

Week 1: Dinosaur Day

A. LEARNING OBJECTIVES:

1. Students will be able to describe a scientist and their job
2. Students will be able to identify (or explain) the lives of dinosaurs

B. TEACHER CONTENT KNOWLEDGE:

- Knowledge of various types of dinosaurs.
- Knowledge about dinosaur's habitat and their eating habits

C. MATERIALS:

Expectations:

- Chart paper (1 sheet)

Ice breaker- 'Draw a scientist'

- Plain sheets (1 sheet/student)
- Crayons

Draw your own dinosaur:

- Plain sheets (1 sheet/student)
- Crayons
- Craft feathers (2 packs)

Story time

- Dinosaur book: Skull Alphabet time

Mold your own dinosaur

- Clay or playdough (enough for each kid to make a small dinosaur)
- Baking soda (6 16 oz boxes)
- Beakers (5-6)
- Pipettes (5-6)
- Vinegar (1-2L)

Where did your dinosaur live?

- N/A

D. TENTATIVE TIMELINE:

9:30 AM- 9:35 AM: Expectations chart

9:35 AM-10:00AM: Introduction/ ice breaker: Draw a scientist, share and discuss, and introduce 1-2 dinosaur scientist.

10:00 AM- 10:20 AM: What do we know about dinosaurs? Draw your own dinosaur and explain it

10:20 AM -10:40 AM: Break --- season 2 episode 4 of magic school bus

10:40 AM -11:15 AM: Make dinosaur with clay/playdough and hatch it from an egg.

11:15 AM -11:35AM: Read a book on dinosaurs and discuss what we know about them from the explore phase

11:35 AM -11:55 AM: Place you dinosaur in a habitat and explain why it would have lived there

E. DESCRIPTION OF LESSON:

9:30 AM- 9:35 AM: Expectations chart:

1. Introduce the teachers for the course. Ask the students to introduce themselves to the class.
2. The teachers will then explain what expectations are. Then, the students will come up with class expectations with the help of teachers. All the expectations will be written on the chart paper.

9:35 AM-10:00AM: Introduction/ ice breaker:

1. Activity: ask students to draw a “scientist”. Then, they will share their drawings with the class. They will introduce themselves again and tell everyone kind of work does their scientist do.
2. Introduce the term paleontology
3. Show 2 pictures of the scientists in this field and tell students about their work

10:00 AM- 10:20 AM: ENGAGE: What do we know about dinosaurs?

1. ENGAGE students in discussion about dinosaurs – about different types of dinosaurs are there.
2. Then, they will draw your own dinosaur (feathers will be provided in case students requires them) and explain it to the class.

10:20 AM -10:40 AM: Break

1. Students will watch season 2 episode 4 of magic school bus. This episode talks about dinosaurs and their habitat.
2. Students will be provided with a snack and water.

10:40 AM -11:15 AM: EXPLORE: Mold your own dinosaur and hatch it from an egg

1. Students will mold their own dinosaur from clay/playdough provided. The dinosaur needs to be small (maximum 7cm in height)
2. Then they will be given a paste of baking soda and water to put around their dinosaurs.
3. Then, students will be given a beaker of vinegar with pipettes. After a quick explanation from the teachers regarding the use of pipettes, the students will pipettes drops of vinegar to their covered dinosaurs.
4. The vinegar will dissolve the baking paste → mimic hatching of student’s dinosaur ‘egg’

11:15 AM -11:35AM: EXPLAIN: Read a book on dinosaurs

1. Students will be asked to come to the front of the class, sit down on the floor together.
2. One of the teachers will sit down with them and start reading the book.

11:35 AM -11:55 AM: ELABORATE: Where did your dinosaur live?

1. Students will be asked to describe where their dinosaurs lived and what they ate
2. Students will share stories of their dinosaurs with the class
3. Also they will explain why it would have lived there

Week 2: Fossil Day 1

A. LEARNING OBJECTIVES:

1. Students will be able to differentiate a fossil from a rock
2. Students will be able to identify an impression fossil

B. TEACHER CONTENT KNOWLEDGE:

mold fossils (a fossilized impression made in the substrate - a negative image of the organism)

cast fossils (formed when a mold is filled in)

trace fossils = ichnofossils (fossilized nests, gastroliths, burrows, footprints, etc.)

true form fossils (fossils of the actual animal or animal part).

