

Fossils

Teacher's Guide Middle School

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A Message from our Company...

Dear Educator:

Thank you for your interest in the educational videos produced by the Visual Learning Company. We are a Vermont-based, family owned and operated business specializing in the production of quality educational science videos and materials.

We have a long family tradition of education. Our grandmothers graduated from normal school in the 1920's to become teachers. Brian's mother was an elementary teacher and guidance counselor, and his father was a high school teacher and superintendent. This family tradition inspired Brian to become a science teacher, and to earn a Ph.D. in education, and led Stephanie to work on science educational programs at NASA.

In developing this video, accompanying teacher's guide, and student activities, our goal is to provide educators with the highest quality materials, thus enabling students to be successful. In this era of more demanding standards and assessment requirements, supplementary materials need to be curricular and standards based - this is what we do!

Our videos and accompanying materials focus on the key concepts and vocabulary required by national and state standards and goals. It is our mission to help students meet these goals and standards, while experiencing the joy and thrill of science.

Sincerely,

Brian and Stephanie Jerome



National Standards Correlations

National Science Education Standards

(Content standards: 5-8, National Academy of Sciences, c. 1996)

Earth Science (Content Standard D)

Earth's History

- Fossils provide important evidence of how life and environmental conditions have changed.

Life Science (Content Standard C)

Diversity and Adaptations of Organisms

- Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.

Benchmarks for Science Literacy

(Project 2061 – AAAS, c. 1993)

The Living Environment

Evolution of Life (5F)

By the end of 5th grade, students should know that:

- Fossils can be compared to one another and to living organisms according to their similarities and differences. Some organisms that lived long ago are similar to existing organisms but, some are quite different.

By the end of 8th grade, students should know that:

- Many thousands of layers of sedimentary rock provide evidence for the long history of the earth and for the long history of changing life forms whose remains are found in the rocks. More recently deposited rock layers are more likely to contain fossils resembling existing species.



Student Learning Objectives

Upon viewing the video and completing the enclosed student activities, students will be able to do the following:

- Define fossils as the remains or traces of once living things (usually ancient life).
- Describe paleontology as the study of fossils and ancient life.
- Understand that through studying fossils, scientists have learned a great deal about life in the past.
- Explain some of the conditions necessary for fossil formation including quick burial, and the presence of hard parts.
- Explain why fossils are much more likely to be formed in sedimentary rocks than in igneous or metamorphic rocks.
- Generally describe the process of petrification in forming specific types of fossils.
- Provide an example of how an impression fossil might be formed.
- Differentiate between a mold fossil and a cast fossil. Provide an example of each.
- List two to three examples of fossils which involve the preservation of original material.
- Describe how index fossils help scientists develop a broader geologic picture and correlate rock layers.
- List some of the uses of fossils including the use of fossil fuels, and cement used in building things.



Assessment

Preliminary Assessment:

The Preliminary Assessment, provided in the Student Masters section, is an assessment tool designed to gain an understanding of students' pre-existing knowledge. It can also be used as a benchmark upon which to assess student progress based on the objectives stated on the previous pages.

Video Review:

The Video Review, provided in the Student Masters section, can be used as an assessment tool or as a student activity. There are two main parts. The first part contains questions that can be answered during the video. The second series of ten questions consists of a video quiz to be answered at the conclusion of the video.

Post Assessment:

The Post Assessment, provided in the Student Masters section, can be utilized as an assessment tool following completion of the video and student activities. The results of the Post Assessment can be compared against the results of the Preliminary Assessment to evaluate student progress.



Introducing the Video

Before showing students the video, hold up three objects for them to see: an apple, a pencil, and a calculator. Explain to students that these three objects could eventually become fossils some day. Ask students what these objects might tell paleontologists 50,000 years from now about our society and culture. Write their answers on the board under the name of each object.

