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GEOS 898

Prepared for Dr. Tracy Frank
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Ancient Nebraska Unit For middle school students

Objectives: *Students will review the geologic time scale.
*Students will predict what the environment of Nebraska was throughout different periods of time.
*Students will have hands-on experience with sedimentary rock from the state of Nebraska.
-Students will predict what kind of environment and which time period the rock would have come from.

Specific Question: *What did Nebraska look like during different times in ancient history?*

Lesson One: Ancient Nebraska Review

Bellwork/Sponge Activity:

Post on the board the following statement, "Please list the eons of time in order from youngest to oldest." Give students 1-2 minutes to answer the question. Discuss in class.

Answer: The youngest is the Phanerozoic eon, then the Proterozoic eon, then the Archean eon and finally the Hadean eon.

Lesson:

1. Pass out geologic time scales and post-it note flags.
2. Have the students indicate, using a flag, on the geologic time scale how far back they think Nebraska's history of time started and also when they think the first human showed up on this scale.

3. Go around and look at the predictions. Have the students go around to also look at the predictions. Make sure to say these are only predictions—we will not critique others ideas. Give the answer.
4. Go over notes that correlate to power point – “Notes Day 1”.
 - a. Demonstration on slide 4: Use six textbooks on a table top to show how each layer on top of the other is the “newest” layer. Stack each book on top of one another. Discuss with students how the book on the bottom would be the oldest layer and the books on the top would be the youngest layers.

Prep for the next lesson:

We will look at the state of Nebraska specifically and how the environment looked throughout the Paleozoic, Mesozoic and Cenozoic Eras.

Lesson Two: Ancient Nebraska

Predictions about environments

Use <http://jan.ucc.nau.edu/~rcb7/nam.html> for maps of ancient times.

Bellwork/Sponge Activity:

Post on the board the following question, “How far back have scientists recorded the rock record in Nebraska? Give students 1-2 minutes to write this down. Discuss/review what was talked about in the last lesson. Look at the four recap questions and discuss with the class (see PP – “Notes Day 1”).

Lesson:

1. “Today we are going to look at what Nebraska’s environment would have looked like during the Proterozoic Eon and make some predictions about what it would have been like for the plants and animals that lived here during those times.”
2. Students will be working in groups of 2-3 looking at pictures of maps on the internet and making predictions of what they think the environment could have been like at the time.
3. Resources needed: worksheet (“wkst predict”), internet, and specific webpage
4. Post on the board the following webpage:
<http://jan.ucc.nau.edu/~rcb7/nam.html>
5. Hand out the worksheet to students.
6. Go over instructions and example question.

7. Let students work together in groups of 2-3 to complete the assignment.
8. Once students have completed the worksheet, have groups compare answers with other groups, allowing time for discussion and questions.
9. Time for class discussion and questions.
10. Post the following question on the board, "Why would the environment matter when we are studying rocks?" Give students 4-5 minutes to answer the question in their groups of 2-3. Ask for volunteers to share their answers. Hints for the class: Think back to superposition, layering, and fossils—where do they come from? Discuss.

Prep for the next lesson:

The environment directly affects the type of life that lives there. These life forms give us many clues to help scientists predict what life would have been like in Nebraska during these ancient times. Nebraska has many sedimentary rock layers that give clues about the environment and climate conditions of those times (Frank-Powerpoint). Now that we have looked at the environments we can look at samples of sedimentary rock for more details.

Lesson Three: Ancient Nebraska
Sedimentary Rock Samples/Environments

Bellwork/Sponge Activity:

Post of the board the following statement, "Look back at your worksheet from yesterday and list the time periods in which humans would have had to migrate to land instead of living in Nebraska." Discuss in class the time periods.

Lesson:

1. Remind students that each environment produces distinctive sedimentary deposits (Frank-Powerpoint).
2. Quick lesson/notes on sedimentary rock:
 - a. Scientists have classified sedimentary rock into 4 types based on what they are made of (see Powerpoint named "Sedimentary Rock").

- b. Scientists also know that these sedimentary rocks are formed from differing environments (see Powerpoint named "Sedimentary Rock").
3. Have the students decide what environment would produce which type of sedimentary rock. Post this short list on the board and have them write down the finalized list in their notes.

Clastic: _____

Biogenic: _____

Organic: _____

Chemical: _____

4. Students will work in groups of 4-5.
5. Give each group a sample of one of the sedimentary rocks of Nebraska. Use up to six different types of the rocks.
6. Each group will also be given a worksheet (see worksheet named "Classification wkst" with the six different rocks pictured on the worksheet. They are to work as a group to decide, which type of sedimentary rock it could be.
7. Discuss the answers in class.

Prep for next lesson:

We are going to use the information that we have collected about these rocks to help us determine what environmental time period these rock samples came from. Bring back your information about environments and rock samples for the next lesson.

Lesson Four: Ancient Nebraska
Sedimentary Rock/Environments continued

Bellwork/Sponge Activity:

Post on the board the following question, "Out of all the samples we looked at yesterday pick a favorite and give an explanation of what you liked about it. By the way—the following will not work for a good explanation, 'because it was cool.'"

Lesson:

1. Review the information about the environments (look back at notes).

2. Review the information about the sedimentary rocks (look back at notes).
3. Look at each rock sample in detail using a Powerpoint (see PP named "Samples") explanation.
4. Review the Geologic Bedrock of Nebraska map.

Closing Activity:

1. Answer the following questions:
 - a. Going across the state, do the rocks get younger?
 - b. Can you get a good picture of what life was like millions of years ago in the state of Nebraska?
 - c. When would you have liked to live in Nebraska? Why?