Brown Bag Science

An AskERIC Lesson Plan

Author: Judy Adair, Spring Creek Elementary, Broken Arrow, OK

Date: May 1994

Grade Level(s): 1, 2, 3, 4, 5

Subject(s):

- Science/Physics

OVERVIEW:

This is a hands-on science investigation on electricity. Students learn through the discovery method how electricity works. The student's natural curiosity and sense of exploration will enable them to explore and learn on their own with little input from the teacher.

PURPOSE:

The purpose of this investigation is to introduce students to the concept of electricity and dispel any fears they may have that they don't understand the concept. This is excellent for girls, who often feel that they don't or shouldn't understand electricity as well as boys.

OBJECTIVES: As a result of this activity, the students will:

1. Be able to draw and explain how an electrical circuit works.
2. Be able to define and use vocabulary associated with electricity. Vocabulary: circuits, electrons, force, conductors, switch, insulation
3. Be able to construct a simple circuit and a parallel circuit.
4. Be able to make an electrical motor work and add a switch to turn it on and off.

RESOURCES/MATERIALS: All items can be bought very inexpensively at Radio Shack or from Edmond Scientific Elementary Catalogue.

ACTIVITIES AND PROCEDURES:

1. The teacher will prepare ahead of time a kit for each two or three students. If students work in larger groups, some will not get hands on experience. Each kit will include a brown lunch sack, one C cell battery, two insulated copper wires, one battery holder and two brass battery clips, one small flashlight bulb and socket. All these items must be separate and in random order in the bag. The bag must be closed, sometimes I close it with one of the copper wires like a twisty.
2. Give each pair of students a bag and allow 10 minutes for exploration. During this time the teacher must remain quiet unless asked a question. The students will be very busy trying to find out what to do with the contents of the bag. Do not give any clues as to use of contents. This is exploration time.
3. Before the 10 minutes are up some students will have undoubtedly have made a simple circuit with the contents of the bag. At this time you can stop for discussion. Have the students explain what they did so others can follow. You can now talk about the concept of electricity, the flow of electrons through a conductor , discuss what things are conductors, etc. Discuss where the electricity comes from and where it goes, how does it make the light bulb light. Discuss how the battery stores electricity. How do we know that electrons are flowing?
4. After all students have been successful with the simple circuit, each pair must draw what they have done in their science log or on a piece of paper. Older kids will label all the parts of the circuit, etc.
5. At this time, I give each pair of students a second battery and let them experiment. Does the second battery change anything? Does the light get brighter or dimmer? Does the way the batteries are connected make any difference in the way the light works. Try different ways of connecting the batteries. Some students will make a parallel circuit. At this time stop and have the students tell what they did. Discuss the concept of parallel circuits. Each pair of students draw what they have done.
6. A follow up activity if you have time is to have switches available. For those students that finish quickly, they get a switch. See if they can connect it into the circuit to make the light come on and off. Discuss how electricity flows. Why does the electricity not cross over the switch when it is open? Does electricity jump? Again, each pair must draw what they have done. This completes the thinking process and makes the learning more personal.
7. Electrical motors can also be added. Students enjoy making small fans out of the motors. Each pair of students can exchange their light bulb and socket for a small electric motor and try to connect it into the circuit. Torn or cut paper makes great fan blades. Let the students experiment to find the best size and shape to make the fan go very fast.
8. The role of the teacher in this activity is to be a facilitator. Please refrain from your urge to teach. In this activity, students discover the concept of electricity. The less you show and tell the better.

TYING IT ALL TOGETHER:

1. Check each pair of students diagrams and leave small personal messages so they will know that you have looked at what they have done.
2. Encourage all students to share what they have learned with other students and parents.
3. I have done this activity with students in grades 1-5 and all have learned and had great fun doing so. For the younger students their drawings will be less sophisticated and you do not need to dwell on vocabulary. With older students, they will need to label and use the vocabulary correctly. Most students are so eager to get hands on experience in science and with this activity, all students can experience success.

Story Starters

An AskERIC Lesson Plan

Author: Frances Vitali
School or Affiliation: Lake Valley School, Crownpoint, NM
Endorsed by: These lesson plans are the result of the work of the teachers who have attended the Columbia Education Center's Summer Workshop. CEC is a consortium of teacher from 14 western states dedicated to improving the quality of education in the rural, western, United States, and particularly the quality of math and science Education. CEC uses Big Sky Telegraph as the hub of their telecommunications network that allows the participating teachers to stay in contact with their trainers and peers that they have met at the Workshops.