Next, explain to students that it is not an easy task for an object to become a fossil. There are certain conditions which promote the formation of fossils, including quick burial, and the presence of hard parts. Ask students how these three different objects might be preserved to become fossils. For example, if the pencil was dropped in a pond, and was buried by sediments, it might become petrified, forming a hard petrified pencil fossil. Write their answers on the board.

Tell students to pay close attention to the video to learn more about fossils, the ways they are formed, and some of the ways we use fossils every day. After watching the video, discuss how these objects might form fossils.

Video Viewing Suggestions

The student Master “Video Review” is provided for distribution to students. You may choose to have your students complete this Master while viewing the program or to do so upon its conclusion.

The program is approximately twenty minutes in length and includes a ten question video quiz. Answers are not provided to the Video Quiz on the video, but are included in this teacher’s guide. You may choose to grade student quizzes as an assessment tool or to review the answers in class.

The video is content-rich with numerous vocabulary words. For this reason you may want to periodically stop the video to review and discuss new terminology and concepts.



Video Script: Fossils

1. What do these dinosaur tracks,...
2. ...this petrified tree,...
3. ...and this piece of coal have in common?
4. All are examples of fossils.
5. What exactly are fossils?
6. How are they formed?
7. And, where are they commonly found?
8. What things can fossils tell about the past?
9. Why do people study fossils?
10. And, how do fossils effect our every day lives?
11. During the next few minutes we are going to answer these and...
12. ...other intriguing questions,...
13. ...as we explore the fascinating features of fossils.
- 14. Graphic Transition – What are Fossils?**
- 15. You Compare!** What makes this fossil of a plant different from this piece of granite?
16. The fossil contains the imprint of a once living thing, a plant. However, the granite is merely a rock which does not have any remnants of pre-existing life.
17. Fossils are generally defined as the remains or traces of once living things.
18. While these two year old handprints found in this cement could be considered fossils, most fossils are considered to be the “ancient” remains or evidence of once living things.
19. Paleontology is the study of fossils and ancient life.
20. And, paleontologists are scientists who study fossils and the life responsible for forming them.
21. Let us take a look at why people are interested in studying fossils.
- 22. Graphic Transition – Why are Fossils Important?**
23. While skiing in the woods in the winter you may not see any animals,...
24. ...but, you know they live in the forest because you notice their tracks in the snow.
25. In a similar way, we know that many different kinds of animals once lived on earth, even though they may be extinct, because we find their fossils.
26. By studying fossils such as ancient bones,...
27. ...impressions left in rocks,...
28. ...or even tracks, scientists have learned an amazing amount of information about the history of life on earth.
29. In some cases, through studying fossils of plants, pollen and seeds, scientists have learned a great deal about past climates, and how earth’s climate has changed.



Script (cont.)

30. For this reason, fossils are often referred to as “windows to the past”.
31. Fossils also have many important uses which we benefit from every day.
32. We will discuss those in a few minutes, but first let us take a look at the conditions necessary for fossil formation.
- 33. Graphic Transition – Conditions for Fossil Formation**
34. Generally speaking, fossils are not very common or easily found.
35. When fossils are found, it is rare to find evidence of the once living thing completely intact.
36. Why do you think that is?
- 37. You Decide!** What factors prevent this dead fish, or these leaves from becoming fossils?
38. Over the next several days, these things will quickly decay,...
39. ...be eaten by other living things,...
40. ...or be destroyed by natural elements such as wind, rain, and the sun.
41. One of the most important conditions for fossil formation includes quick burial by sediments soon after the organism dies.
42. Quick burial prevents the dead organism from being eaten by other animals and it also slows the process of decay.
43. These types of conditions are more common in or near the water. That is why fossils of animals living in water, such as these shelled brachiopods, tend to be more abundant than fossils of animals which live on land.
44. The presence of hard parts in an organism also promotes fossil formation.
45. Bones, teeth, shells, and hard skeletal parts tend to produce fossils.
46. The majority of fossils tend to be found in sedimentary rocks. Sedimentary rocks are made from sand, mud, fine sediment, or of once living things.
47. The rocks seen here in Bryce Canyon National Park are sedimentary rocks, as are the rocks seen here in the layers in the Grand Canyon.
48. The ripple marks in this sedimentary rock called shale were formed by small waves in soft mud which hardened into rock.
49. Sedimentary rocks are much more likely to bear fossils than igneous rocks of volcanic origin.
50. ...or than metamorphic rocks which have been altered by great heat and pressure.
51. Another key to fossil formation is that once a fossil is formed, it must be left undisturbed for long periods of time.
52. Let us now take a closer look at some of the different ways fossils form.
- 53. Graphic Transition – Petrification**
54. This dry desert area seen here in Eastern Arizona was once a moist, lush forest,...
55. ...not unlike the conifer forest seen here along the pacific coast today.



