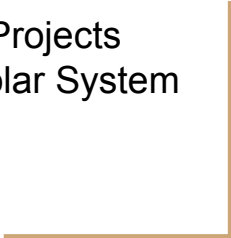


Introduction to Physical Science

EMPACTS Capstone Projects
Earth Systems and the Solar System
Fall 2023



Fall 2023 EMPACTS Project
Introduction to Physical Science, C. D. Phillips, Professor
Northwest Arkansas Community College
Bentonville, AR 72712

Project Introduction

The class was challenged to choose one or more topics from the list of end of semester curricular content and prepare to complete a final project during the two hour final examination period for the course.

Concepts, Demos, Division of Labor, and Materials list were generated before the final exam period.

One project investigated Earth Systems, in particular they demonstrated the effects different types of erosion have on soil.

The second project focused on the solar system with 6th-12th learning outcomes in mind.

College Curricular Goals

- Recognize the implications of science in making choices on personal, community, and global issues
- Identify unifying principles and repeatable patterns in the physical world and apply them to problems or issues of a scientific nature
- Explain the relevance of understanding the natural laws and processes of the world and the cosmos

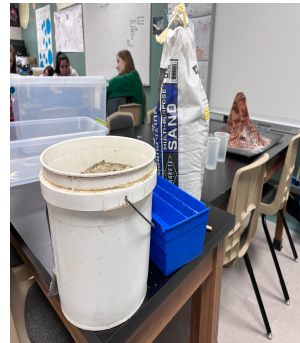
Our Teams

Earth Systems

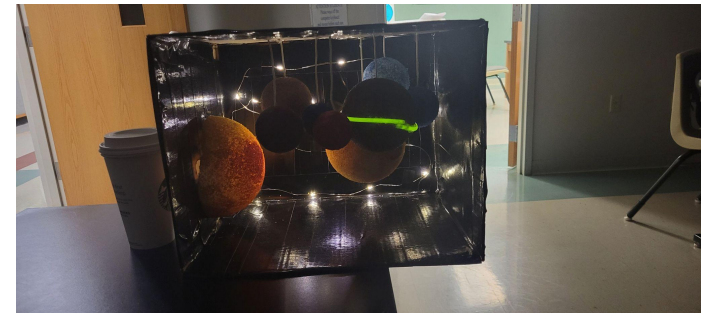


Planet Earth - Erosion and weathering

Solar System



Solar System - 6-12th



Division of Labor-Divide and Conquer

Earth Systems

- College Level Presentation
 - Sarah
 - Stephanie
 - Kimberly
- **Demo**
 - Israel
 - Elizabeth
 - Susana
 - Abby Suedel
- **Demo Materials List and media**
 - Stephanie



