horns
it lived in
cretaceous
he carry
on his head


Crayola
Colored Pencils


something has 4 medrong
spikes on his tail.
he lived in the creticeous.
he ate pans and fins

Comic Book Creator Dinosaur Stories:

The University of Alberta early literacy class collaborated with my class to use the software *Comic Book Creator* to create dinosaur stories in a comic book format.

A guideline reference was given to each U of A student to use while they worked side by side with my young students. Directions on opening, finding photos/illustrations, and saving the project were all outlined. The U of A students were to facilitate the creativity of the young children and follow their lead. First, choices had to be made to insert Images that could be used for background images for each comic cell. Next, dinosaur clip art could be inserted, but they had to be relevant to the story being created. Children could choose from any category: Armored Dinosaurs, Dinosaur Babies, Duckbills, Fast Dinosaurs, Flying Reptiles, Fossils, Giant Dinosaurs, Horned Dinosaurs, Meat Eaters, Paleontologist, Water Reptiles.

The U of A students then helped with the use of dialogue balloons and/or text boxes for the children to compose their dinosaur story. They also needed to coach them to think about beginning, middle and end of the story by guiding them with questioning and feedback. When completed, they used the colour printer for the final copy.

Unfortunately, I have no visuals to share, but the learning story was worth sharing.

Allosaurus Hunting

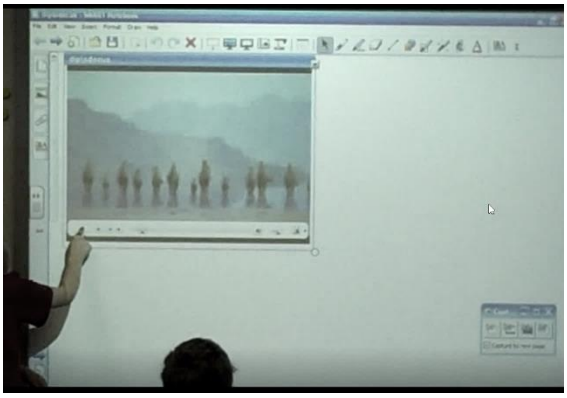
This book was created from a BBC YouTube video that was available online. The following will describe the process of capturing still photos from the video and creating the text to create a story.

This book was the second one we had done as a class, so the SMARTBoard techniques had been experienced before. The success of the book Jurassic Battle was the motivation for trying one more. The children only needed a reminder of how things worked.

We watched the video, then debriefed the story – the sequence, the reasons for the dinosaur behavior, the key elements that make up the story. We noted important scenes that we needed to capture for our book.

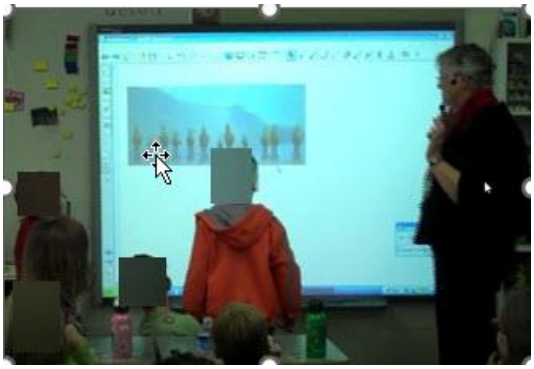
The process of doing the screen capture was reviewed, and a child selected to focus on the play pause buttons, while the class selected images for the book.

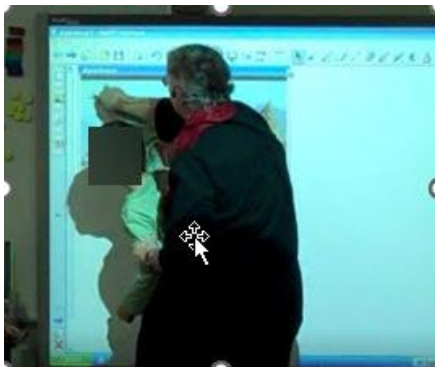
Here are some images of that process:

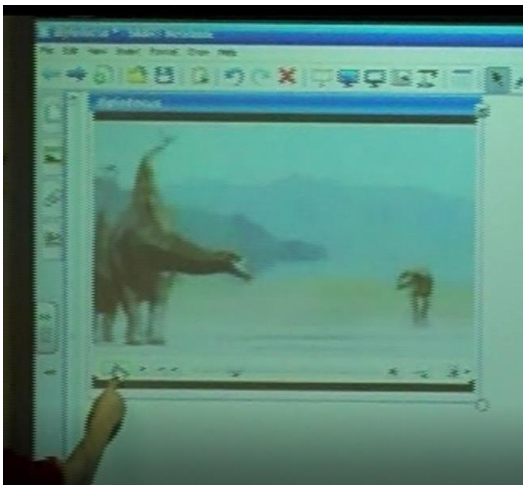


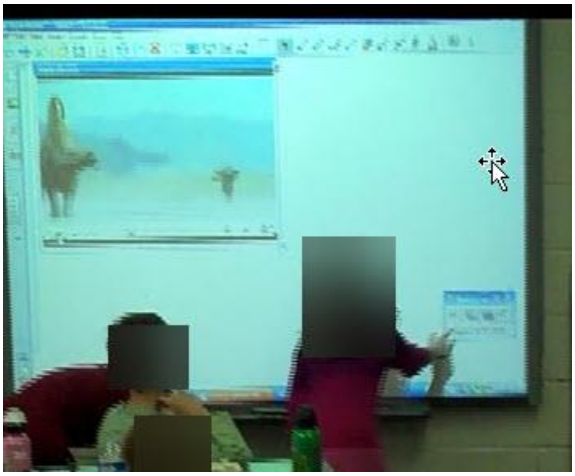
B has just paused the video on class's 'NOW!'

