

FIELD TRIP

Meeting Kentucky's Teaching Curriculum Through a Dinosaur World Field Trip

At Dinosaur World, we know it is a challenge for teachers to prepare studies around the *Academic Expectations, Program of Studies, and Core Content for Assessment*. So, we've prepared the below information and activities using the *Combined Curriculum Document* to help explain how a field trip to Dinosaur World can fit into your studies.

This document contains the primary science combined curriculum document. It is divided into the corresponding "Big Ideas". The appropriate program of studies: understandings, program of studies: skills and concepts, and core content for assessment is under each "Big Idea". This layout follows the 4.1 version. Because the academic expectations were similar throughout the curriculum, they have a separate section.

There is also a *Teacher's Guide To Dinosaur World*, showing how to incorporate basic subjects such as math, language arts, science and others into a trip to Dinosaur World. The teacher's guide is available on the website at www.dinoworld.net and also via request.

Science – Primary Level **Academic Expectations**

Academic Expectations 2.1 – Students understand scientific ways of thinking and working and use those methods to solve real life problems.

Program of Studies SC-P-ET-S-2 Students will create or interpret sketches, diagrams, 3 dimensional constructions and concept maps as models that can be used to represent things that can be seen, cannot be seen or cannot be seen easily or in their entirety.

Corresponding Activity

If you do not know something, sometimes you guess. If a scientist does not really know something they guess as well, however, a scientist's guess develops a theory.

Sometimes paleontologists find just one bone and then guess or create a theory of how that dinosaur may have looked based on that one bone. Teachers can get one bone from any animal and have the students draw what they think the animal will look like based on that one bone.

In the Prehistoric Museum at Dinosaur World, there are many exhibits displaying just one bone from a dinosaur or prehistoric creature. The teacher can lead a discussion about how the dinosaur might look if that's all the paleontologist found of the dinosaur. Assuming finding more bones would make this more accurate. A good example of this is the entire turtle skeleton exhibit. If the scientist found just the head that's in the exhibit they would create a theory as to how big the turtle was and how it would look. Since the scientist was able to find the entire body, it is easier to make calculations.

Academic Expectations 2.2 – Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

Core Content SC-EP-3.4.1 – Students will explain the basic needs of organisms. Organisms have basic needs. For example, animals need air, water and food; plants need air, water, nutrients and light. Organisms can survive only in environments in which their needs can be met.

Corresponding Activity

One theory on how dinosaurs disappeared is their inability to adapt to the earth's changing temperature and the affects the changing temperature had on the environment. The teacher can help the class study this theory before the trip. The trip to Dinosaur World will help bring this lesson to life when students are able to see the dinosaurs.

On the dinosaur walk in the park, the children will read about the Brachiosaurus. The information on the sign says that the Brachiosaurus weighed over 70 tons and would have needed over 400 pounds of food daily. The teacher can help the children understand just how much food was needed for one plant eating dinosaur based on the size. Seeing the size of the dinosaur and learning how much it ate will help the children understand that it would be difficult to find huge quantities of plant matter if the temperature change was causing plants to cease growing.

The teacher can then talk about how the current temperatures rises are affecting the environment today and the affect global warming is now having on the environment and the problems this will cause on current ways of life.

Academic Expectations 2.3 – Students identify and analyze systems and the ways their components work together or affect each other.

Corresponding Activity

On the dinosaur walk, one of the last exhibits is the “main grazing field”. At this area, you can see various herds of dinosaurs grouped together in one big field. This means each system or group of dinosaurs is working together with the other “systems” or groups of dinosaurs by using the same space (the grazing field).

The teacher can lead a discussion on how this scene may play out. Questions should include...

- 1) Why is each dinosaur able to occupy this same space?
- 2) What potential problems may occur with so many dinosaurs in the same space?
- 3) How long will these dinosaurs be able to use this same space?
- 4) How do these dinosaurs compliment each other?

Academic Expectations 2.4 – Students use the concept of scale and scientific models to explain the organization and functioning of living and non living things and predict other characteristics that might be observed

Corresponding Activity

Upon first entering the park, students will see a replica of the largest dinosaur bone ever found (Ultrasaurus). The teacher can lead a discussion on how this one bone is used to imagine the size of the rest of the dinosaur. They can also discuss characteristics of the dinosaur based on its size.

On the dinosaur walk, the students will also see a Scutellosaurus. This tiny dinosaur was only about 2 feet long. The class can discuss the advantages and disadvantages of the small size.