Script (cont.)

56. Today, these petrified trees are the main attraction here in the Petrified Forest National Park.
57. The method by which these wooden trees became hard rock-like fossils involved the process of petrification.
58. Petrification is the process in which cells in once living things are replaced by minerals located in water surrounding the once living thing. In this process the part preserved literally turns to stone.
59. In the case of these petrified trees, when they fell, they were washed by swollen streams into floodplains where they were covered by silt, mud, and volcanic ash.
60. Gradually groundwater containing silica seeped through the logs, replacing wood tissue with silica deposits.
61. Over time water and wind have worn away layers of hardened sediments, exposing the petrified logs.
62. In some instances, the process of petrification is so complete that annual growth rings can still be seen over 225 million years later.
63. Petrification is not only a mode of preservation in wood, but in bones, shells, and other materials.
64. The dinosaur bones seen here are hard as rock, preserved by the process of petrification.
- 65. Graphic Transition – Impressions**
- 66. You Predict!** What would happen if you put your hands or feet in this wet cement?
67. They would leave an imprint,...
68. ...which would become permanent as the cement hardened.
69. There are some types of fossils, such as these dinosaur tracks, called impression fossils or imprints that form in a similar way.
70. For example, as a dinosaur walked over the moist, soft mud, it left footprints which hardened into rock producing the tracks we see today.
71. Footprints, tracks, and trails are often referred to as trace fossils. Trace fossils provide evidence of the shape, size, and habits of once living things.
- 72. Graphic Transition – Molds and Casts**
73. If a plant or an animal is buried by sediments, then two types of fossils may be formed – a mold and a cast.
74. Over time the living thing may decay, leaving a space.
75. The space is called the mold.
76. These fossils of shells show one part of a mold left in the rock after the shells dissolved.
77. And, this fern fossil represents both sides of the mold created when the fern was encased in sediment and later decayed.



Script (cont.)

78. In some cases, the space left by the once living thing, may be filled in by sediments or minerals. These may harden creating a cast.
79. A cast is a fossil formed in a mold and resembles the same general shape as the original organism.
80. This brachiopod, a two-shelled organism, is a cast, having the same shape as the original brachiopod.
81. Casts are quite useful to paleontologists because they represent the actual shape and general features of the original organism which lived eons ago.
- 82. Graphic Transition – Original Material**
83. While it seems hard to believe that the original body parts of a once living thing can last thousands or even millions of years, it is possible. Let us take a look at some examples.
- 84. You Observe!** Describe this substance.
85. This is a black, gooey substance composed of crude oil referred to as asphalt or tar.
86. These sticky, bubbly, tar-like pools are the remnants of the La Brea Tar Pits in Los Angeles, California.
87. Ten to Forty thousand years ago many different kinds of animals became trapped in this sticky soup. Unable to escape, they met their doom, and were quickly buried.
88. Bones of animals such as saber tooth tigers, trapped in the tar pits, have been remarkably well preserved.
89. Another medium in which original organisms have been preserved is amber.
90. Amber is the hardened resin from the sap of trees.
91. Over time, it forms a stone-like amber gem.
92. Insects trapped in the amber are perfectly preserved, allowing us to view a complete organism that is thousands of years old.
93. Freezing is another mode of preservation.
94. Extinct woolly mammoths, thousands of years old, have been discovered frozen in large blocks of ice.
95. The actual original parts of ancient animals may also be preserved.
96. For example, shark teeth, common along parts of the Atlantic Coast, are the actual teeth of sharks which lived thousands of years ago.
- 97. Graphic Transition – Index Fossils**
98. The Earth, while it seems rather quiet and motionless to us, over geologic time has been very active, undergoing many changes.
99. Since there are no written records describing Earth's history, scientists have developed methods to help them unravel the story of our planet.