C. MATERIALS:

- Plaster of Paris (4 lb box)
- Small paper cups (24, 8 oz)
- Seashells
- Fossil samples
- Rock samples
- Water

D. REFERENCES:

E. TENTATIVE TIMELINE:

9:30 AM- 9:35 AM: Expectations chart review

9:35 AM-10:00AM: Observing rocks and fossils

10:00 AM- 10:20 AM: Class discussion about fossil vs. rock observations

10:20 AM -10:40 AM: Break --- season 2 episode 1 of magic school bus

10:40 AM -11:30 AM: Make your own fossil

11:30 AM -11:55AM: Read a book about fossils

F. DESCRIPTION OF LESSON:

Engage: When the students arrive we will briefly go back over the expectations chart that we made the prior week. I will then ask the students to describe some characteristics of a rock and I will write these down on the board. I will then do the same thing, but this time asking about fossils.

Explore: I will hand out various rock and fossil samples to the students. I will then hand out a worksheet that asks the students to circle whether each sample is a rock or a fossil. The students will be asked questions such as “how does it feel?” “Can you see any designs?” “Describe how it looks”. Each student will get a chance to look at every sample.

Explain: I will bring the class back together and hold a discussion about what they determined the samples to be. We will record a class data chart on the board to compare what students thought were a fossil and what was a rock. The students will tell me why they thought something was a rock vs. a fossil. We will come with a class consensus as to what makes them different.

Explore 2: The students will now get a chance to make their own impression fossil. Before starting I will remind them of the fossils we just looked at and tell them that these types of fossils are impression fossils. The students will mix together the plaster of paris and water to create a paste like substance. The students will then pick out a seashell that will leave an impression in the plaster of paris mixture. I will remind them that fossils take a long time to form, so we are going to have to let these sit until the following week. We will dig out our fossils then.

Explain 2: The students will come back together as a group and we will finish reading the fossil alphabet book that we started the week before. This book will help give the students some background into what different fossils and bones can tell us about the organisms.

Elaborate: If there is still time remaining, the students will create another impression fossil, but this time it will be of a footprint that they make using their fingers. It can be any type of animal footprint that they would like. We will let these harden and use them for an activity the following week (if time permits.)

Week 3: Fossil Day 2

A. LEARNING OBJECTIVES:

- Students will be able to identify an impression fossil
- Student will be able to explain the process of digging up fossils.

B. TEACHER CONTENT KNOWLEDGE:

mold fossils (a fossilized impression made in the substrate - a negative image of the organism)

cast fossils (formed when a mold is filled in)

trace fossils = ichnofossils (fossilized nests, gastroliths, burrows, footprints, etc.)
true form fossils (fossils of the actual animal or animal part).

C. MATERIALS:

- Hard chocolate chip cookies (30)
- Paint brushes (30)
- Popsicle sticks (30)
- Toothpicks (30)
- Clear bins (4)
- Sand
- Soil
- Rocks
- Metal spoons
- Hammer
- Chisel

D. REFERENCES:

E. TENTATIVE TIMELINE:

9:30 AM- 9:35 AM: Expectations chart review

9:35 AM-10:10AM: Chocolate chip cookie extraction

10:10 AM- 10:20 AM: Class discussion about extraction activity

10:20 AM -10:40 AM: Break

10:40 AM -11:30 AM: Dig out your plaster fossil

11:30 AM -11:55AM: Digging out your own fossils from sand and dirt bins

Engage: We will begin with a quick reminder of the class expectations. The kids will then be asked about what it takes to dig up fossils. What tools do we need? How do scientists dig up fossils? What techniques might they use?

Explore: The students will each be given a chocolate chip cookie, paint brush, and toothpick. Before beginning ask the students what each material would represent in the real world. After this discussion, the students may begin digging out the chocolate chips from the cookie. The goal is to not damage the chocolate chips or the cookie as much as possible so that we can keep the fossils intact.