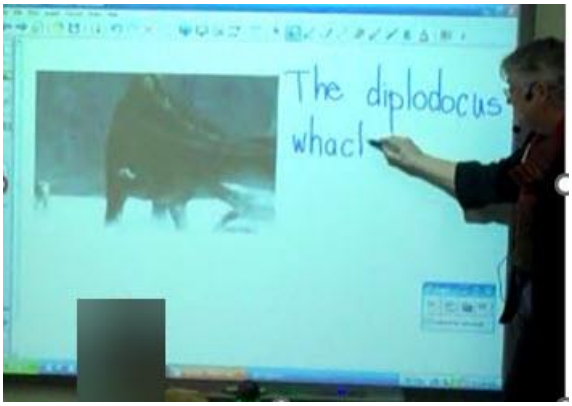
Drawing the rectangle around the section we wanted to capture. Because it required a certain pressure on the board to work, I assisted.



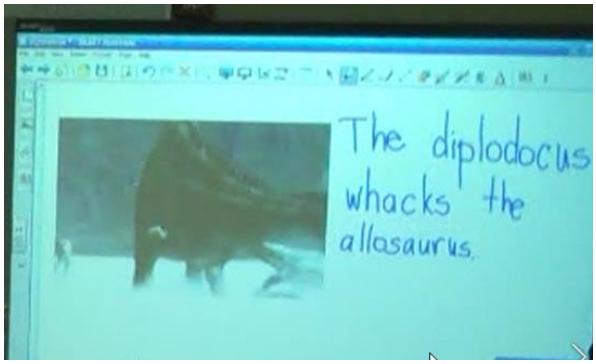






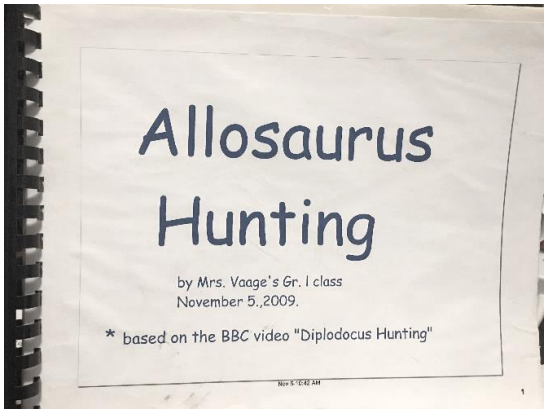


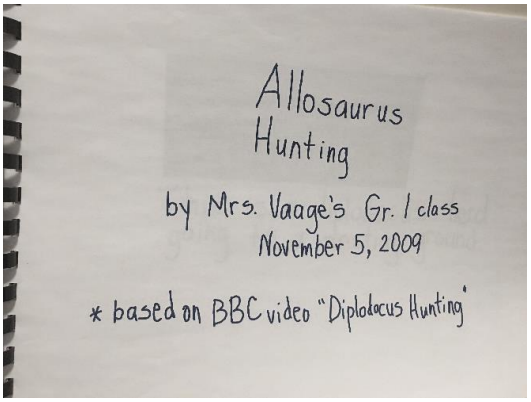
When we had the pictures for our story, I asked. "Where should we start writing our story? Beginning, middle or end?" *"The END!"* was their reply.

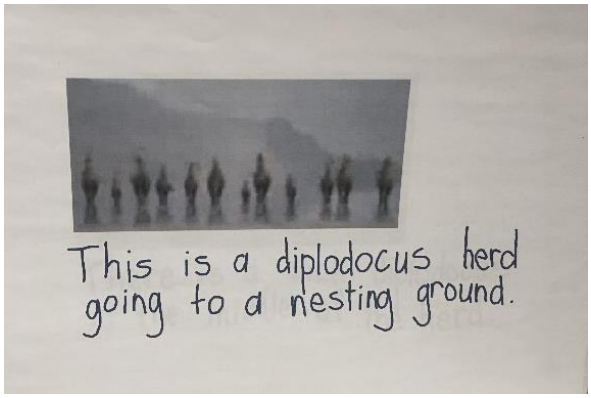


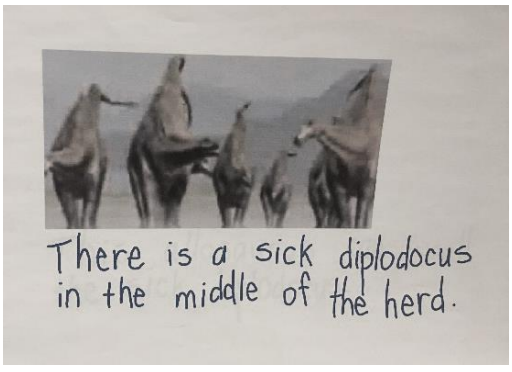
Children dictated text, helping me figure out the letters for each word.