Script (cont.)

100. One such method is the Law of Superposition.
101. The Law of Superposition states that in layers of sedimentary rocks, the younger rocks are found on top of the older rock layers.
102. This is based on the notion that older sediments were deposited first and younger sediments were deposited on top of the older sediments.
103. Geologists use the Law of Superposition to determine whether a fossil or a rock layer is older or younger than another layer.
104. The Law of Superposition is helpful in figuring out the sequence of events for a particular area.
105. But, how can geologists get a wider geologic picture, for example, when comparing distant areas to each other?
106. Index fossils help geologists develop a broader geologic picture and correlate rock layers.
107. An index fossil tends to be a fossil of an organism that lived once during a relatively short period of time.
108. Since the living organisms lived during the same period of time,...
109. ...geologists assume that layers of rock containing these organisms are close in age.
110. So, even though the rock layers may be quite some distance from each other, if they contain the same index fossils, the rock layers correlate to each other and can be assumed to be relatively close in age.
- 111. Graphic Transition – Uses of Fossils**
- 112. You Decide!** What fossils do you use nearly every day?
113. Without thinking about it, you use fossil fuels derived from oil every day.
114. We burn oil in our homes for heat,...
115. ...and, we put it in our vehicles to help engines run.
116. Gasoline is also derived from oil.
117. If you rode in a car, truck, or bus today, it burned gasoline.
118. Oil is referred to as a fossil fuel, meaning it is a fuel formed millions of years ago from the accumulated remains of once living plants.
119. Coal is another fossil fuel formed from the remains of ancient plant and animal matter.
120. Coal is widely burned in power plants across the world to produce electricity.
121. Another extremely valuable product derived from fossil rocks is cement.
122. Cement, used in the foundations of buildings, bridges, and sidewalks is made from a rock called limestone.
123. Limestone, a sedimentary rock containing calcium carbonate, was formed mostly from the remains of dead marine organisms,...
124. ...which lived in ancient seas.



Script (cont.)

125. These are just a few examples of the many ways fossils help us in our every day lives.
- 126. Graphic Transition – Summing Up**
127. During the past few minutes we have explored some of the fascinating features of fossils.
128. We saw that fossils are the remains or traces of ancient organisms,...
129. ...and that paleontology is the study of fossils and ancient life.
130. The conditions necessary for fossil formation including quick burial and the presence of hard parts were discussed.
131. Many of the different means of fossil formation were explored including petrification...
132. ...the formation of molds, casts, impressions...
133. ...and the preservation of original material.
134. The importance of the Law of Superposition and the importance of index fossils were stressed.
135. Last, we discussed some of the valuable ways we use fossils every day.
136. So, the next time you pick up a fossil...
137. ...walk on a cement sidewalk...
138. ...or put gasoline in your car,...
139. ...think about some of the things we discussed during the past few minutes.
140. You just might think about fossils a little differently.
- 141. Graphic Transition – Video Assessment**

Fill in the correct word to complete the sentence. Good luck and let us get started!