Date: May 1994

Grade Level(s): Kindergarten, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Subject(s):

- Language Arts/Story telling

Overview:

Children enjoy telling stories as much as they enjoy listening to them. Sometimes simple props such as masks, puppets and costumes take the attention away from the student so s/he can focus on the content and telling of the story. In using every day objects as props, students become more relaxed to let their story unfold naturally and creatively while others (the audience) enjoy the visual representations as well as the oral delivery.

Objective(s):

Students will be able to:

1. Orally tell different kinds of stories using the assistance of props.
2. Be a performing storyteller as well as a receptive member of the audience.

Resources:

Teacher: box, container, or paper bag

Students: odds and ends to contribute for prop box

Activities and Procedures:

1. Explain that not all stories are written down. Ask students for examples of stories they know are not written in books (oral history, family stories, etc.). Optional - Tell the story, "Knots on a Counting Rope" by Bill Martin and John Archambault as an example of a family story.
2. Ask students to think of the many different and unusual ways you can tell a story (mime, poetry, theater, plays, dance, ballet, etc.).
3. Take an empty box and have each student contribute something small to put in the box - pencil, button, penny, string, bobby pin, tissue, etc. (anything they freely are willing to give up for a while or are willing to donate without wanting it back).
4. Suggest that just as an actor/actress on stage has props and scenery, you are going to tell a story using the objects in the box as the props and scenery for **your** story.
5. Tell a short story using some (not all) of the objects from the box as you tell the story to the students.
6. Explain that all students will have a chance to tell a story using the props in the box.

Tying It All Together:

Storytelling is a special activity that may be reserved for special times or for all times keeping in mind respect for the storyteller and the audience. A ritual of lighting a candle during storytelling time can be observed.

Variations:

Students in the audience can illustrate stories being told stories may be told according to specific genre: Mystery, Horror, Comedy, Fiction, Biographical, Autobiographical, Science Fiction, etc.

Story Improvisation

- the telling of a story will include a given condition, setting, situation, or theme, etc.

Story Relay

- One student begins a story and another student can pick up the story where the previous student left off, followed by another student until the end of the story.

Story telling is an effective means of communication. I heard a storyteller once say, ' When you read a book, the audience connects with the pictures in the book. When you tell a story, the audience connects with you.'

Space: Your Guide to Location Orientation and Travel

An AskERIC Lesson Plan

Submitted by: Brian F. Geiger, EdD
School or Affiliaton: University of Alabama at Birmingham, School of Education

Date: June 16, 1998

Brief Description: The purpose of this lesson is to teach elementary school students the basic knowledge and skills of location orientation and map reading. There are three objectives for learners:

1. Each student will demonstrate accurate map reading skills
2. Each student will correctly identify the names of one star, two planets, and one constellation
3. Each student will create a mini-model of the solar system using an empty box or food container

Grade Level(s): 2, 3, 4

Subject(s)

- Social Studies/Geography
- Science/Astronomy

Background Information and Concepts Covered:

Using space to teach elementary school children about astronomy, mythology, location orientation, map reading skills, and travel is fun and engaging.

Students can plan mock trips from school to home, to a field trip site or distant city, or even into the solar system. Combining didactic instruction with practical learning activities is an effective way to increase the level of interest and attention of learners.

Materials or Equipment List:

illustrated atlas and books about the solar system
state and city highway maps
shoeboxes or empty food containers
sheets of construction paper
buttons
seeds
pom-poms
Styrofoam balls of assorted sizes
glue
scissors
marking pens
paint
aluminum foil
string
yarn or ribbon
stapler

Procedures:

1. Use illustrated atlas or wall charts of the continent, nation, and state to locate the U.S.A., Washington, D.C., your state, and city.

2. Ask students to distinguish directional locations important for map reading, i.e., north, south, east, and west.

3. Demonstrate the use of a map index and grid to locate a nearby landmark or city.

4. Assist pairs of students to locate the state capitol, and cities in each of four directional locations.

5. Students will practice locating a distant home city of a relative or friend.

6. Use illustrated books, for instance, The Magic School Bus Lost in the Solar System (Cole, 1990), and The Glow-in-the-Dark Night Sky Book (Hatchett, 1988), and astronomical photographs to identify the names of prominent stars and planets in our solar system, several constellations, and our galaxy.