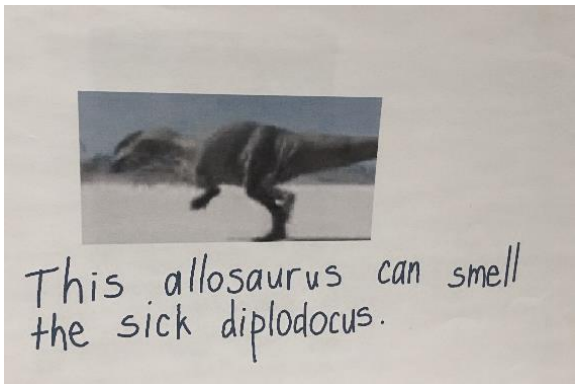
Following is the co-created story using SMARTBoard technology to create a class book.



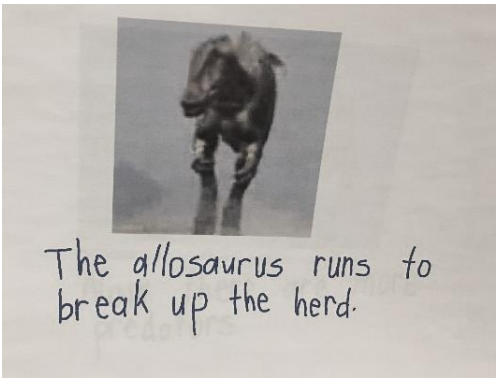




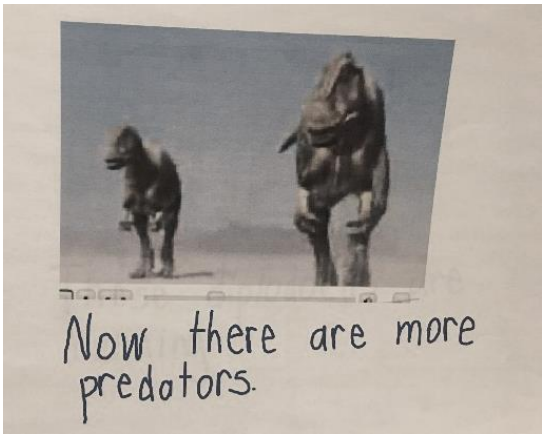




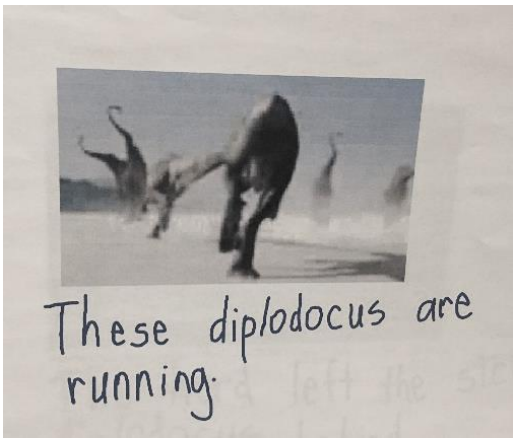
This allosaurus can smell the sick diplodocus.



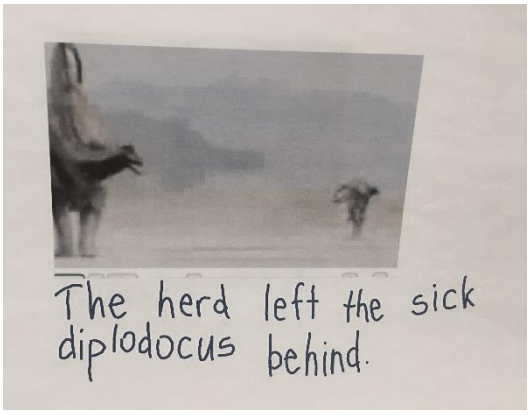
The allosaurus runs to break up the herd.



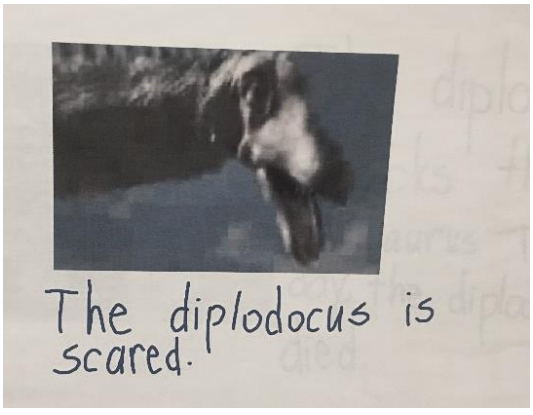
Now there are more predators.



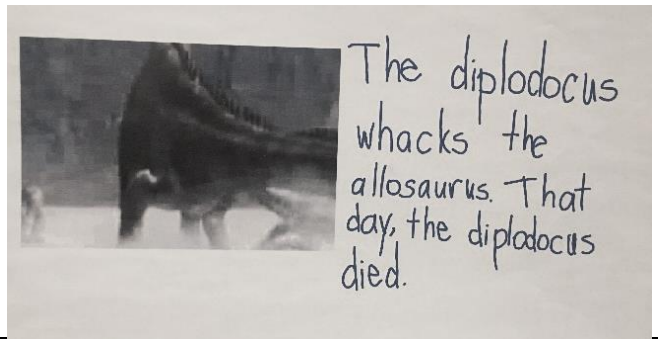
These diplodocus are running.



The herd left the sick diplodocus behind.



The diplodocus is scared.



My reflection:

Writing the ending for this story was very tough. The children wrestled with the idea of being factual, e.g., the allosaurus killed and ate the diplodocus, and having compassion in the telling for other audiences who might read the book.

A child came up with the perfect ending that relieved the class angst. **That day, the diplodocus died.** It left the emotion of hope within the truth, within the facts.