1. ____ are the remains or traces of once living things.
2. ____ are scientists who study fossils.
3. ____ burial is important for fossil formation.
4. Most fossils are found in ____ rocks.
5. The presence of ____ parts increases the likelihood of an organism forming a fossil.
6. ____ is the process by which cells are replaced with minerals.
7. A ____ is a fossil which resembles the original organism.
8. A frozen woolly mammoth is an example of preserved ____ material.
9. ____ fossils help scientists correlate rock layers.
10. Oil and coal are examples of fossil ____.

Answers can be found on page 17



Student Assessments and Activities

Assessment Masters:

- Preliminary Assessment
- Video Review
- Post Assessment

Student Activity Masters:

- Windows to the Past
- Fossils in the Making
- La Brea Tar Pits
- Vocabulary of *Fossils*



Answers to Student Assessments

Preliminary Assessment (pgs. 20-21)

1. fossils
2. paleontology
3. burial
4. hard
5. sedimentary
6. petrification
7. impression
8. cast
9. index
10. oil
11. true
12. true
13. false
14. false
15. true
16. false
17. true
18. true
19. true
20. false

Video Review (pg. 22)

1. The fossil contains the imprint of a once living thing, a plant. The granite is merely a rock which does not have any remnants of pre-existing life.
2. The dead fish and leaves will quickly decay over several days, be eaten by other living things, or be destroyed by wind, rain, and the sun.
3. The hands and feet would leave an imprint which would become permanent as the cement hardened.
4. This substance is a black, gooey substance composed of crude oil referred to as asphalt or tar.
5. We use oil in our homes for heat and gasoline for our vehicles. Oil and gasoline are fossil fuels. Another type of fossil fuel we use is coal. Coal is widely burned in power plants across the world to produce electricity. Cement is another product derived from fossil rocks. Cement is used in foundations of buildings, bridges, and sidewalks.

Video Quiz (p. 22)

1. fossils
2. paleontologists
3. rapid
4. sedimentary
5. hard
6. petrification
7. cast
8. original
9. index
10. fuels

Post Assessment (pgs. 23-24)

1. petrification
2. index
3. sedimentary
4. oil
5. fossils
6. cast
7. hard
8. paleontology
9. impression
10. burial
11. true
12. false
13. true
14. true
15. true
16. false
17. true
18. true
19. false
20. false



Answers to Student Activities

Windows to the Past (pgs. 25-26)

1. a. Trilobites were segmented arthropods which are now extinct. They are believed to have lived on the sea floor, and were common in the Paleozoic Era. b. Trilobites lived in the oceans and most likely fed on the ocean bottom. c. The fossil was most likely buried in marine sediments.
2. a. The fossil contains the actual original remains of an insect. b. The insect lived in the forest or an area where trees existed. c. The insect became entrapped in the resin of a tree. The resin engulfed the insect, hardened, and thus encased the insect as a fossil.
3. a. This is an imprint of a dinosaur's foot. b. The dinosaur was a terrestrial dinosaur; meaning it lived on land. c. The dinosaur most likely walked across moist sediment such as mud, leaving its footprint. The mud hardened into rock and thus preserved the footprint.
4. a. This leaf fossil is from a broad leafed tree or shrub. b. The tree or shrub may have lived in a forest or swamp. c. The leaf most likely fell on moist sediment such as mud or clay. The leaf left its impression on the substance which later hardened into rock.
5. a. This is a fossilized ammonite which was a spiral-shelled organism which became extinct at the end of the Mesozoic Era. b. Ammonites lived freely swimming in the oceans. They were common in open tropical seas and in coral reefs. c. This fossil may have been buried by deep marine sediments, or have been buried by sediments associated with reef environments.

Fossils in the Making (pg. 27)

A mold fossil is formed when a plant or animal is buried by sediments. Over time the living thing may decay, leaving a space. This space is called a mold.

A cast fossil is formed when the space left by the once living thing is filled in by sediments or minerals that harden. A cast fossil resembles the same general shape as the original organism.