The teacher can lead a discussion about what life would be like based on the size of the dinosaur centered on the Ultrasaurus and the Scuttelosaurus. The students can choose what dinosaur they would rather be and tell why that was their choice.

Science – Primary Level

Big Idea: Structure and Transformation of Matter (Physical Science)

Program of Studies: SC-P-STM-U-2 and SC-P-STM-S-2 – Students will understand that tools such as thermometers, magnifiers, rulers and balances can give more information about objects than can be obtained by just making observations.

Corresponding Activity

The teacher should bring a tape measure to the field trip. Upon first entering the park, students will see a replica of the largest dinosaur bone ever found (Ultrasaurus). The teacher should have the students measure the circumference of the leg, the length of a toe and the length of the first section of shin bone.

The teacher can then lead a discussion on how the circumference of the leg would help support the large body. The teacher can talk about how toes would help balance and why large toes are important on the dinosaurs. The teacher can talk about how each section of bones come together to construct the entire leg. A point should be made on what conclusions would be made about the entire size and structure of the leg is just a portion of the bones had been found.

This activity can be repeated on the “photosaurus”, which is the imaginary dinosaur that can be seen from the interstate. Unlike the dinosaurs in the park, this dinosaur is not to scale but can still be used for this activity. The size helps demonstrate the point.

Program of Studies: SC-P-STM-S-1 – Students will use senses to observe and describe properties of material objects (color, size, shape, texture, flexibility, magnetism)

Corresponding Activity

One exhibit at Dinosaur World is the “touch and tell”. This is part of the Prehistoric Museum. At this exhibit, students use their sense of touch only to feel the shape of a small dinosaur. Then, using their sense of touch only, they must decide what dinosaur they just felt.

The teacher can lead a discussion on the importance of the sense of touch. The point should also be made on how the senses compliment each other and how senses take over when one is absent. The teacher can ask the question, “Would a different guess have been made if another sense was used?”

Program of Studies: SC-P-STM-U-5 Students will understand that in science, it is often helpful to work with a team and to share findings with others. All team members should reach their own individual conclusions, however, about what the findings mean.

Corresponding Activity

At the Fossil Dig, divide the team into a team and individuals. Put the team on one side of the fossil dig and put the individuals on the other side of the fossil dig. When the guide says, “begin”, have everyone start finding fossils and identifying them using the guide and the identification board. The team members can work together, but the individuals must not. The guide will call time and the activity must end.

After the activity, the teacher can help review the activity using these discussion questions...

Which group found the most amount of fossils?

Which group correctly identified the most fossils?

Which group learned the most about the fossils?

Did the methods of learning differ in each group?

Which environment do you like to work?

How can a team be helpful?

What are some challenges to overcome when working with a team?

Science – Primary Level

Big Idea: Motion and Forces (Physical Science)

Program of Studies: SC-P-MF-U-1 – Students will understand that things move in many different ways. (fast and slow, back and forth, straight and zig zag, etc)

Corresponding Activity

Before the field trip, the teacher should study two different types of dinosaurs – the Saltasaurus and the Oviraptor. Information on these two dinosaurs can be provided by Dinosaur World upon request. The purpose of this comparison will be to see how the two dinosaurs move differently. The Saltasaurus is a large, herbivorous, four legged dinosaur that moves slowly and awkwardly. The Oviraptor is a smaller, carnivorous, dinosaur that walks on two legs. The teacher can discuss how different dinosaurs move different ways and why their body is designed to move certain ways based on their needs. During the dinosaur walk, the students will see these life size replicas and help them better understand the comparisons.

Program of Studies: SC-P-MF-U-3 – Students will understand that the position of an object can be described by locating it relative to another object or the background.

Core Content For Assessment SC-EP-1.2.4 – Students will understand that the position of an object can be described by locating it relative to another object or the background. The position can be described using phrases such as to the right, to the left, 50 cm from the other.

Corresponding Activity

A part of the dinosaur walk is the main grazing field. It is located near the end of the walk. In this exhibit, the students will see various groups of dinosaurs occupying the same field. The teacher can have the students describe where the various dinosaurs are by words relating to the other species. The following questions will help with the activity

- Where is the Brachiosaurus in relation to the other dinosaurs in the field?
- Where is the Stegosaurus in relation to the Brachiosaurus?
- Where can you find the Chasmosaurus?
- How would the Brachiosaurus tell the Stygimoloch where the Tyrannosaurus was located?
- Where is the Tyrannosaurus located in the field?
- Use the surroundings to describe where the Stygimoloch is located.

