Earth and Sun

Collaboration

Stage 1 - Desired Results

Standards

Science Performance Expectations (NGSS, 2013)

MS Earth & Space Sciences

MS.Space Systems

Performance Expectations

- MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

DRAGONS

DRAGONS
- Get global

Students will decided where they should live based on how the Sun affects the Earth in different locations on the planet.

Enduring Understandings

Overarching: Each part of the Earth receives a different amount of sunlight that affects how people live in each place.

Topical: The tilt of the Earth affects the amount of sunlight that reaches the Earth's surface.

Essential Questions

Overarching: Where is the best place to live on Earth?

Topical: What does the tilt do for me?
How are polar, temperate and tropical climates different?

Knowledge

The student will know....

SWK:

- what type of energy the Sun provides to the Earth
- that the Earth is spherical
- the Earth spins/rotates every 24 hours which causes day and night
- the Earth orbits (revolves) arounds the Sun once a year
- Earth's orbit is nearly a perfect circle
- that the Earth is tilted at a 23 degrees
- the impact of the tilt on number of hours of daylight on different parts of the Earth

Skills

The student will be able to....

SWBAT:

- **Model** the orbit of the Earth around the Sun
- **Model** the angle of the Earth and angle of sunlight on the Earth
- **Compare** the amount of sunlight places around the world receives
- **Relate** the amount of sunlight to daylight hours and seasonal changes
- **Explain** how the angle changes in one place over the corse of the Earth

Stage 2 – Assessment Evidence

Assessments

Earth Sun Survey
Formative: Other: Quiz

Survey about student's previous knowledge of how the Sun and Earth interact. Student reflect on the quiz over the course of the unit.

sun-earth_survey.pdf

Trip to the Sun Writing
Formative: Written: Journal/ Diary

Reflective writing over the distance of the Earth from the Sun and how the Earth rotates on an axis.

Favorite Place to Live
Summative: Oral: Presentation

GRASPS: Students pick a location and present how the Sun affects the Earth and this location.

EarthandSunFinalProject.pdf

Performance Tasks (GRASPS)

Goal: The goal is to convince your family to move to a location of your choosing.

Role: You are expert on how the Sun affects the Earth.

Audience: Your target audience is your family.

Situation: You and your family are moving! But you get to pick were you are all moving to. You need to research a location and convince your family why this would be the best place for you all to live. You will need to persuade your family that your choice is the best choice based on the tilt of the Earth, the solar radiation this location receives, and how the seasons and length of day will change (in comparison to where you live now).

Product: You will need to research a location and understand how it is affected by the Sun, Moon and Earth's tilt. Then you will need to prepare a argument to persuade your family to move to your location. You will need to explain to them how the Earth is affected by the Sun and the Moon and relate the information to your chosen location.

EarthandSunFinalProject.pdf

Stage 3 – Learning Plan

Learning Activities

Engage

- Chalk Talk: Seasons, Spring, Summer, Fall, Winter.
- Student Survey of prior knowledge, survey given to family/friends, data collected in class and discussed

Explore

- Size and Scale of the Universe (NASA lesson)
- Trip to the Sun Activity
- Sun Photo comparison
- Earth's orbit shape vs Pluto's orbit shape (drawing and comparing)

Mid-Explain Question: Why do you think we have seasons? Reference back to Student Survey from engage

Explore

- Temperatures and Daylight hours from around the world (graphing activity)
- Tilt of the Earth Activity
- Angle of Sunlight Activity

Explain

- Why does to Earth have seasons?
- What does the tilt do for me?
- What happens to the seasons at the equator? At the poles?

Evaluate:

- GRASPS

Resources

1. **The Real Reasons for the Seasons: by Alan Gould, Carolyn Willard,**
   and Stephen Pompea
    1. Used activities 1-6 for Earth and Sun connections.
2. Explore Learning Gizmos
    1. Used for Seasons in 3D and Seasons: Why do we have them?

http://lhsgems.org/GEMSSeasons.html

https://www.explorelearning.com/

ELL Strategies

Reflection

This unit was really good in using the Real Reasons for the Seasons book that systemically takes the misconceptions about seasons that the students comes in with and uses hands on activities to correct their understanding of the Earth Sun relationship. The unit's essential question helped drive the direction of the the students thinking. They helped challenged the students misconceptions about the seasons. Overall, the students understood the misconceptions for the seasons and the real seasons were. There was a few misunderstandings towards the last concept of direct and indirect sunlight; partially because we had many interruptions with field trips, half days etc and because the hands on activities were never attempted because of lack of materials. The unit meet the needs of both higher level thinkers and ESL students. The higher level thinkers were challenged to rethink how the Earth and Sun interacted and the hands on activities helped support the English development of the students. The students stayed engaged throughout most of the lessons, with some engagement dropping off with the Gizmo labs.

This unit was not the most challenging unit in terms of content (seasons) but understanding the large abstract concepts such as the Earth's orbit, tilt and sunlight variation was a challenge that the students worked to understand. Having a more concrete model of orbits such as orreries would allow the students to visually understand the planets orbits more clearly and without a computer. For this unit the missing hands on activity should have been done. However I was missing globals for each pair and flashlights. Inflatable globals were ordered but a mix up in the order lead to only one arriving at the end of the unit when the students were already working on their final project. If I adapted this unit again I would change the guides for the online labs. They can be wordy and lengthly but overall leads to a better understanding of concepts.