Dinosaur Joke Book

As part of my literacy program, our morning always started with a morning message on the white board. Letters were omitted and children took turns guessing which letter the message was missing, for e.g., *t.* The *t's* would all be filled in, much like the TV Show *Wheel of Fortune.*

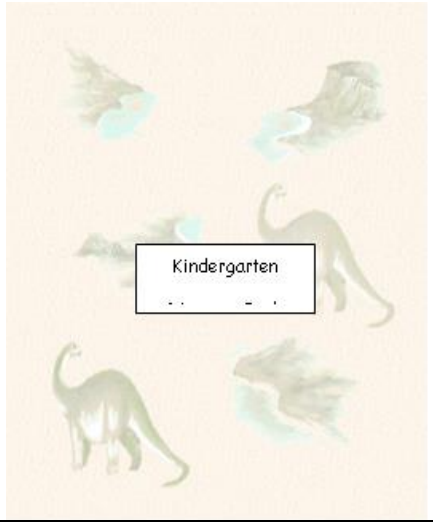
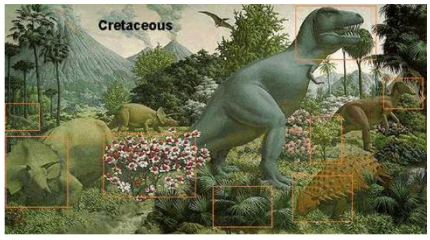
One class was really into jokes, so I began to use a knock-knock joke for the morning message, and I soon found that parents would wait around until the joke was solved. They loved it as much as the children!

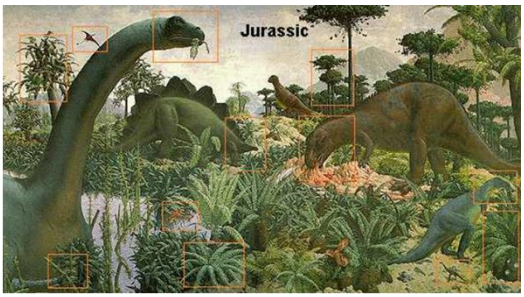
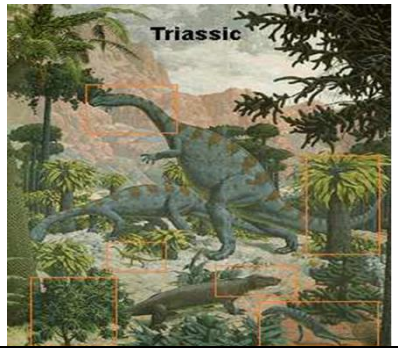
After searching online for dinosaur jokes, I printed out several pages of them and compiled them into a book. This became a favorite as children began to tell each other the jokes.

Kindergarten Dinosaur Book

Sometimes during a project, I created a place for children to record and represent their learning. It gave us a place of common reference. Not all pages were completed as our project journeyed on its own path.

Each cell represents one page in the book – so there is a prompt and space for response.

<table>
<tr>
<td> 
</td>
<td>In Alberta, many fossils were found in these hoodoos.
  </td>
</tr>
<tr>
<td>Bones and footprints give us clues about the dinosaur.</td>
<td>Paleontologists use many tools when they do dinosaur digs.
  </td>
</tr>
<tr>
<td>The last of the dinosaurs was the Cretaceous Period.
 
</td>
<td>I like this dinosaur best:</td>
</tr>
</table>

The middle times of the dinosaurs was theJurassic Period.  	I like this dinosaur best.
The first time of the dinosaurs was the Triassic Period.  	I like this dinosaur best.
Dinosaurs hatched from eggs.   	Some dinosaurs were very big. I can draw one. 

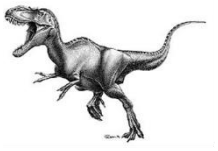
Some dinosaurs were very small. I can draw one.

Some dinosaurs eat other dinosaurs and insects. They are meat-eaters.

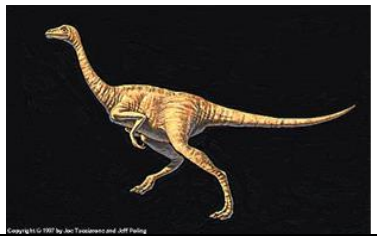
Some dinosaurs ate plants. I will draw some plants for this dinosaur.

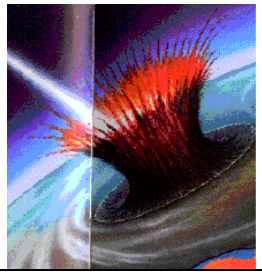
The carnivores always hunted the herbivores.

I can hide an iguanadon in the water.



Some dinosaurs took care of their babies. Here is a picture of my favorite dinosaur mother and her family.

This Edmontonia dinosaur has good armor. Here is another dinosaur with armor. 	Sir Richard Owen named the dinosaurs in 1841. Dinosaur means terrible lizard. Here is my dinosaur name. 
Some dinosaurs hunted alone. 	Others hunted in packs. 
Struthiomimus was a very fast runner. 	Some dinosaurs moved very slow. I can draw a slow one.
Scientists do not know why the dinosaurs disappeared. Maybe the dinosaurs got sick.	Maybe the temperature changed. 

Most likely, a giant meteorite hit the earth. Dust covered the sky for 3 months and all the plants died. Then the plant eaters died when they had no food. Then the meat eaters died when they had no food. 	I wish dinosaurs were still alive. I can draw a picture of me with my dinosaur.