Program of Studies: SC-P-MF-S-1 – Students will identify points of reference/reference objects in order to describe the position of an object

Corresponding Activity

The pterodactyl valley is a part of the dinosaur walk. Starting with the pack of Deionychus, have the students direct each other to the Photosaurus sign by identifying points of references including other dinosaurs and plants along the walk.

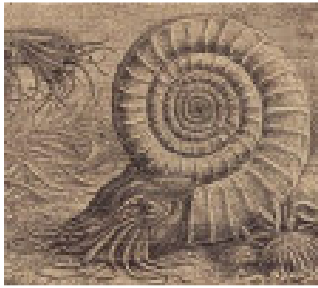
*This activity can become more complicated by mapping the entire dinosaur walk or various portions throughout the walk.

Program of Studies: SC-P-MF-U-6 – Students will understand that discovering patterns through investigation/observation allows predications, based on that evidence to be made about future events.

Program of Studies: SC-P-BC-S-2 Students will examine fossils/representations of fossils and make comparisons between organisms that lived long ago and organisms of today (e.g. compare a fern to a fossil of a fern like plant).

Corresponding Activity

An ammonite is a cephalopod which once swam in shallow marine seas and became extinct. Cephalopods are mollusks with soft bodies, like octopus and squid, which also had tentacles that surrounded beaklike jaws. The closest living relative to the ammonite is the chambered nautilus. Like the chambered nautilus, the ammonite's ability to swim was due to the unique construction of its shell. The shell contained many chambers filled with air, which provided buoyancy and allowed the ammonite to float. The ammonite lived in the last chamber, which ranged in size from a half of a whorl to one and a half whorls of the shell.



At the fossil dig, students should pick out the ammonites among the fossils they have found. Using observations made from the ammonite fossil, the students should tell the teacher what the ammonite looked like as it lived. They should also talk about why it became extinct. Then the teacher should lead a discussion on what would happen if a snail living today died and became fossilized. What conclusions could people make in the far future looking at that fossilized snail.

Science – Primary Level

Big Idea: Grade: Unity and Diversity (Biological Science)

Program of Studies: SC-P-US-U-1 – Students will understand that most living things need water, food and air, while nonliving things can continue to exist without any requirements.

Corresponding Activity

After the field trip to Dinosaur World, the teacher should lead a discussion about how the dinosaurs are only replicas of reptiles that once lived. The teachers can ask the students about living animals they have at home such as pets or farm animals. The discussion should include what is required to take care of those animals. The teacher should also ask what type of requirements the dinosaurs would have needed while they were alive. The discussion can end with the students acknowledging the dinosaurs are not alive and do not have any requirements as they did when living.

Program of Studies: SC-P-UD-S-1 – Students will describe the basic needs of organisms and explain how these survival needs can be met only in certain environments

Corresponding Activity

The teacher should pick one carnivorous, land-dwelling dinosaur and one water dwelling prehistoric reptile. After the students have become familiar with both animals, the teacher can talk about why one would not be able to live in the other's environment. This activity would be further enhanced when the animals are seen in their proper size and with their unique characteristics at Dinosaur World.

For a more advanced activity, the teacher can discuss how the dinosaurs may have become extinct based on the theory that the dinosaurs died out because of their inability to adapt to the changing environment.

Program of Studies: SC-P-UD-S-7 – Students will ask questions that can be investigated, plan and conduct fair tests and communicate (write, draw, speak, multi media) findings to others

Corresponding Activity

At the Fossil Dig, students will learn about once living organisms. They will be able to sift through sand in search of authentic fossils. They will also be able to take three of their favorite fossils from what they have found home. The guide at the Fossil Dig will describe their fossils and how they looked when they were living. Students will learn that fossils are anything that was once living that became preserved over time in the earth.

At the Dinosaur Walk, students will experience over 100 life size dinosaurs. They will learn that these animals were once living and also learn information about how they looked during that time.

Since Dinosaur World is an outdoor dinosaur museum set in a natural hardwood forest, there is an abundance of wildlife to be seen throughout the walk. The teacher can point out the living creatures throughout the walk.

Program of Studies: SC-P-UD-U-2 – Students will understand that plants and animals have features that help them live in different environments.