7. Ask students to locate the Earth in relation to the other planets in our solar system.

8. Use a chart to illustrate approximate average distances of each planet from the Sun (DeWeese, 1994).

9. Read a story of mythology that describes a constellation, for instance, Great Bear and Little Bear.

10. Describe basic scientific knowledge of the formation of stars.

11. Discuss how stars have been used to assist with navigation for centuries.

12. Assist pairs of students to locate and name at least two stars and their constellations, e.g., Polaris or the North Star and the Little Dipper.

13. Each student will describe the directional location and distance from the classroom to his or her home, a field trip site or distant city, or a location somewhere in our solar system.

Application Assignment:

Display a labeled 3-D model of the solar system constructed inside of an empty box or food container.
As class work or homework, each student will create their own models before the next class.
Offer art supplies such as seeds, pom-poms, Styrofoam balls, and string or yarn for their use.
Models should show each planet' s name and position in relation to the Sun and the other planets.
Students should refer to an illustration of the solar system as a reference.

Assessment:

Review again the purpose and objectives for the lesson.

1. Observe pairs of students as they locate the state capitol and different cities will reveal their abilities to correctly read a map using an index and grids to determine a location and distance.

2. Observe students as they locate and name at least two stars and their constellations. Critique students' models of the solar system for accuracy and completeness.

Useful Informational Resources:

1. Boy Scouts of America, 1984. The Big Bear Cub Scout Book. Irving, TX: Author.

2. Cole, J., 1990. The Magic School Bus Lost in the Solar System. New York, NY: Scholastic Press.

3. DeWeese, B., 1994. Outer Space: Putting Distances in Perspective. Monterey, CA: Evan-Moor Corporation.

4. Eyewitness Encyclopedia of Space and the Universe. 1996. New York, NY: DK Multimedia, http://www.dk.com

5. Hatchett, C., 1998. The Glow-in-the-Dark Night Sky Book. New York, NY: Random House.

6. NASA Spacelink homepage http://spacelink.msfc.nasa.gov

7. Wood, L.H., 1996. Eyes on Adventure. Exploring Space. Chicago, IL: Kidsbooks, Inc.

8. Young Astronaut Council, Washington, D.C., 1-800-800-4182. Brian Geiger

Story Pyramid

An AskERIC Lesson Plan

Author: Donna Calder
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Endorsed by: These lesson plans are the result of the work of the teachers who have attended the Columbia Education Center's Summer Workshop. CEC is a consortium of teacher from 14 western states dedicated to improving the quality of education in the rural, western, United States, and particularly the quality of math and science Education. CEC uses Big Sky Telegraph as the hub of their telecommunications network that allows the participating teachers to stay in contact with their trainers and peers that they have met at the Workshops.

Date: May 1994

Grade Level(s):

Kindergarten, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Subject(s):

- Language Arts/Whole Language

Overview:

This is a strategy to help students with comprehension. Could be used for character traits and relationships with other characters.

Purpose:

To make sure the students understand the story

Objectives:

Students will be able:

1. to read and understand a story line
2. to state the story problem
3. to state the solution to the problem

Materials:

overhead, transparency, paper, and pencils

Activity:

Prepare the transparency for the class to do as a class activity the first few times. Later the students should be able to do this on their own.

Story Pyramid

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Have the students fill in the pyramid with the information asked for below.

On line

1. write the name of the main character
2. two words describing the main character
3. three words describing the setting
4. four words stating the story problem
5. five words describing one event in the story
6. six words describing a second event
7. seven words describing a third event
8. eight words describing the solution to the problem

The more the students work with this activity, the easier it will become. Have the students write a sentence for each line using the number of spaces as the amount of words for each sentence. Then they can write a sentence for each space for each line.

Tying It All Together:

Use this pyramid as an outline for a summary of the story.