Dinosaur Songs

My reflection:

With all my years of teaching, one thing I learned that is supported by research, is that children retain things learned through music. It goes into long-term memory, much the same as we remember the songs we learned growing up.

Over 45 dinosaur songs had been recorded – either purchased or available for free, and lyrics typed out for each. These were printed and collated into books for the children. We started by singing/reading the first song in the book, then over the next while progressively added the next song, and the next. So, by the time we reached the 46th song, our repertoire took us to almost 45 minutes of continuous singing.

The easiest, most predictable songs were at the beginning of the book and more complex lyrics and melodies near the end.

It sounds unbelievable for such young children to maintain that type of concentration, but they loved it, and insisted on including their favorites in their Dinosaur videos. The entire 45 song production was videotaped and recorded for the children for their year-end DVD.

The proof, the evidence, of the value of the songs, was exemplified during the parent-teacher conferences. The children were showing their parents the dinosaurs, and the information they were sharing was word for word from the songs. E.g., *Sir Richard Owen named the dinosaurs in 1842.*

Parents were amazed, but I just smiled proudly.

Following are images and samples of the book.

Their absolute favorite song: *My Name is Stegosaurus*

<u>My Name is Stegosaurus</u>

Refrain:

My name is stegosaurus.
I'm a funny looking dinosaur.
For on my back are many bony plates
And on my tail there's more.

Verse 1:

My front two legs are very short
My back two legs are long.
My body's big. My head is very small.
I'm put together wrong.

Refrain

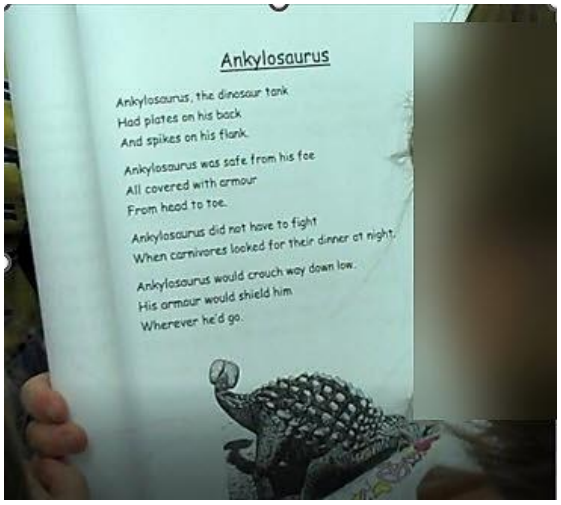
Verse 2:

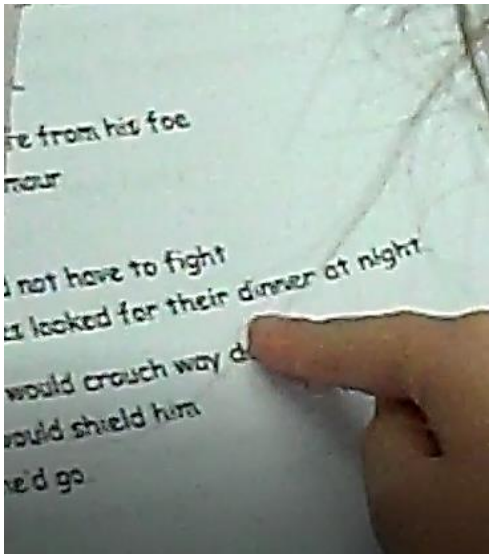
Sometimes another dinosaur
Comes by and wants to fight.
I don't use fists. I use my tail.
It has four sharp, sharp spikes.