Program of Studies: SC-P-UD-S-4 – Students will analyze structures of plants and animals to make inferences about the types of environments for which they were suited.

Corresponding Activity

On the Dinosaur Walk, the students will see many different types of Dinosaurs. One of these dinosaurs is the Spinosaurus. An important feature of the Spinosaurus is the teeth. Scientists believed this dinosaur lived near water and used its spear like teeth to spear fish. Examples of the Spinosaurus tooth can also be found in the Prehistoric museum.

Another animal found on the Dinosaur Walk is the Ultrasaurus. This dinosaur was a plant eater. Unlike the Spinosaurus, this animal's teeth were more suited for chewing and sawing plants instead of stabbing fish. Also notice the long neck, which would have been perfectly suited for eating the tops of trees. These examples will help the students understand certain features in animals help them adapt to their environment.

Program of Studies: SC-P-US-U-3 – Students will understand that some animals are alike in the way they look and in the things they do and others are very different from one another.

Corresponding Activity –

The Dinosaur Walk is full of different types of dinosaurs. It is designed to start from the smaller and lesser known dinosaurs to the larger more impressive prehistoric creatures. Each dinosaur has a description. During the walk, the students will learn of the various dinosaurs and their differences and similarities.

Prior to the trip, the teacher should assign a dinosaur from the list found at the park. Each student should look for their dinosaur during the trip and take notes about that dinosaur. After the trip, each child can report on their dinosaur listing a few facts they learned during the trip. The teacher can make notes on the board of what each child says regarding their dinosaurs. After each student has talked about their dinosaur, the teacher can use the chart to discuss some differences and similarities in the dinosaurs.

Program of Studies: SC-P-UD-U-4 Students will understand that the offspring of living things are very much like their parents, but not exactly alike.

Corresponding Activity

During the Dinosaur Walk, the students will see the Mimi dinosaur. This dinosaur was known as the “good mother” dinosaur because several skeletons have been found with the dinosaur near the egg nest. This is unique because most dinosaurs were believed to have left their eggs similar to modern turtles. The students can observe the adult dinosaur and the juveniles that have just hatched in the display. The teacher can help the students point out the differences between the two. There are also other packs of dinosaur located throughout the Dinosaur Walk that differences can be pointed out under guidance of the teacher.

Program of Studies: SC-P-UD-S-2 Students will identify the characteristics that define a habitat.

Program of Studies: SC-P-I-S-2 Students will observe document and explain how organisms depend on their environment.

Corresponding Activity

The natural setting in which the dinosaurs appear at Dinosaur World is strength of the park. After the students pass the Allosaurus on the walk, they will enter a section of the walk known as “Pterodactyl Valley” where they will see Deinonychus, Pterodactyl, Iguanodon and Saltasaurus. This area of the park would look much like it did when these dinosaurs were alive. Flowering plants were appearing and deciduous trees were also abundant. The teacher should take time while in this part of the park to discuss why the animals would be able to live in the environment in which they are currently standing. A step further would be to discuss what would happen as the environment began to change.

Program of Studies: SC-P-UD-S-3 Students will investigate adaptations that enable animals and plants to grow, reproduce and survive (e.g. Movements, body coverings, and method of reproduction).

Corresponding Activity

The teacher should point out the Euoplocephalus on the walk. The teacher should point out that Euoplocephalus had an excellent survival trait with protective armor on his back. This is similar to how a turtle’s shell is used for protection. Another defense is the Euoplocephalus’ club tail. The herbivores were often equipped with such defenses to keep them alive with so many predators.

A popular dinosaur is the Spinosaurus. Some paleontologists believe that the huge fin on its back was used as a way for the dinosaur to heat up faster in the morning enabling it to move while the other cold blooded dinosaurs were still slower. This could have helped Spinosaurus get food.

Program of Studies: SC-P-UD-S-6 Students will analyze and compare a variety of plant and animal life cycles in order to uncover patterns of growth, development, reproduction and death of an organism.

Corresponding Activity

The teacher should assign each student a dinosaur that is found at Dinosaur World. Prior to the trip, the student should study the dinosaur. While on the dinosaur walk, the teacher should let each student discuss their dinosaur in front of the class when they reach that animal along the walk. After the walk, the teacher should lead discussion on how the dinosaurs differ. Another option is to discuss along the way after each child is done with their presentation how that dinosaur differed from the previous.