Lesson Plan #: AELP-PHS0066

Making an Electrical Circuit

An AskERIC Lesson Plan

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Endorsed by: Lisa Blank
The University of Montana

Date: November 5, 1999

Grade Level(s): 4

Subject(s):

- Science/Physics

Duration: 45 minutes

Description: Students will be provided with a battery, insulated wire, and a light bulb. They will be asked to create an electrical circuit that will light the light bulb.

Goals: Students will understand the concept of electricity and electrical circuits.

Objectives:

1. Students will be able to construct an electrical circuit.
2. Students will be able to describe and identify open circuits and closed circuits.

Materials:

- batteries
- insulated wire
- light bulbs
- teacher-made worksheet (see **Procedure** for details)

Procedure:
Scientific Explanation:
Questions: How do you use electricity in your daily lives? How would it affect you if you could not use these items for a week?

Focus Phase:
Divide students into groups of four and present each group with a set of materials (battery, insulated wire, and light bulb). Ask students, "Do you think that you could make a light bulb light with two wires and a battery?" Ask them to test their hypothesis by constructing a circuit, which would light the light bulb with their materials.

Allow students to build their circuits while you go around the room observing and asking them thought provoking questions. Give subtle suggestions to those that are becoming frustrated. Ask questions to those that have successfully constructed their circuit.

- Can you make the light bulb light a different way?
- What would happen if you turned the light bulb sideways?
- How many different ways can you get the light bulb to light?
- What would happen if the wire were underneath the light bulb?

Challenge Phase:
After students have had time to successfully construct their electrical circuits, ask them to compare their results with other students. Have them discuss why the light bulb lit. After a short period of discussion ask a student or a group of students to draw a diagram of their circuit on the board.

Discuss the diagram with the rest of the class. Do they agree or disagree with the diagram? Have groups that disagree draw a diagram of their electrical circuit on the board. Discuss these diagrams. After a classroom consensus has been reached, begin asking discussion questions:

- What made the light bulb light?
- What was the power source?
- What did the wires do?
- Is this circuit open or closed?
- Did electricity flow through the wire when the circuit was open?
- Did electricity flow throughout the wire when the circuit was closed?

Concept Introduction Phase:
To reinforce the concept, demonstrate a closed electrical circuit and an open circuit. Have students make a circle holding hands. Have one person squeeze a hand. Once that student's hand is squeezed, have him or her squeeze the next person's hand and so on. Now remove one student from the circle so there is a gap; have them try squeezing hands. Have students sit back down and discuss open vs. closed circuits. Ask questions:

- What happened when we broke hands?
- What kind of circuit was it when we broke hands?
- What kind of circuit was it when we were all holding hands?
- What kind of circuit did you make today with the battery, wire, and light bulb?

Concept Application:
Pass out the teacher-made worksheet. [**Note:** The authors regret that the original worksheet could not be included with this lesson plan. Teachers can create their own

worksheet by drawing examples of open and closed circuits. Students will need to identify which circuits are open and which circuits are closed.]

Students will use their knowledge to predict which circuits will light the light bulb and which will not. If time allows, go over the worksheet and discuss the correct answers and why they are correct/incorrect.

Assessment: Were students on task? Were students working cooperatively with their groups? When asked a question regarding their circuit, were students able to relevantly respond to the question? Did students demonstrate an understanding of electrical circuits on their worksheets?

Lesson Plan #: AELP-INT0112

The Clocks of Time

An AskERIC Lesson Plan

Submitted by: Stacie Smeltzer
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Date: September 15, 1999

Grade Level(s): 4, 5

Subject(s):

- Interdisciplinary
- Mathematics
- Science
- Social Studies

Duration: 45 minutes

Description: Children will be introduced to several types of time pieces from various periods in history. This lesson can be integrated with math. The students can review telling time. This lesson can also be integrated with science. The students can study astrology and how the movement of the earth, sun and moon relate to time.

Goals: The goal of this lesson is to familiarize students with the different types of clocks used thoughout time.

Objectives: The students will be able to:

1. place the clocks of history into the appropriate chronological time order.
2. draw and label their own futuristic clock.

Materials:

- various clocks
- watches and timepieces from the past and present
- timeline on a poster
- posterboard (6 sheets)
- markers
- crayons, etc.