Refrain

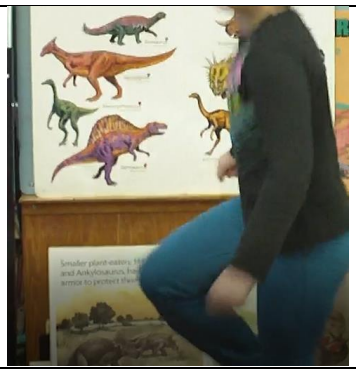
Verse 2

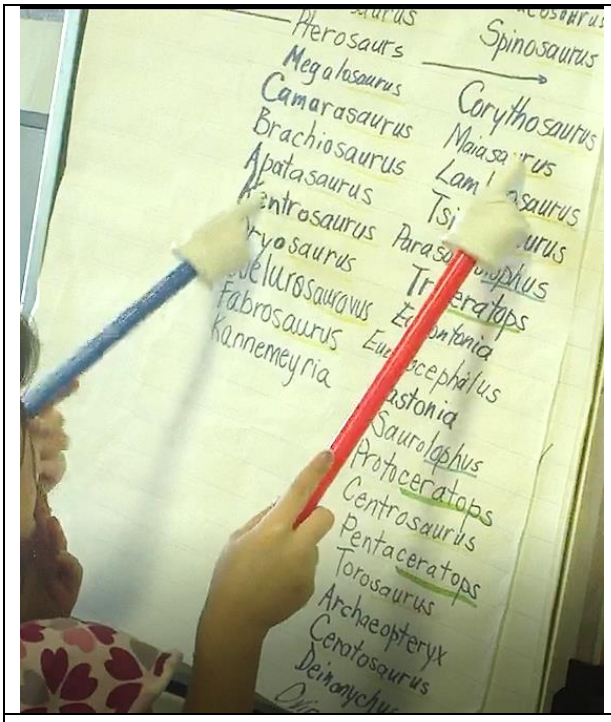
Refrain

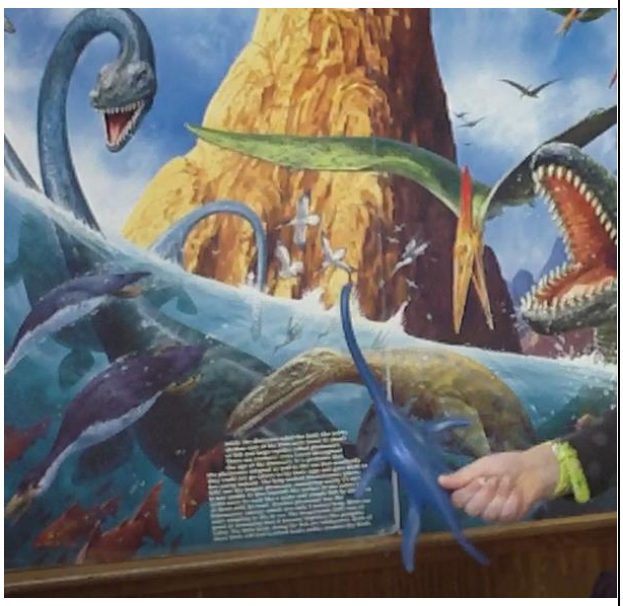


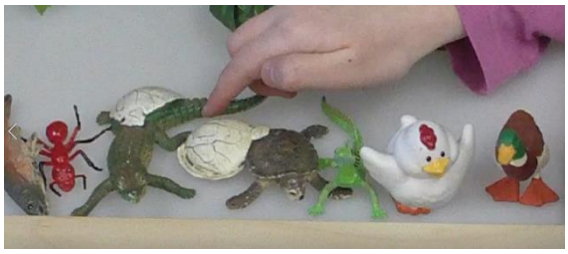


When the children were making a video of these 46 songs, they wanted to act some of them out, so searched out props to use, or volunteered to be the actor.




Pterosaurs
Spinosaurus
Megalosaurus
Camarasaurus
Brachiosaurus
Apatosaurus
Fabrosaurus
Kannemeyria
Corythosaurus
Lambeosaurus
Tsintaosaurus
Saurolophus
Protoceratops
Centrosaurus
Pentaceratops
Torosaurus
Archaeopteryx
Ceratosaurus





This last drama was for the song *The Dinosaur Race.* Some dinosaurs started faster with the advantage of longer legs. In the song, different dinosaurs had the lead for a while, but in the end, *Struthiomimus wins! Hurray!*

Dinosaur Literacy Centers

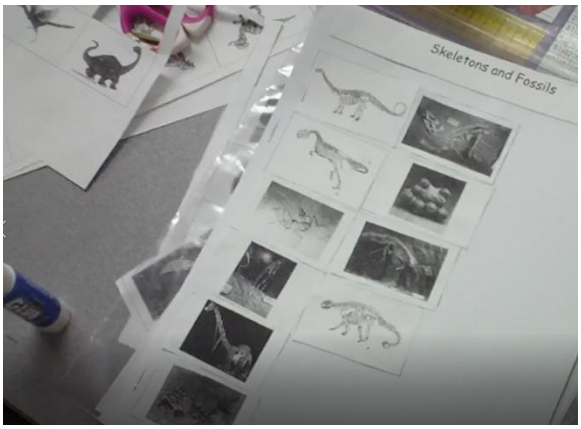
When doing project and inquiry learning, it proves to be a challenge to bring in the literacy teaching requirements to support children's learning. Building my own literacy centers around any project supported the topic but also encouraged literacy development.

Using a pocket chart, I listed the stations and the names of the children working at that station for that day. Usually, children worked in pairs or trios. Every morning, I moved the name of the station down one level, so children had a new and interesting engagement every day. Sometimes they had a second turn, if the station offered enough complexity to have another go at it.

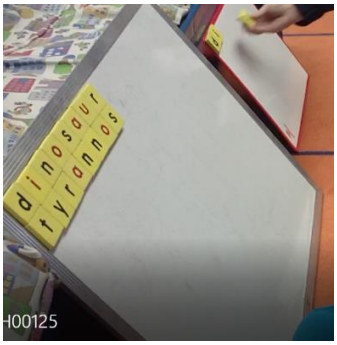
Non-Fiction Research	SMARTBoard – internet encounter
	

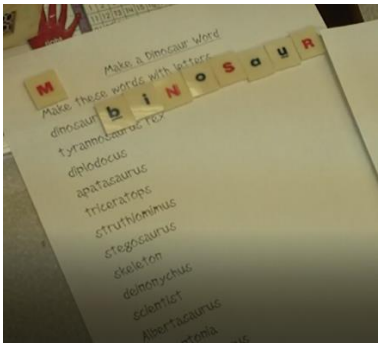
Scientific Drawings from Non-Fiction Books