Corresponding Activity Option Two

The movie cave at Dinosaur World shows the story of the Allosaurus. The 20 minute movie follows the live of “Big Al” from hatching to death.

Core Content For Assessment: SC-EP-3.4.3 Students will describe the basic structures and related functions of plants and animals that contribute to growth, reproduction and survival. Each plant or animal has observable structures that serve different functions in growth. For example, humans have distinct body structures for walking, holding, seeing and talking. These observable structures should be explored to sort, classify, compare and describe organisms.

Corresponding Activity

The teacher should assign each student a dinosaur that is found at Dinosaur World. Prior to the trip, the student should study the dinosaur focusing on the distinct structures. While on the dinosaur walk, the teacher should let each student discuss their dinosaur in front of the class when they reach that animal along the walk. The teacher can help further the discussion by talking about how each dinosaur is different from the last. Some examples include the long neck on the Brachiosaurus and how it was used to reach high trees for food and how the raptors were built smaller and more agile for speed efficiency.

Core Content For Assessment: SC-EP-3.4.4 Students will describe a variety of plant and animal life cycles to understand patterns of the growth, development, reproduction and death of an organism. Plants and animals have life cycles that include the beginning of life, growth and development, reproduction and death. The details of a life cycle are different for different organisms. Observations of different life cycles should be made in order to identify patterns and recognize similarities and differences.

Corresponding Activity

The Movie Cave at Dinosaur World plays the story of a life cycle of an Allosaurus from birth to death. After the movie, the teacher can lead a discussion on how the life cycle of one of the other dinosaur characters in the movie would have been different from Big Al.

Program of Studies: SC-P-UD-U-5 Students will understand that organisms may not be able to survive if some of their parts are missing.

Corresponding Activity

In the museum, students will see a hand claw of a Therizinosaurus. This is a type of dinosaur that had huge hand claws. One theory is that the claws were used to dig for ants and other insects and to dig for roots. There are other examples of claws and teeth in the museum. The teacher should point out that while the Therizmasaurus may be able to live if one of the arms were missing, that the survival chances would greatly drop because the hand claw is a key to survival. The teacher can point out that it would be okay if most of the other claws and teeth in the museum were lost, this particular dinosaur relied more heavily on its hand claws than others..

Science – Primary Level

Big Idea: Biological Change (Biological Science – Grade: End of Primary

Academic Expectations: 2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.

Program of Studies: SC-P-BC-S-1 Students will identify and describe evidence of organisms that no longer exist (fossils).

Corresponding Activity

At the fossil dig, the students will learn about different types of fossils and the differences between fossils and rocks. Prior to the trip, upon request, the teacher can be provided with a list of fossils in the dig. The teacher can study each of the fossils to see what the animals looked like while they were alive. When the students see the fossils, they will understand the impact of time.

Program of Studies: SC-P-BC-U-1 Students will understand that fossils found in Earth materials indicate that organisms and environmental conditions may have been different in the past.

Program of Studies: SC-P-BC-S-3 Students will make inferences about the basic environments represented by fossils found in earth materials (e.g. fossils of fish skeletons represent aquatic environments).

Corresponding Activity

The state fossil of Kentucky is the Brachiopod. This is a small marine invertebrate with a shell that comprises two valves. Most brachiopods are permanently anchored to the seabed or to other shells by a short fleshy stalk called a pedicle, though some lay freely on the seafloor sediment. They live by drawing seawater through their open shells and filtering out microscopic particles of food. Although they resemble clams, they are not related to them. Brachiopods still live today in cool and temperate waters. Since the fossil was in water while alive, and is found in an area now that is nowhere near water, it points out the fact that the environmental conditions have changed. The brachiopod is one of the many fossils the students will find in the Fossil dig.

Core Content for Assessment: SC-EP-3.5.1 Students will describe fossils as evidence of organisms that lived long ago, some of which may be similar to others that are alive today. Fossils found in Earth materials provide evidence about organisms that lived long ago and the nature of the environment at that time. Representations of fossils provide the basis for describing and drawing conclusions about the organisms and basic environments represented by them.

Program of Studies: SC-P-BC-S-5 Students will compare fossils, plants and animals from similar environments in different geographic locations.

