Western Upper Peninsula Center
for Science, Mathematics and Environmental Education

FAMILY SCIENCE/MATH NIGHT LESSON PLAN

Family Math & Science Lesson Plan from students in ED 3510 Communicating Science course (2-credits)
Western Upper Peninsula Center for Science, Mathematics & Environmental Education at Michigan Technological University
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Starry, Starry Night

Presenter's name: Chris Beyer, senior, Electrical Engineering
Age Group: K-2
Topic: Earth, Moon, Sun and Stars
Michigan Content Standards

- Compare and contrast characteristics of the sun, moon and earth. (SCI V.4. Elem.1)
- Describe the motion of the earth around the sun and the moon around the earth. (SCI V.4. Elem.2)

Lesson Overview
Students will learn about our planet, the earth, the moon, the sun, and stars, and how they move in relation to each other. Students will participate in three hands-on activities: acting out the paths of the earth and moon, identifying constellations, and making their own constellations.

References
1. Activity Guide – Star Finder, Folders 1 and 2
2. http://www.kidsastronomy.com/solar_system.htm - Information on our Solar System
3. http://www.astronomyinyourhands.com/cgi/makestarwheel.chooser.cgi – Information on constellations and star wheels

Objectives
After this presentation, students will be able to:
1. Explain and demonstrate the paths of the Earth and the moon - rotation, revolution, orbit, and length of each
2. Explain what constellations are, and their history.
3. Recognize several common constellations.

Materials
Per teacher:
Sign for Sun, Moon, Earth to act out rotation and revolution
Earth, Sun and Moon Pictures (1 each)
Push Pins (~10)
Per student:
3-4 Dot to Dot Printouts of common constellations
Scotch Tape
Paper Towel Roll
Black Paper Circles
Push pin (for adults only)
Rubberband
pencil

Room Arrangement or Special Needs: Room needs to have a fairly big space up front, about 12x12 foot space for students to do the earth's orbit activity.

Procedure

Attention-getter: Put the colored Earth transparency in front of my face, and ask what it is.

Introduction
Welcome to Family Science Night put on by the Western Upper Peninsula Center for Science and Math. My name is Chris, and I am in the Department of Chemical Engineering at Michigan Tech. When I graduate, I plan to make hot dogs (in a laboratory)!

Tonight, we are going to learn about ASTRONOMY! Let's say "astronomy." Astronomy is the study of planets, the moon, the sun and the stars! Show picture of earth, moon, sun, and ask students what each is. Can you look right at the sun? No, it's too bright, and will hurt your eyes if you look right at it.

Does the earth move? Yes, it does move. How does the Earth move? It spins! This is called rotation. The Earth rotates, or spins. One complete rotation of Earth is equal to one day. This is how we get day and night! Also, the earth moves around something. Do you know what it moves around? Right, the sun! This is called an orbit or a revolution. Can everyone say Orbit? Good! The Earth moves around the sun, and that is Earth's orbit. It takes one year for the earth to complete one revolution around the sun. How about the moon, does it move? The moon orbits the earth. It takes one month for the Moon to complete one orbit of Earth. So the moon orbits the earth, the earth spins and revolves around the sun! Wow! If we act it out, you will be able to see what I mean! Let's get everyone up here in outer space. (3 min)

Activity #1 - Orbits
Everyone starts as the sun! Get in a group right over here. I need someone to be the earth. OK, you be the earth (give them Earth picture). What does the Earth do? Right it rotates, or spins. Face student towards the sun. Ask, 'Can you see the sun?' Right, you can, so is it day or night? Right, it's daytime. Turn student around. Now can you see the sun? Nope, you can't. It must be night time. But wait, what about your back? That is facing the sun. So different parts of Earth have daytime and night time at different times. When it is daytime here, on the other side of the world it's night time! OK earth, start spinning! OK, someone needs to be the moon. Here's the moon picture. What does the moon do? It orbits the earth, right. Start orbiting the earth! Is the Earth getting dizzy yet? Ok, remember, what does the earth orbit around? Right, the sun. So we need to try to get the earth and moon to go around the sun! Try to get the orbits right, and laugh a lot! OK, let's get everyone back in their seats.

Alright! So we learned why we have day and night, and how the Earth and moon travel around the sun. How long does it take the Earth to rotate one time? One rotation of the Earth is one day, remember? How many hours is that? Right, it's 24 hours. How long does it take for the earth to orbit around the sun? One revolution, or orbit of the earth around the sun takes one year. Does anyone know how many days that is? Right, there are 365 days in a year. That's how long it takes for the earth to go around the sun once. (7 min)

So we talked about the sun, the earth and the moon. At night time when you look up in the sky, what else can you see besides the moon? **Stars!** Right! There are a lot of stars. People have been looking at the stars for a long time. Did anyone know that our sun is just another star? It's OUR STAR! Does anyone think that stars are cool? Wait for a 'Yes' answer. So why else are

stars cool? <wait for answers> I think stars are cool, because I can see pictures in the sky that stars make! A picture in the sky that is made up of stars is called a Constellation! Can everyone say constellation? <CONSTELLATION!>

Activity 2- Constellation Dot to Dots
Distribute three Dot-to-dot constellation handouts. After the students finish, ask them what they look like. There are five different constellations. <Answers should be something like: A person, soup ladel, house, bear, dragon! <Orion, Big Dipper, Cassiopeia, Ursa Major, Draco>

Activity 3 – Make Pinhole Constellations.
Distribute one black construction paper circle, rubberband, push pin (parents only) and one paper towel roll per person. Students will make a constellations to look at with their tubes, and then compare them to the dot to dots that they just made. Explain the differences between the dot to dots and the pinhole constellations. There are other stars in the sky in the dot to dot, and the pinhole constellations are just the brightest stars.

Activity 4 – Making original constellations!
Distribute one black construction paper circle, rubber band, push pin (parents only) and one paper towel roll per person. Think of a simple picture that you could make into a constellation. Then, using the pencil, make a few dots to make the general shape of the constellation. Next, poke small holes right through the stars. Then, take the pre cut circle and put it at the end of your paper towel roll. You're done! Look up at the light to see your very own constellation.

Assessment of Student Learning:
Ask students:

- How does the earth move? <It spins! It orbits the sun!>
- Why do we get day and night? <Because the Earth spins away from the sun!>
- What is the Solar System? <It's our sun and the nine planets!>
- What is a picture made of stars called? <Constellation>(2 min)

Filler: make more original constellations

Take Home Handouts and/or materials: Original Constellations, Dot to Dots

Cleanup: Pick up scraps of paper from the star charts, gather extra brass clips, scissors, markers, tape, flashlights into Tupperware bins. I will collect penny nails from the parents.

SAFETY- BE CAREFUL WITH THE PUSH PIN! It is very sharp and you could get hurt. Parents, please help your child poke the star holes.