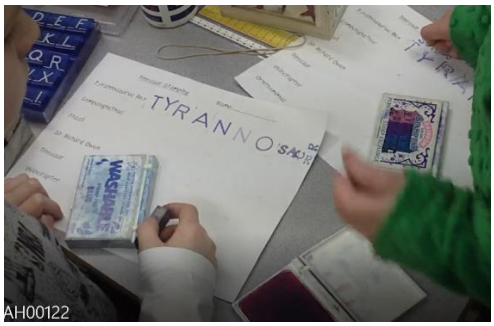
Classification



Making Words with Letters



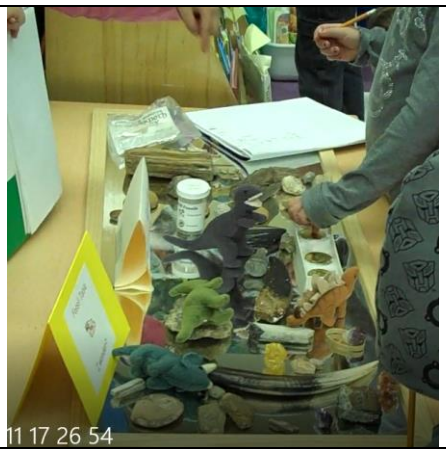




Scientific Drawings and Observations of Fossils

Fossil Hunters Name:_____

You are a scientist and found these fossils on a dig. Draw a fossil. Then tell 2 facts or make a guess about it.



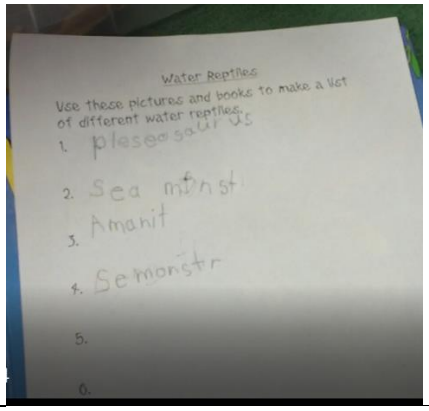
Research Duckbills

Duckbill Dinosaur Sort Name: _____

Look in the books to find the names of duckbills who have smooth heads and fancy heads. Write their names in the right boxes.

Smooth Heads	Fancy Heads

Water Reptiles Research



Ceratopsians Dinosaur Sort Name: _____

Look in the books to find the names of dinosaurs who have no horns, 3 horns, or fancy horns. Write their names in the right boxes.

One Horn	Three Horns	Fancy Horns

Flying Reptiles

Use these pictures and books to make a list of different flying reptiles.

1.

Story Writing from Pictures

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The center/station that had the most engagement and pleasure were the "Hunts." Using a wide source of clip art and images, I printed them on card stock, cut them up and sorted them into bags along with a sheet of descriptors. Each bag had images that would match one sentence of text.

The children then problem solved using visual literacy and collaborative reading to match each image with the descriptor. The images are not included here but I've posted the descriptions to give examples of how complicated these hunts were. This not typical reading material for Grade 1's in October through February.

Armoured Dinosaur Hunt 1. Find the blue ankylosaurus with brown legs. 2. Find the grey ankylosaurus with short nubs on the sides. 3. Find the grey ankylosaurus with long spikes on the sides. 4. Find the ankylosaurus who is in a museum. 5. Find the 2 brown ankylosaurus with grey knobs and spikes. 6. Find the ankylosaurus who is being attacked by velociraptors. 7. Find the yellow and orange ankylosaurus who has a face like a pig. 8. Find the green ankylosaurus with brown knobs and spikes.	**Apatosaurus Hunt** 1. Find the brown dinosaur in the water. 2. Find the brown dinosaur with three legs on the ground. 3. Find the green brachiosaurs with the nose on top of his head. 4. Find the green apatosaurus who is lying down. 5. Find the green dinosaur with wrinkles on his tummy. 6. Find the blue dinosaur eating leaves from the top of a tree. 7. Find the blue dinosaur who is whipping his tail. 8. Find the blue dinosaur with a hump on his back. 9. Find the grey dinosaur who is running. 10. Find the grey dinosaur who is growling. 11. Find the grey dinosaur who is whipping his tail.

Ceratopians Hunt

NOTE: Protoceratops has no horns.
Triceratops has 3 horns.
Styracosaurus has horns on its frill.

1. Find the protoceratops who is looking back.
2. Find the protoceratops head.
3. Find the 2 protoceratops who are growling.
4. Find the triceratops head.
5. Find the triceratops who has a red pattern on his frill.
6. Find the picture with 2 triceratops.
7. Find the triceratops with lots of wrinkles on his tummy.
8. Find the brown triceratops who is looking to the side.
9. Find the blue styracosaurus.
10. Find the grey styracosaurus.
11. Find the red styracosaurus.
12. Find the 2 brown styracosaurus.
13. Find the grey styracosaurus.
14. Find the 2 gold styracosaurus.

Deinonychus Hunt

1. Find the yellow and brown deinonychus with a curved tail.
2. Find the two deinonychus running together.
3. Find the purple deinonychus with a lizard in its mouth.
4. Find the purple deinonychus who is turning around to look behind him.
5. Find the purple deinonychus with the bumpy skin and words on the card.
6. Find the green deinonychus standing on one foot.
7. Find the yellow and brown deinonychus standing on one leg and his mouth is open.
8. Find the yellow and brown deinonychus standing on two legs and his mouth is closed.

Eggs and Baby Hunt

1. Find the green baby in the egg.
2. Find the red baby hatching out of the egg.
3. Find the grey baby sitting up in his egg.
4. Find the baby and mom apatosaurus nest.
5. Find the tyrannosaurus rex baby hatching.
6. Find the protoceratops mom laying eggs..
7. Find the dinosaur stealing an egg.
8. Find the baby who has a beak like a parrot.
9. Find the mom dinosaur who is guarding her nest full of eggs.
10. Find the mom and baby corythosaurus lying down.
11. Find the fossil eggs that look like balls.
12. Find the fossil eggs that are big and long.