Corresponding Activity

Track ways (sets of footprints) or Dinosaur tracks, usually made in mud or fine sand, have been found in every type of environment, including quarries, coal mines, riverbeds, deserts, and mountains. There are so many of these fossils because each dinosaur made many tracks (but had only one skeleton) and because tracks fossilize well. Fossil footprints yield much information:

- speed and length of stride
- whether they walked on two or four legs
- the bone structure of the foot
- stalking behavior (a carnivore hunting a herd of herbivores)
- the existence of dinosaur herds and stampedes
- how the tail is carried (few tail tracks have been found, so tails were held above ground)

In the museum, one exhibit is a set of track ways. The teacher can point out the various prints in the track ways. Also notice there are fern prints in the fossil, showing this particular track way was in a green area instead of a dessert. The teacher can point out how track ways would be different in different environments.

Program of Studies SC-P-BC-6 Students will describe in words, pictures and/or measurements, changes that occur quickly (e.g. puddles forming from rain, cutting hair, burning paper) and changes that occur more slowly (e.g. hair growing, water evaporating in an open container, growing in height, noting the factors that influence change).

Corresponding Activity

There are many theories regarding why dinosaurs became extinct. One includes a catastrophic event such as a meteor or a flood that would have instantly changed the world. Other theories include slower climate changes that would have been a much slower process. The dinosaurs would have been unable to adapt causing extinction. An example of the climate change would be too cold for plants which would affect what the plant eaters ate. If the plant eaters died from lack of food, then the meat eaters would have no food. The teacher can lead a discussion on these theories that will be enhanced when the students see the dinosaurs at the park.

Program of Studies SC-P-BC-U-4 Students will understand that things change in some ways and stay the same in some ways.

Corresponding Activity

One exhibit in the museum is of a fossilized turtle. Turtles are the oldest living group of reptiles, first appearing about 200 million years ago. The first known turtles appeared on Earth in the late Triassic Period, so they are older than many of the well known great dinosaurs! Turtles have evolved into more than 250 species, including about 180 species of freshwater turtles, 60 species of tortoises, and 8 species of sea turtles, with new species still being discovered.

This exhibit will show the students that the prehistoric turtles are very similar to modern turtles. The prehistoric turtle was called the Proganochelys . It looked like a modern turtle, with a fully developed shell, but it had small teeth and ears (which differ from modern turtles). The prehistoric turtles were also much larger. This is an excellent example of things change, yet still stay the same.

Core Content For Assessment: SC-EP-4.6.2 Students will describe evidence of the sun providing light and heat to the Earth. Simple observations and investigations begin to reveal that the Sun provides the light and heat necessary to maintain the temperature of Earth. Based on those experiences, the conclusion can be drawn that the Sun's light and heat are necessary to sustain life on earth.

Program of Studies: SC-P-ET-U-3 Students will understand that the sun warms the air, land and water and lights the earth.

Program of Studies: SC-P-ET-S-4 Students will observe and describe evidence of the sun providing light and heat to the Earth.

Program of Studies: SC-P-I-S-4 Students will describe how changes in an environment might affect plants' and animals' ability to survive.

Corresponding Activity

No one has been able to prove why dinosaur became extinct. One theory is a giant meteor. We're also not sure of how long it took for extinction to take place. Some believe it happened over half a million years and others say it only took a few days. The extinction event that killed the dinosaurs affected the entire earth; plants and animals on both land and in water were also affected.

Some believe the extinction was caused by a catastrophe such as a meteorite or comet hitting the earth. Many small meteorites have been found on the earth, and the giant craters mark major collisions. The shock of such a massive collision would have surrounded the earth in a huge cloud of dust and steam, blocking out the sun for months or even years. Many animals would have been killed by the explosion and the resulting alteration in weather patterns. Dinosaurs may have been particularly vulnerable to these changes in the ecology of the earth. The asteroid would have exploded deep into the earth forming a massive crater hundreds of kilometers wide, and shot out up to 400 million tons of rock and dust! The dust that resulted would have traveled round the earth and stayed for many months, effectively blocking out the sun and possibly resulting in raising atmospheric temperature.

The best evidence in support of the meteorite theory so far is found when examining sedimentary rocks. In several places around the world, geologists have found large amounts of the metal *iridium* in clay bands. Iridium is a rare metal which generally only comes from space. Normally we only find very small amounts - which come from tiny meteorites that land on earth. But there are large amounts of iridium at the time the dinosaurs died out. Many scientists believe this is good evidence for an asteroid, yet others suggest that iridium could have come from large volcanoes

This theory of extinction is a great beginning for discussion on the importance of the sun and what happens when living things cannot get sunlight, which is the case in this theory. The meteor caused a huge dust cloud that blocked sunlight, eventually killing off the dinosaurs. The students will be able to better appreciate these concepts on the field trip.