Explain: We will hold a class discussion about how difficult it was to get the chocolate chips out without damaging the cookie or the chips. We will discuss some techniques that worked the best and what didn't work so well

Explore 2: The students will work to unearth their own fossils that they made in plaster of paris from the week before. They will use popsicle sticks, paint brushes, and metal spoons. Depending how deep the seashells are in the plaster, it may require a hammer and chisel to remove some of the seashell. The goal here is to remove the seashell and be left with an impression in the plaster. Thus, the students will be careful removing the shell because they do not want to damage the impression fossil.

Explain 2: We will revisit the discussion from the previous explain phase, but now with the plaster being more realistic to some of the rock that scientists have to dig through. We will discuss that scientists often struggle to get the fossils out in one piece and that they often have to glue the pieces back together after they dig them out.

Elaborate: Time permitting, the students will bury their fossils that they made from clay last week in the bins of sand, rocks, and soil. There will be 4 fossils in each bin. The instructors will then rotate the bins to a different group and the students will dig out the fossils. After digging out the fossils, the students will infer what animal left the footprint. The person who made the fossil will tell them if they are correct or not.

Week 4: Dinosaur Day

A. LEARNING OBJECTIVES:

1. Students will be able to describe the word archeology and explain what it means
2. Students will be able describe what happens during an archeological expedition

B. TEACHER CONTENT KNOWLEDGE:

1. Knowledge about generally how an archaeology expedition works
2. Knowledge about different archeological sites
3. Knowledge about tools needed for archaeological expedition
4. Knowledge about earth's stratosphere and layers in the soil and their relationship with archaeological timeline

C. MATERIALS:

Expectations:

- REUSE Chart paper

Simulated dig for objects hidden in the soil

- Clear boxes (4-5 students/ box)
- Soil (2 big bags)
- Sand (2 big bags)

- Objects: shells, toys, everyday tools/ things used (~30/box)
- Plain paper
- Crayons
- Shovel (1/box)
- Sieve (1/box)
- Spoons (1/student)
- Plastic bags (2/box)

Story time

- Boy, Were We Wrong About Dinosaurs

D. REFERENCE:

- https://www.archaeological.org/pdfs/education/digs/Digs_T-shoebox.pdf

E. TENTATIVE TIMELINE:

9:30 AM- 9:35 AM: Expectations chart

9:35 AM- 10AM: What does a real archeological expedition look like?

10AM – 10:40 AM: Simulated dig for objects hidden in the soil

10:40 AM - 11 AM: Break --- season 3 episode 6 of magic school bus

11AM- 11:30AM: Draw predictions about evidence from dig

11:30AM- 11:35AM- Break: Go noodle dance

11:30AM- 12 PM- Read a book

F. DESCRIPTION OF LESSON:

9:30 AM- 9:35 AM: Expectations chart:

1. The teachers and students will discuss the class expectations as they were set on the first day of class.

9:35 AM- 10AM: ENGAGE: What does a real archeological expedition look like?

1. ENGAGE students to talk about real archeological expedition. Here are some questions to ask:
 - a. What do archaeologist look for while excavating?
 - b. What can we learn about from an excavation?
 - c. What are some things we need for our expedition? Why?
 - d. If we found (hold up 3 objects) what are some things we could say about the people who lived there?

10AM – 10:40 AM: EXPLORE: Simulated dig for objects hidden in the soil

1. Students will work in groups of 4 to EXPLORE objects from their own archaeological site- 'shoe box'.
2. When they find something, they will clean them with brushes and place it in different plastic bags according to the soil type they found it in.
3. They will discuss with teacher about why they might have found those particular objects in their excavation site.

10:40 AM -11 AM: Break

1. Students will watch season 3 episode 6 of magic school bus. This episode talks about archaeologist and their work.
2. Students will be provided with a snack and water.

11 AM- 11:30AM: EXPLAIN: Draw predictions about evidence from dig

1. Each student will make a drawing of their excavation site elaborating on what they found and why they did.
2. Each table will share their story of what they think happened in their make shift civilization
3. ELABORATE: students can draw their predictions of what the area looked like thousands of years ago based on the evidence they collected.