Extinction Hunt

1. Find the tyrannosaurus getting hit by meteorites. The sky is blue.
2. Find the duckbill getting hit by meteorites. The sky is orange.
3. Find the rock meteorite just touching the blue and green earth.
4. Find the rock meteorite making a dust cloud when it touches the earth.
5. Find the rock meteorite that is burning in the dust.
6. Find the big red dust cloud from the meteorite.
7. Find the volcano with lava flowing down the sides.
8. Find the world before the meteorite hit earth.

Ostrich Dinosaur Hunt

1. Find the green ostrich dinosaur with a blue crest on his head.
2. Find the ostrich dinosaur chasing a lizard.
3. Find the green ostrich dinosaur with curly lines on his body.
4. Find the red, yellow and blue dinosaur with wattles under his head.
5. Find the green ostrich dinosaur who is looking at something in the sky.
6. Find the 2 yellow ostrich dinosaurs who have blue stripes on them.
7. Find the two racing green ostrich dinosaurs.
8. Find the fat grey ostrich dinosaur.
9. Find the brown ostrich dinosaur with brown stripes.
10. Find the brown dinosaur with a green back.
11. Find the brown dinosaur with dark brown blotches on his back.
12. Find the grey ostrich dinosaur with brown on his back.

Spinosaurus Hunt

1. Find the spinosaurus eating something in a tree.
2. Find the spinosaurus with spots.
3. Find the orange spinosaurus with his mouth open very wide.
4. Find the spinosaurus who is going to eat a small animal.
5. Find the blue spinosaurus.
6. Find the green spinosaurus with a fancy pink fin.
7. Find the gold spinosaurus who is running.
8. Find the green spinosaurus with the golden fin.

Stegosaurus Hunt

1. Find the yellow stegosaurus with 4 spikes.
2. Find the blue stegosaurus with red plates.
3. Find the stegosaurus standing on a rock.
4. Find the green stegosaurus with a brown head.
5. Find the sleeping stegosaurus with the pink plates.
6. Find the yellow stegosaurus with too many spikes.
7. Find the green stegosaurus who has brown plates and 4 toes on each foot.
8. Find the green stegosaurus who has brown plates and 3 toes on each foot.

Cards sometimes take a walk in a Grade 1 classroom, so I labelled the back of the image cards with letters and numbers, so it was easier to re-sort and organize every so often.

This teacher tip comes from experience!

Predictable Books

Just as in other literacy materials, it is very difficult to find supporting predictable books for any project for early learners. Using familiar patterns of predictable books, it is easy to create specific books for your class. Look for images and write text to support the visual. For example, the following are two books I created for our dinosaur projects.

What is a Fossil?

A fossil is an artifact that has turned to rock.
A leaf can be a fossil.
A (shell, bone, footprint, skin print, insect, feather, fish, tusk, egg) can be a fossil. (one page each)
A fossil is an artifact that has turned to rock.

Paleontologist

A paleontologist gets excited about bones.
A paleontologist gets excited about artifacts.
A paleontologist works very carefully with bones.
A paleontologist collects specimens.
A paleontologist sweeps off the dust.
A paleontologist marks the site.
A paleontologist makes good notes.
A paleontologist prepares the fossils.
A paleontologist displays fossils in a museum.
I wish I could be a paleontologist!

Curriculum Connections:

Many parents are concerned that the project approach may not cover curricular objectives. Below is a list of objectives met during our dinosaur projects. The objectives of higher-grade levels should be included as well, as we reached beyond the basic Grade 1 curriculum.

Guided by students' interests, the classes met many learning outcomes through the dinosaur projects.

Language Arts:

- Explore thoughts, ideas, feelings, and experiences; talk with others about something you recently learned.
- Enhance the clarity and artistry of communication; be attentive and show interest during listening or viewing activities
- Comprehend and respond personally and critically to oral, print, and other media texts: use knowledge of context, pictures, letters, words, sentences, predictable patterns and rhymes in a variety of oral, print and other media texts to construct and confirm meaning

- Manage ideas and information; explore and share own ideas on topics of discussion and study; use questions to find specific information in oral, print, and other media texts
- Respect, support and collaborate with others; talk about other times, places, and people after exploring oral, print, and other media texts from various communities; ask questions and contribute ideas related to class investigations on topics of interest.

Science:

- Needs of Animals and Plants; develop skills for describing and classifying what they see; become aware that groups of living things have some common needs, and that different animals and plants meet those needs
- Creating Colour; learn to distinguish and describe colours, and work with a variety of materials to create, modify, and apply colours.
- Building Things; learn to look at objects that are like what they are trying to construct and, with guidance, begin to recognize the component parts that make up the whole; select materials to use and gain experience as they cut and shape, fold, pile materials on top of one another, join parts, and try different techniques to achieve the result that they intend

Health:

- Relationship choices: students will develop effective interpersonal skills that demonstrate responsibility, respect, and caring to establish and maintain healthy interactions

Art:

- Add finishing touches to their creations
- Decorate items personally created
- Use media and techniques with an emphasis on exploring and applying methods in drawing, painting, print making, sculpture, fabric arts, photography, and computer graphics.

Concluding Reflection:

My reflection:

Eleanor Duckworth expressed a concept that has guided me in my teaching. **Long-term, in-depth projects enhance the disposition for lifelong learning.**

Developing the disposition for lifelong learning should be a key element in schools, and my number one mantra while teaching is that **each child leaves my classroom knowing they can learn anything they want to**.