Program of Studies: SC-P-ET-U-1 Students will understand that energy makes things move, grow or work. Everything that changes uses energy to make those changes happen. Sometimes evidence of these changes can be seen, but not always.

Corresponding Activity

The playground is a fun part of Dinosaur World. While on the swings, the teacher should explain that if a student just sits on a swing, nothing will happen, but if another student gives a push, then the motion of swinging occurs. The person on the swing can also move their legs in order to get the swing moving. Both motions require energy to make a change.

Also on the playground is a metal slide on a yellow dinosaur. If the sun is out, the slide becomes warm to the touch, if it is cool outside, the slide becomes cool to the touch. It is energy producing this heat, however, it is not visible.

Science – Primary Level

Big Idea: Interdependence (unifying concepts) – Grade: End of Primary

Program of Studies: SC-P-I-S-1 Students will identify the characteristics of an ecosystem

Program of Studies: SC-P-I-U-2 Students will understand that when the environment changes, some plants and animals survive and reproduce and others die or move to new locations.

Program of Studies: SC-P-I-U-1 Students will understand that the world has many different environments. Distinct environments support the lives of different types of organisms.

Core Content for Assessment: SC-EP-4.7.1 Students will describe the cause and effect relationships existing between organisms and their environments. The world has many different environments. Organisms require an environment in which their needs can be met. When the environment changes some plants and animals survive and reproduce and other die or move to a new location.

Corresponding Activity

The dinosaurs lived in three different time periods, each with their own characteristics. The teacher can help the students define each of these ecosystems and what makes each unique.

- 1) The Triassic period was first.
 - a. There was one giant land mass called Pangaea.
 - b. The temperature was dry and warm
 - c. There were no flowering plants
 - d. Types of dinosaurs: Coelophysis and other smaller dinosaurs
- 2) The Jurassic period was second
 - a. The land began to split forming separate land masses
 - b. The temperature turned cooler with more rain
 - c. There were palms and ferns but still no flowering plants
 - d. Types of dinosaurs: Allosaurus, Stegosaurus, Brachiosaurus
- 3) The final period was the Cretaceous
 - a. Land moved to present day positions
 - b. Climate was cooler and formed seasons
 - c. Flowering plants appeared with trees like oaks, maples and walnut
 - d. Types of dinosaurs: Tyrannosaurus, Triceratops, raptors

The teacher can point out each of these dinosaurs while on the walk and review with the children their time periods. The teacher can lead discussion on why the dinosaurs lived in their prospective time period (remembering that no one knows for sure what caused the dinosaurs to become extinct). For example, the smaller dinosaurs of the Triassic period may not have been able to adapt with the temperature change. The Jurassic dinosaurs may not have been able to adapt to the vegetation change. Most of the signs also have the locations in which the dinosaurs were found. The teacher should point out that they lived in different parts of the world.

Program of Studies: SC-P-I-S-5 Students will ask questions that can be explored using a variety of appropriate print and non print resources (e.g. why certain plants can not survive in a particular area, why some animals are endangered or extinct, why some areas are protected)

Corresponding Activity

The museum at Dinosaur World has a wealth of knowledge including life size signs containing information. The teacher can give students a sheet with the following questions that the children will easily be able to identify on the signs in the museum.

- 1) What colors were dinosaurs?
- 2) What defenses did plant eaters have?
- 3) Were dinosaurs like animals today?
- 4) What sounds did dinosaurs make?
- 5) What weapons did the meat eaters have?
- 6) How did the dinosaur reproduce?

Program of Studies: SC-P-I-S-3 Students will describe and explain how the environment can be affected by the organisms living there.

Program of Studies: SC-P-BC-S-4 Students will investigate and describe occurrences in the environment that illustrate change (e.g. erosion, earthquake, weather phenomena, human intrusion)

Corresponding Activity

A part of the dinosaur walk includes the wooded mulch trail to the “photosaurus”. The teacher should explain that people are organisms too and have a huge impact on the environment. While walking on the wooded mulch trail, the teacher should explain that humans cut the trail through the woods and also cut down the trees to make the mulch. The teacher should ask the students how the area looked before this walk was put down, pointing out the trees that were cut to make the trail and the mulch. This is also a great time for a speech on how humans have a responsibility to take care of the environment.