La Brea Tar pits (pgs. 28-29)

1. The La Brea tar pits are located in southern California. Today they can still be found within the city limits of Los Angeles.
2. The tar pits consist of pools of asphalt. This is an oil-based compound that has a thick, gooey, tar-like texture.
3. The tar pits have provided paleontologists with thousands of well preserved specimens of mammals, birds, reptiles, and plants.
4. What makes the fossils at La Brea so unusual is that they are so well preserved. This is due to the fact that the organisms were buried completely and quickly.
5. Because the fossil record at La Brea is so extensive and complete, it allows scientists to reconstruct what life was like in southern California 12,000 to 40,000 years ago.

Vocabulary of Fossils (p. 30)

1. g - fossil
2. d - paleontology
3. a - quick burial
4. j - hard parts
5. i - petrification
6. b - trace fossils
7. e - mold
8. c - cast
9. h - index fossils
10. f - fossil fuel

Assessment and Student Activity Masters



Preliminary Assessment

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. _____ are the remains or traces of once living things.
2. _____ is the study of fossils and ancient life.
3. Quick _____ soon after an organism dies promotes fossil formation.
4. The presence of _____ parts promotes fossil formation.
5. _____ rocks are more likely to form fossils than igneous or metamorphic rocks.
6. _____ is the process in which cells in once living things are replaced with minerals to form a stone-like fossil.
7. A dinosaur track is an example of an _____ fossil.
8. A _____ is a fossil formed in a mold and resembles the shape of the original organism.
9. _____ fossils help geologists develop a broader geologic picture and correlate rock layers.
10. _____ is an example of a fossil fuel.

cast	hard
fossils	impression
petrification	paleontology
burial	index
oil	sedimentary

Preliminary Assessment

Directions: Decide whether the statement is true (T) or false (F).

- | | | |
|--|---|---|
| 11. Paleontologists are scientists who study fossils and ancient life. | T | F |
| 12. Fossils are often referred to as “windows to the past” because they tell us about ancient plants, animals, and climates. | T | F |
| 13. Soft tissue in living things easily forms fossils. | T | F |
| 14. Most fossils tend to be formed in igneous rock. | T | F |
| 15. Quick burial of the dead organism by sediments increases the likelihood of fossil formation. | T | F |
| 16. Petrification is a type of an imprint. | T | F |
| 17. A mold is a fossil formed when the once living thing decays and leaves a space. | T | F |
| 18. Bones, teeth, and organisms preserved in amber are examples of fossilized original material. | T | F |
| 19. Geologists often assume that rock layers far from each other containing the same index fossil are close in age. | T | F |
| 20. Oil and coal should not be considered fossils because they are young. | T | F |

Video Review

Directions: During the course of the program, answer the questions as they are presented in the video. At the end of the video, answer the Video Quiz questions.

You Compare!

1. What makes this fossil of a plant different from this piece of granite?

You Decide!

2. What factors prevent this dead fish, or these leaves from becoming fossils?

You Predict!

3. What would happen if you put your hands or feet in this wet cement?

You Observe!

4. Describe this substance.

You Decide!

5. What fossils do you use nearly every day?

Video Quiz:

1. _____ are the remains or traces of once living things.
2. _____ are scientists who study fossils.
3. _____ burial is important for fossil formation.
4. Most fossils are found in _____ rocks.
5. The presence of _____ parts increases the likelihood of an organism forming a fossil.
6. _____ is the process by which cells are replaced with minerals.
7. A _____ is a fossil which resembles the original organism.
8. A frozen woolly mammoth is an example of preserved _____ material.
9. _____ fossils help scientists correlate rock layers.
10. Oil and coal are examples of fossil _____.

Post Assessment

Directions: Fill in the blank with the correct word. A list of possible answers is provided at the bottom of the page.