Division of Labor-Divide and Conquer

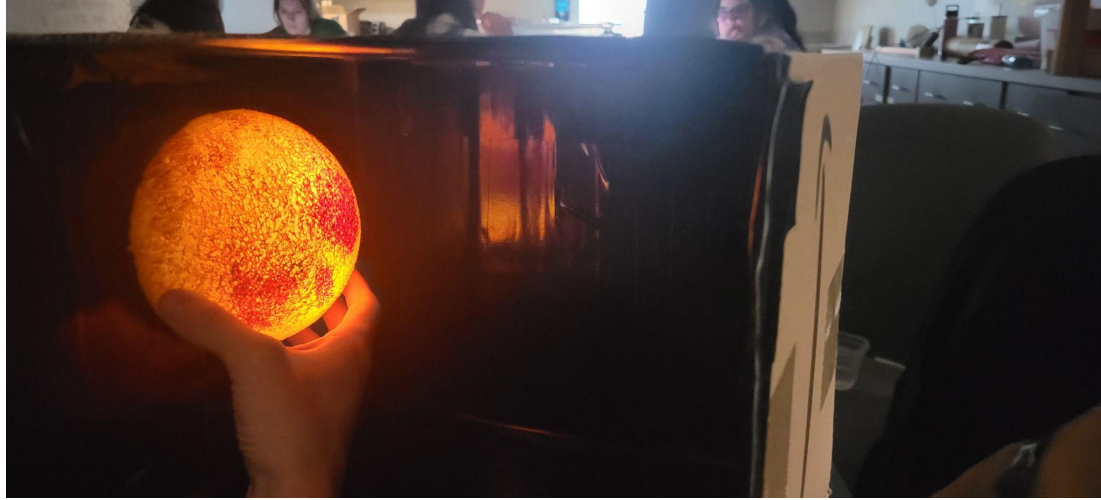
Solar System

- Lesson plan/Research Worksheet
- Activity- hands on activity - building a model of the solar system
- Grade level presentation

Work Division among group members:

- Building of the Demo : Cade & Kallie
- Lesson Plan/ Research sheet : Kaylee
- Grade Level Presentation : Kallie
- Extension activity: Abby Suedel

Collaboration



Project Results

Erosion

Project Products

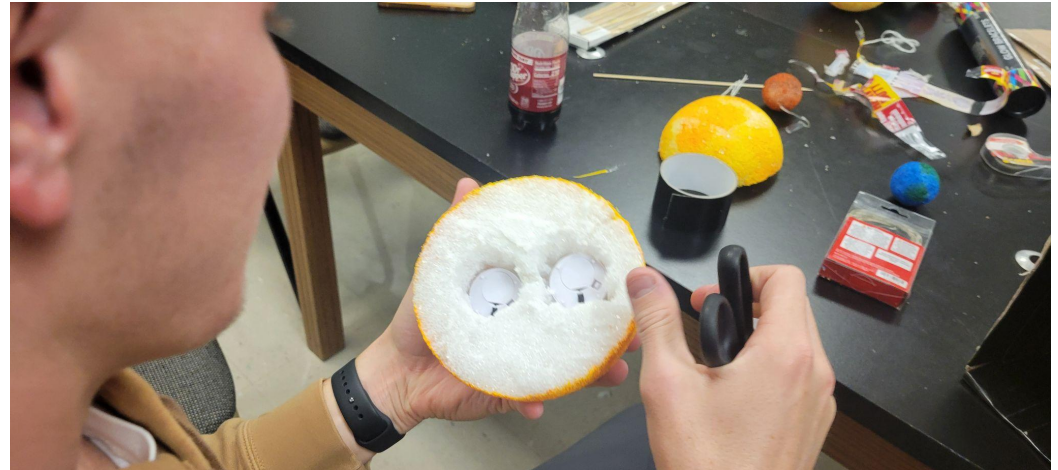
- College Level Presentation
- Demo Materials List
- Demo



Solar System

Project Products

- Lesson plan
- Activity/Worksheet
- Grade level presentation



Earth Systems- College Level Presentation

Erosion and Weathering:

<https://docs.google.com/presentation/d/1-DuKvFTivkuV6di7PJmmOL3dSfrMDCKEtZRQMfTL4Vk/edit?usp=sharing>






Demo Info

Materials Needed

- 3 plastic trays
- Sand
- Dirt
- Duck tape
- Beaker
- Water
- Straws

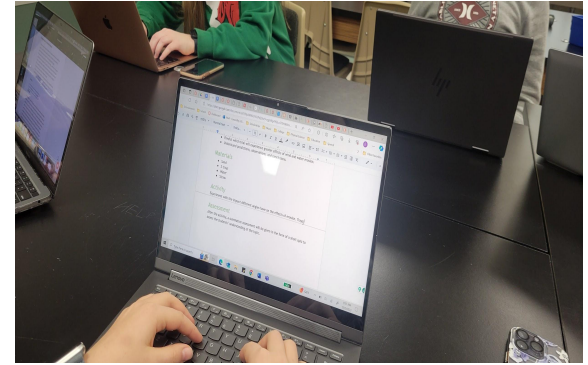
Steps Needed for Demo to be Functional

- Put sand in the bottoms of our blue trays
 - Tilt one of the sand trays
 - Pour water into the flat tray
 - Pour water into the tilted tray
 - Blow into the third tray with the straws.
 - Observe how the sand changes position.
- 

