MANCHESTER COLLEGE
Education Department

Lesson Plan By: Emily Quandt

Lesson: Guided Discovery **Length**:10-15 minutes each day

Age or Grade Intended: 4th

Academic Standards:

4.3.8 Explain that the rotation of Earth on its axis every 24 hours produces the night-and-day cycle.

4.6.1 Demonstrate that in an object consisting of many parts, the parts usually influence or interact with one another.

4.6.2 Show that something may not work as well, or at all, if a part of it is missing, broken, worn out, mismatched, or incorrectly connected.

Performance Objectives:

1. The student, after building a diorama of the solar system, will tell while manually moving the object why the rotation of Earth on its axis every 24 hours produces the night-and-day cycle with 100% accuracy.
2. After learning about the solar system, the student will give 3 examples of how the planets influence each other with 100% accuracy.
3. After learning about the solar system, the student will give 3 examples how each of the planets interacts with each other with 100% accuracy.
4. After building a diorama of the solar system, the student will give one example of how the solar system may not work as well if there was a part missing with 80% accuracy.

Advance Preparation by Teacher: In newsletters sent home previous to the Space Unit, I would have asked parents to send in any large shoe boxes that they would donate. If I have not collected enough shoe boxes for everyone I would bring the rest in from home. I would then have sytrofoam balls for each student. Each student will be given 9 balls of different sizes for the planets and one large ball for the sun. There will be wire, pipe cleaners, paint, fabric and other materials available to the children. This activity will not all be done in one or two days. We will be working on it each day for 10-15 minutes if time allows. It will be built into the schedule 3 times a week to ensure we make time. The materials will all be kept in plastic bins in a part of the room that will not be bothered. Students can also keep their dioramas in this safe area. Having the students make their projects in class and throughout the unit will eliminate the possibility of not having materials or having parents doing the project.

Procedures

Introduction/Motivation: Why is it light outside right now? (Knowledge) Where does that light come from? (Comprehension) Why will it be dark later tonight? (Knowledge) Where does the darkness come from? (Comprehension) Right now is it

light all over the world? (Knowledge) Why are some places dark at the same time other places are light? (Comprehension) I would start by asking these questions. We would have already talked about the Earth's orbit and I would remind them that at times the Earth is close to the Sun and at other times it is far away. This is why we have seasons because when we are close it is warm and when we are far apart it is cold. But this does not explain why it is dark part of the day and light the other part; or how it can be dark in one part of the world at light in another part at the same time. They will have directions for making a diorama and on the directions it will explain that the Earth has to have an axis and its orbit. I will tell them while making their diorama in their groups to find answers to these questions.

Step-by-Step Plan: I will then give the students the materials needed for their diorama. I will also give each student a flash light to act as the Sun. They will be able to use the flashlight to see that the Sun can only light up part of the Earth at a time. I will then walk around to each group and ask more specific questions so each group can figure out answers at their own pace. Once they know that the Sun produces the light, I will ask them how the Sun gives us the light and how does it give us heat? (Comprehension) Can the Sun reach every part of the Earth at the same time? Why not? What would happen if the Earth was flat? (Analysis) When it is light in the United States, where is it dark? (Knowledge) Why is it light and dark all in one day? (Analysis) So how long does it take for the Earth to turn around once on its axis? (Comprehension) While I am asking the students questions, they will have the materials there to show me how this works. (Application) Groups that are struggling will need extra scaffolding and I will use their materials to help them answer the questions. Once I see the groups understand that the Earth's axis allows it to rotate once a day and this produces day and night, I will move on to the instruction part of the lesson.

Closure: What would happen if the Earth did not have an axis? (Synthesis) What would happen if the Earth did not have an orbit? (Synthesis) We know that the Earth moves in an orbit around the Sun and it takes 365 days for it to complete an orbit. This is what causes our seasons and temperature changes. But we have light and dark every day so rotating on its axis must take much less time. How long is a day? (Knowledge) So how long does it take for the Earth to rotate on its axis one time? (Knowledge) I will then explain further how the Sun does not reach every part of the Earth at one time because it is a sphere. Therefore when we are at school there are children in another part of the world sleeping because it is their night time. The guided discovery part of the lesson would end with the children finding that the Earth's axis produces day and night every 24 hours. Then I would cover two other standards in this lesson by expanding on the two questions I asked in the beginning of the closure. I would let the students still use the materials and discuss these questions further in their groups. Then as a class we would discuss how only part of the Earth would receive Sun if there were no axis. It would either be light or dark all the time depending on which part of the Earth the Sun would reach. We would talk about how we would not have seasons if the Earth did not orbit the Sun. We would talk about how all these parts work together and make the Solar System function as it does. We would then talk about how other objects would not work if there were a part missing just like the solar system.

Assessment would take place by talking to and listening to the children. They are to discover the answers on their own while I facilitate their discussions. There for I

would do informal observations by walking around and talking with the groups. I would look to see if they use their materials to explain their answers and if they can justify them as well. If the children can explain that the Earth rotates on its axis once every 24 hours and this produces day and night then they understand. There are many questions that I pose that will allow me to see if the children do understand. I will also listen to their answers of what would happen if the Earth did not have an axis or orbit the Sun. By posing questions I will shape their train of though while ultimately allowing them to put the information together to come up with an answer.

Self-Reflection: Since my assessment will be informal observation and talking with the students, my self-reflection will be short. I will easily see if the students understand the concepts by listening to them answer my questions and talk with one another. If groups are struggling I will think about the questions I'm asking and see if I need to change my line of questions. I will also consider the materials and think about other materials that could help the students understand the concepts. I will consider how the students worked in groups. If there were problems I might assign groups my self, make them smaller, or have students work alone. I will take into account any behavior problems that occurred during the lesson, and consider what might have caused these problems.