1. _____ is the process in which cells in once living things are replaced with minerals to form a stone-like fossil.
2. _____ fossils help geologists develop a broader geologic picture and correlate rock layers.
3. _____ rocks are more likely to form fossils than igneous or metamorphic rocks.
4. _____ is an example of a fossil fuel.
5. _____ are the remains or traces of once living things.
6. A _____ is a fossil formed in a mold and resembles the shape of the original organism.
7. The presence of _____ parts promotes fossil formation.
8. _____ is the study of fossils and ancient life.
9. A dinosaur track is an example of an _____ fossil.
10. Quick _____ soon after an organism dies promotes fossil formation.

burial	petrification
hard	oil
index	cast
impression	paleontology
sedimentary	fossils

Post Assessment

Directions: Decide whether the statement is true (T) or false (F).

- | | | |
|--|---|---|
| 11. A mold is a fossil formed when the once living thing decays and leaves a space. | T | F |
| 12. Oil and coal should not be considered fossils because they are young. | T | F |
| 13. Quick burial of the dead organism by sediments increases the likelihood of fossil formation. | T | F |
| 14. Paleontologists are scientists who study fossils and ancient life. | T | F |
| 15. Geologists often assume that rock layers far from each other containing the same index fossil are close in age. | T | F |
| 16. Soft tissue in living things easily forms fossils. | T | F |
| 17. Bones, teeth, and organisms preserved in amber are examples of fossilized original material. | T | F |
| 18. Fossils are often referred to as “windows to the past” because they tell us about ancient plants, animals, and climates. | T | F |
| 19. Petrification is a type of an imprint. | T | F |
| 20. Most fossils tend to be formed in igneous rock. | T | F |

Windows to the Past

Background: Fossils are the remains or traces of once living things. They can range in age from a few hundred years old to several hundred million years old. Fossils are very valuable to scientists because they can be used to tell a great deal about the history of life on earth. For this reason, fossils are often referred to as “windows to the past”.

There are many types of fossils and different ways fossils can be formed. A fossil formed from a living thing gives us important clues to what it was like. The way a fossil is created and the environment in which it was formed can also tell us a great deal about the past. Paleontologists spend the majority of their time trying to solve these mysteries. In this activity you will attempt to carry out the job of a paleontologist by describing the living thing in each fossil diagram. You will describe the environment in which it lived and was formed.

1. Trilobite



a. Describe the living thing:

b. Where did it live?

c. Describe the environment in which the fossil may have formed:

2. Insect in Amber



a. Describe the living thing:

b. Where did it live?

c. Describe the environment in which the fossil may have formed:

Windows to the Past Cont.

3. Dinosaur Track



a. Describe the living thing:

b. Where did it live?

c. Describe the environment in which the fossil may have formed:

4. Plant Fossil



a. Describe the living thing:

b. Where did it live?

c. Describe the environment in which the fossil may have formed:

5. Ammonite Fossil



a. Describe the living thing:

b. Where did it live?

c. Describe the environment in which the fossil may have formed:

Fossils in the Making

Background: Fossils are sometimes referred to as windows to the past because they tell us about the plants, animals and even climate of ancient times. A fossil is a remain or trace of a once living ancient organism.

There are many different kinds of fossils, and many different ways fossils are formed. In some cases, actual original material of an organism may be preserved such as when it is frozen or preserved in the hardened resin (amber) of a tree. Or fossils may be formed via a process called petrification in which minerals gradually replace the cells in a once living material.

In this activity you will create your own fossils. You will make mold and cast fossils. These types of fossils are usually formed in sedimentary rock. As the body of the dead organism decays, an empty space called a mold is formed. Under certain conditions, the mold may fill with sediments or minerals. These may harden, producing a replica in which the outer surface resembles the original organism. This type of fossil is called a cast.