Teamwork



Critical Thinking Skills



Problem solving



Products of Learning experience

EMPACTS Skills

- Teamwork
- Problem solving
- Time management
- Communication
- Use of Technology

Two Curriculum driven projects:

Earth Systems and The Solar System

- Final Presentation - whole class
- Contributions from both teams to the final overall presentation

<https://drive.google.com/file/d/13MSbC52vcMPBFtjdrEUb8FXQSezjJmCD/view?usp=sharing>

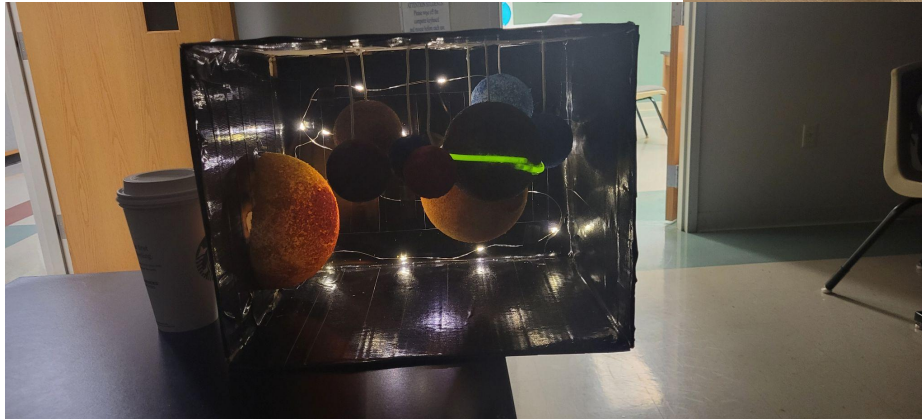


Solar System - 6-12th Presentation

Grade level presentation

Lesson Plans/Research
Sheet

Solar system model



6-12th Lesson Plan

Kaylee brought the materials listed in the activity sheet to her workplace, where she serves as a pre-K teacher. Employing the lesson plan she had created, she organized it as a class activity with her students, breaking them into groups to research, paint the planets, and collectively conduct the model. Given that Kaylee works at a preschool where instruction is delivered entirely in Spanish, the science activity was taught in both English and Spanish.



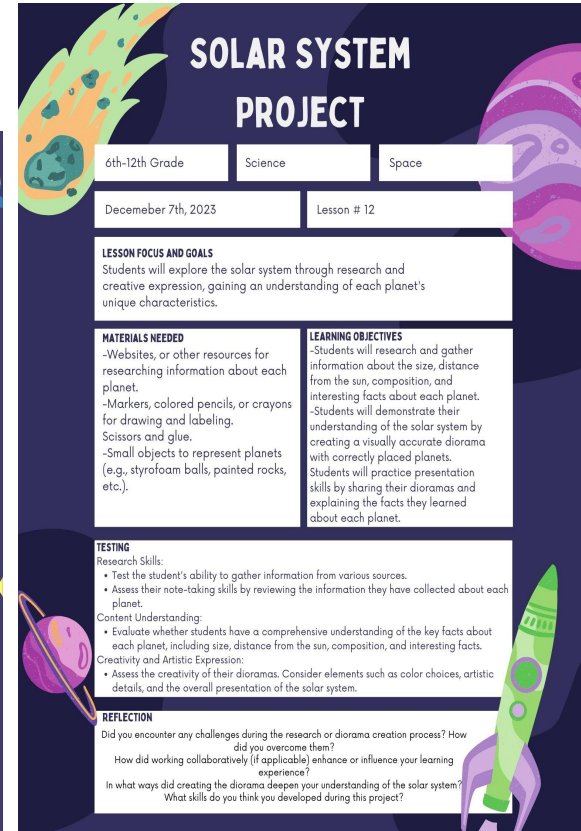
A poster titled "SOLAR SYSTEM ACTIVITY" with a dark blue background featuring a yellow crescent moon, a blue planet with a white ring, a red and orange comet, and a large Earth at the bottom. The text is in white and light blue. It includes a materials list, a list of instructions, and a central atom symbol.