11:35 AM -12PM: Read a book on dinosaurs

1. Students will be asked to come to the front of the class, sit down on the floor together.
2. One of the teachers will sit down with them and start reading the book.

Week 5: Final Day- Wrap Up

A. LEARNING OBJECTIVES:

1. Students will be able to identify three different types of rocks
2. Students will be able describe the difference between different type of rocks
3. Students will be able to identify where igneous, metamorphic and sedimentary rocks originate

B. TEACHER CONTENT KNOWLEDGE:

1. Knowledge about three different kinds of rocks and where they originate and how they are formed
2. Knowledge about how igneous, metamorphic and sedimentary rocks look different
3. Knowledge about volcanoes and how they help make different type of rocks

C. MATERIALS:

Expectations:

- REUSE Chart paper

What type of rock is this?

- Sedimentary rock examples (1/student)
- Metamorphic rock examples (1/student)
- Igneous rock examples (1/student)

Let's build rocks!

- White chocolate (4+ bars)
- Dark chocolate (4+ bars)
- Knife (to cut chocolate in to shreds)
- Foil (1 roll)
- Water cups (1/table)

Let's build volcanoes!

- Clay (5lbs or 2 tubs)
- Baking soda (2 -16oz boxes)
- Red food coloring (2 bottles)
- Dish soap (1L)
- Vinegar (1L)
- Empty camera film roll tubes (1/student)

Story time

- Oh say Can You Say Di-no-saur?

D. REFERENCE:

- <https://www.earthsciweek.org/classroom-activities/chocolate-rock-cycle>
- <https://teachingmama.org/5-baking-soda-experiments/>

E. TENTATIVE TIMELINE:

9:30 AM- 9:35 AM: Expectations chart

9:35 AM- 9:50 AM: What type of rock is this?

9:50 AM – 10:20 AM: Let's build rocks!

10:20 AM – 10:40 AM: Break --- Season 1 episode 4 of new magic school bus

10:40AM- 10:45AM: Break: Go noodle dance

10:45AM- 11:30AM: Let's build volcanoes!

11:30AM- 12 PM- Read a book

F. DESCRIPTION OF LESSON:

9:30 AM- 9:35 AM: Expectations chart:

1. The teachers and students will discuss the class expectations as they were set on the first day of class.

9:35 AM- 9:50 AM: ENGAGE: What type of rock is this?

1. ENGAGE: Introduce students to 3 main type of rocks: Sedimentary, Igneous and metamorphic and show them an example of a rock.
2. Ask students to share the what they see in each rock example and point any differences between them

9:50 AM – 10:20 AM: EXPLORE: Let's build rocks!

1. Pass a piece of foil paper to each student along with shaved pieces of white and brown chocolate.
2. First, we will make sedimentary rock by folding the chocolate shavings in foil and hitting hard with hands as an example of nature's force
3. Then, we will hand small pieces of chocolate to the students and ask them to add those to the foil.
4. After the chocolate is put in the foil, ask students to wrap the chocolates tightly and ask them to put it in semi- warm water. This will make metamorphic rock.
5. Finally, for igneous rocks, add big pieces of chocolate pieces and then add the wrapped-up chocolate in hot boiling water and wait for 20-30 minutes.
6. After break, students will open their chocolate rocks which will resemble igneous rock.

10:20 AM – 10:40 AM: Break --- Break

1. Students will watch season 1 episode 4 of new magic school bus. This episode talks about volcanoes
2. Students will be provided with a snack and water.

10:45AM- 11:30AM: ELABORATE: Let's build volcanoes!

1. Each student will be given an empty camera film roll with some clay. They will then mold a volcano with clay
2. Then, we will provide them with baking soda and dish soap to pour into the volcano
3. After that, students will be asked to slowly add vinegar to the volcano and see it ERUPT!

11:30AM- 12 PM- EXPLAIN: Read a book

1. Students will be asked to come to the front of the class, sit down on the floor together.
2. One of the teachers will sit down with them and start reading the book.