Materials:

- modeling clay
- hard objects such as shells, keys, coins, or paper clips
- plastic bowl
- plastic spoon
- newspaper
- plaster of Paris

Directions:

1. Obtain a small ball of clay. Press the clay to form a flat disk about 10 centimeters in diameter.
2. Obtain a hard object from your instructor. Press the object into the surface of the clay so that it creates an indentation. Carefully remove the object from the clay. This represents the bottom position of a mold.
3. In the next step you will create a partial cast fossil. First obtain a plastic bowl, plastic spoon, and plaster of Paris. Spread out newspapers under the work area. Mix up a small amount of plaster of Paris with water. Your teacher will give you more specific instructions on how to make the mixture.
4. Carefully fill the mold in the clay with plaster of Paris. Let it harden for at least 20 to 30 minutes.
5. After hardening, remove your newly formed cast. In a paragraph, explain how mold and cast fossils are formed.

La Brea Tar Pits

Directions: Read the following information and answer the questions on the next page.

Imagine stepping back in time 30,000 to 40,000 years ago, seeing a woolly mammoth stuck in a pool of tar-like goo, surrounded by a pack of wolves that would also soon fall prey to the sticky trap. Before you lie pools of thick, black, gooey, tar-like liquid that can entrap even the largest animal. This was not an uncommon scene in a place now called the La Brea Tar Pits in southern California. These tar pits still exist today in modern downtown Los Angeles, although now they are surrounded by tall fences to prevent animals, pets, and people from falling prey to the inescapable liquid. The liquid consists of asphalt, which is an oil-based compound that has a thick, gooey, tar-like texture.



Today, the La Brea tar pits are a paleontologist's dream. For nearly a hundred years, the area has provided scientists with thousands of well preserved specimens from the close of the last Ice Age 10,000 to 40,000 years ago. Paleontologists have unearthed over a million bones representing 58 species of mammals, 138 species of birds, and 24 species of reptiles. The bones of mammals such as the saber tooth tiger, camels, long-horned bison, mammoths, and mastodons have been found in a remarkable state of preservation. The remains of birds too have been unearthed including those of vultures, condors, eagles, and extinct, stork-like birds. The remains of hundreds of thousands of fossilized plants represented by 158 species tell us about plant life at the end of the last ice age. Insects, snakes, turtles, and even the remains of fish have been removed from the tar-like deposits.

What makes the fossilized remains found at the La Brea tar pits so unusual? Paleontologists do not commonly find fossils of plants and animals so well preserved as they do at La Brea. Because the once-living things were quickly buried in the tar-like asphalt they are preserved completely and thoroughly. In many cases complete skeletons of large animals such as ancient elephants and bears are remarkably preserved. The vast number and diversity of animals found at La Brea is also incredible. More than 600 different kinds of living things have been documented, and the number continues to grow. Such a complete record gives scientists an excellent window to the past, enabling them to understand the interaction of living things in the ecosystem. This evidence allows us to reconstruct what existed in this fascinating part of southern California 12,000 to 40,000 years ago.

Vocabulary of Fossils

Directions: Unscramble the vocabulary words in the first column. Match the words to the definitions in the second column.

_____ 1. slfiso _____

_____ 2. Inlyaoogpeto

_____ 3. ucqki uilrba _____

_____ 4. rhda asptr _____

_____ 5. tfaopritneici

_____ 6. recta slfisos _____

_____ 7. omdl _____

_____ 8. satc _____

_____ 9. xneid sslfios _____

_____ 10. olsifs lfeu _____

a. the process of covering a once living thing with sediment in a timely manner.

b. examples of fossils which include footprints, tracks, and trails.

c. fossil formed in a mold and resembles the same general shape of original organism.

d. the study of fossils and ancient life.

e. space left by a once living thing which was surrounded by sediment.

f. examples include oil and coal which were formed millions of years ago.

g. the remains or traces of once living things.

h. fossils of the same general age which help scientists develop a broader geologic picture and correlate rock layers.

i. process by which cells in once living things are replaced by minerals causing an object to become stone-like.

j. include bones, teeth, shells, and skeletal parts.