SOLAR SYSTEM ACTIVITY

Materials

- Styrofoam balls
- Paints
- Led lights (optional)
- String
- Cardboard box, duck tape

- Provide students with reference materials and encourage them to research details about each planet, such as size, distance from the sun, and key features.
- Instruct students to plan their solar system models. They should decide on the size of each planet and consider how to represent features like rings, moons, and color variations. (Paint Styrofoam balls)
- Once the models are complete, students can present their solar systems to the class.
- Encourage them to explain the unique features of each planet and how they represented them in their models.



A poster titled "SOLAR SYSTEM PROJECT" with a dark blue background featuring a green and orange comet, a purple planet with a ring, and a green rocket. The text is in white. It includes a table with project details, a list of materials and learning objectives, and sections for testing and reflection.

SOLAR SYSTEM PROJECT

6th-12th Grade	Science	Space
December 7th, 2023	Lesson # 12	

LESSON FOCUS AND GOALS
Students will explore the solar system through research and creative expression, gaining an understanding of each planet's unique characteristics.

MATERIALS NEEDED
-Websites, or other resources for researching information about each planet.
-Markers, colored pencils, or crayons for drawing and labeling.
Scissors and glue.
-Small objects to represent planets (e.g., styrofoam balls, painted rocks, etc.).

LEARNING OBJECTIVES
-Students will research and gather information about the size, distance from the sun, composition, and interesting facts about each planet.
-Students will demonstrate their understanding of the solar system by creating a visually accurate diorama with correctly placed planets.
Students will practice presentation skills by sharing their dioramas and explaining the facts they learned about each planet.

TESTING
Research Skills:

- Test the student's ability to gather information from various sources.
- Assess their note-taking skills by reviewing the information they have collected about each planet.

Content Understanding:

- Evaluate whether students have a comprehensive understanding of the key facts about each planet, including size, distance from the sun, composition, and interesting facts.

Creativity and Artistic Expression:

- Assess the creativity of their dioramas. Consider elements such as color choices, artistic details, and the overall presentation of the solar system.

REFLECTION
Did you encounter any challenges during the research or diorama creation process? How did you overcome them?
How did working collaboratively (if applicable) enhance or influence your learning experience?
In what ways did creating the diorama deepen your understanding of the solar system? What skills do you think you developed during this project?

Share your experiences

Did we build skills?

Yes, our team learned how to work together. We learned how to see everybody's strengths and give them jobs based on those strengths. Our demo group learned problem solving with how to properly demonstrate erosion in a way that's accessible and presentable. Our presentation slide crew got to play around with the different themes and transitions to create a wonderful group of slides. -Earth Systems member

Solar System members:

Yes, we had a really great time coming together to work on this project. We were able to work together and problem solve when our demo was not turning out exactly how we had planned. We all have different strong suits and we were able to curate this project in a way that highlighted them all. We got to use our creativity and critical thinking skills on this project and I think we all learned a lot from this project. -Solar Systems member

Acknowledgements

Who do we thank?

We all classmates would like to thank our Professor Phillips, who worked hard to design this amazing curriculum and taught us unique things about the world. Additionally, we extend our thanks to Kaylee's students for their valuable assistance in building the solar system model.

Solar System team and Earth System team also would like to thank the EMPACTS lab assistants, Dawson Robinson and Caden Biscup, for all their help and all the team members in the team who helped each other and worked together and turned some beautiful projects in front of the class.

Citations

See individual projects.