- definition of a clock on a poster

Procedure:

Anticipatory Set:

To activate prior knowledge, ask the students to look at last night's assignment and give one reason why it is important to know what time it is.
To introduce the lesson, tell them we will be looking at the history of time and how clocks have played an important role throughout history.
To motivate the children and apply the lesson to their lives, have them raise their hands if they have at least one clock in their houses. Then, have the students guess how many clocks the teacher has in his or her house.

Continuation of Lesson:

Tell the students the definition of a clock while displaying it on the board.
Explain the time line that is on the board.
Describe B.C. and A.D.
Explain each clock, when it was invented, and show it to the class.
After showing each clock, put the name on the time line by the correct date.
The students will take turns putting the clocks in time order.
Explain all of the directions for the final project before placing them into groups of four.
Each group will have a *Recorder* , *Timekeeper* , *Reporter,* and *a Materials Person* .
Tell them that they have 15 minutes to draw a picture of a futuristic clock, give it a name and write a few sentences about the way the clock works.

Closure:

At the end of the lesson, the Reporter from each group will present his/her group' s' futuristic clock and explain how their clock works and the name of it.

Assessment:

The teacher can evaluate the students' ' understanding of the history of clocks by seeing if they can place the clocks in the right time order. The teacher can assess the students by listening and observing the cooperative groups to make sure they are on task. The teacher can also observe each group' 's presentation and listen to the explanations.

Lesson Plan #: AELP-PHS0054

Static Electricity

An AskERIC Lesson Plan

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Endorsed by: Lisa Blank, University of Montana, Missoula, MT

Date: December 8, 1998

Grade Level(s): 4

Subject(s):

- Science/Physics

Duration: 30 minutes

Description: A learning cycle format for inquiry teaching. Journal about what students think causes a lightbulb to light up when rubbed with a plastic bag. Then several activites for students to explore how static electricity works. An opportunity to use knowledge learned and get an accurate assessment of students' understanding of static.

Goals: To teach through inquiry method about static electricity. For students to learn these main points about static electricity:

* Positive and negative charges attract each other.
*Charges can jump from one object to another when there is a buildup of electrons.
* This buildup is called static electricity.

Objectives:

Students will be able to explain how static electricity works in journal entry. They will also show how objects can become negatively charged and attract other objects, causing static electricity.

Materials:

balloons, salt, pepper, plastic rulers, cloth or wool, torn up pieces of paper, paper plates, questions for each activity

Procedure:

Concept Assessment: Hold up a lightbulb and a plastic sack and say: In your journal describe what you think will happen when I rub the plastic bag up and down the light bulb? Why do you think this happens?

Concept Exploration: Two activities will be given to each group of students (groups of 3-4) in the class.

1. This activity is with pepper and salt. A pile of pepper and salt will be on a paper plate. Take a plastic ruler and place it above the pile and see what happens. Then, rub the ruler with the cloth or wool for 5-10 seconds. Then place the ruler one inch above the pile of salt and pepper. Note the reaction.
2. This activity involves the use of a balloon. Students will try to stick the balloon to the wall. Then they will rub the balloon on their head or a piece of cloth and then try to stick it to the wall. They will take note of what happens in both instances.

Closure: Students will then share their results. Discuss as a class:

What happened when you tried to stick the balloon to the wall without rubbing it?
What happened to the salt and pepper when you didn't rub the ruler?
Why don't you think anything happened?
What does rubbing the balloon and the ruler do that causes there to be a reaction?
What were your other findings and why do you think they occurred?

Introduce facts about static electricity. Discuss that electrons are negatively charged and when rubbed with other objects they build up excess electrons from the other object. Those electrons need to be released and thus, when it comes in contact with something else they are released by a zap or an attraction to positively charged protons. Draw on the board the placement of excess electrons on the outer edge of a balloon and then when you stick a balloon to the wall all the electrons jump away and the balloon is held up by the attraction of the positive and negative charges. Talk about getting shocked when you're walking around the house and what is actually happening. Have the students help you explain it by asking: So when I scuff my feet what's happening? What happens when I touch someone else? Why is there a shock?

Assessment:

Concept Application: Students will be asked to find a way to use a balloon to pick up pieces of paper without touching them. All they will be given is a balloon and several torn up pieces of paper. They will have to ask for any objects they might need. Afterwards, we would discuss why they used the method they did and why it worked. Then they'd enter in their journal what they learned about static electricity, and briefly explain what causes static electricity.