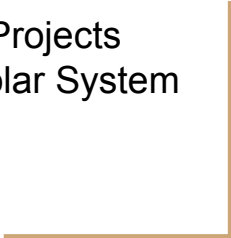


Introduction to Physical Science

EMPACTS Capstone Projects
Earth Systems and the Solar System
Spring 2023



Spring 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 how weather and climate are influenced by global climate change - College Level Concepts

The second project focused on the solar system with K-6 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 - Climate and Weather

Solar System



Solar System - K-6



Division of Labor-Divide and Conquer

Earth Systems

- College Level Presentation
 - Marin
 - Faith
 - Zaelea
 - Avery
- Demo
 - Matthew
 - Ryne
 - Jacob
 - Dawson
- Demo Materials List
 - Matthew



Division of Labor-Divide and Conquer

Solar System

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

Work Division among group members:

- Building Model, presentation, assemble the model, demo: Hiba
- lesson plan, demo: Ashley
- Building model (painting planets), demo: Abby, Luna
- Presentation and Demo: Jennifer, Ashanti

Collaboration



Project Results

Earth Systems

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

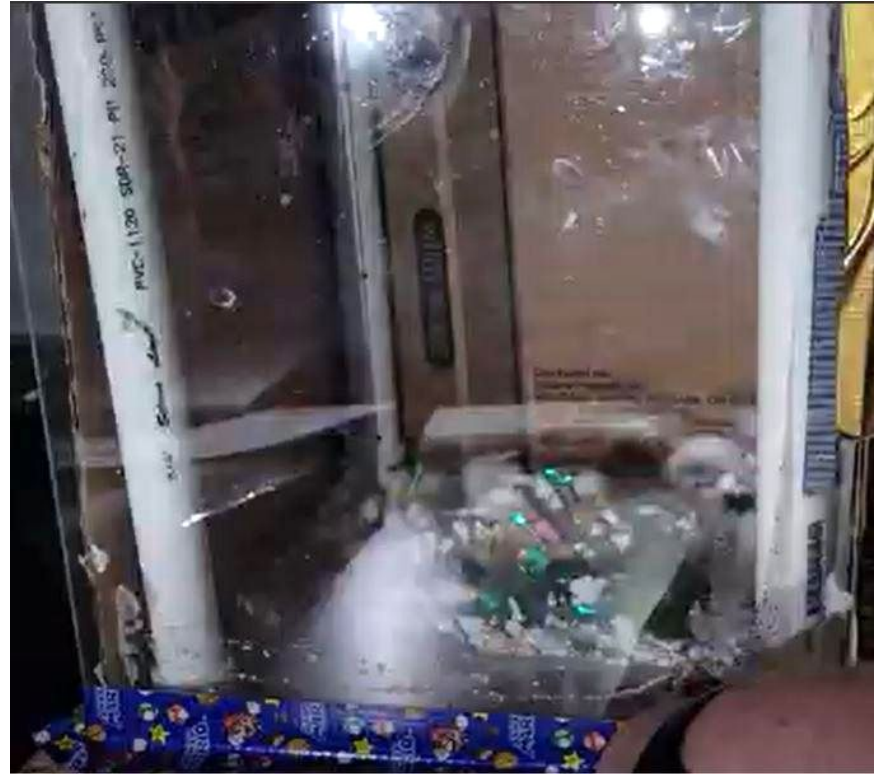
Extreme weather

The Tornado

[Planet Earth Team- Tornadoes](#)

Demo

[Tornado Machine](#)





Our Demo

Demo Info

Materials Needed

- Failed tornado machine
- 3 siding pieces of cardboard
- Plastic wrap
- Styrofoam beads
- Miniature structures (If needed)
- Leaf blower
- Small fan
- Fine mesh sheet
- Any other debris
- Box fan

Steps Needed for Demo to be Functional

- Install the 3 cardboard sides
- Cut intake holes as needed
- Install fine mesh grate over the air intake
- Replace intake fan on top with small fan and make as air tight as possible with duct tape
- Install leaf blower in bottom hole
- Add in styrofoam beads and debris or structures
- Seal in the chamber with plastic wrap and tape

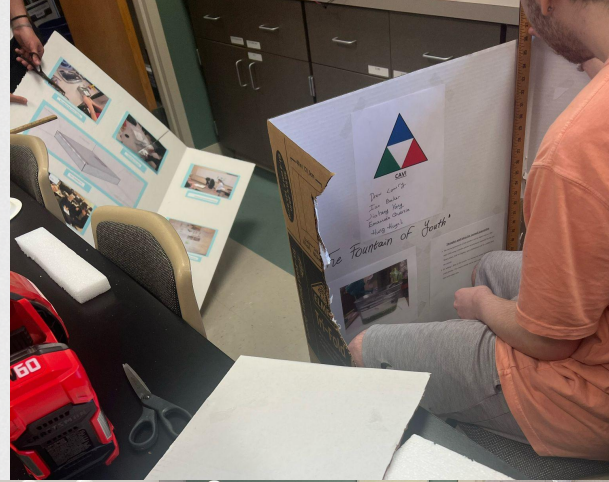
How to Work

- Turn on box fan
 - Watch for any loss of air intake around edges
- Turn on leaf blower
 - This may sometimes be too much airflow, at which point you should pulse the leaf blower

Teamwork



Critical Thinking Skills



**Problem
solving**



Final Result



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

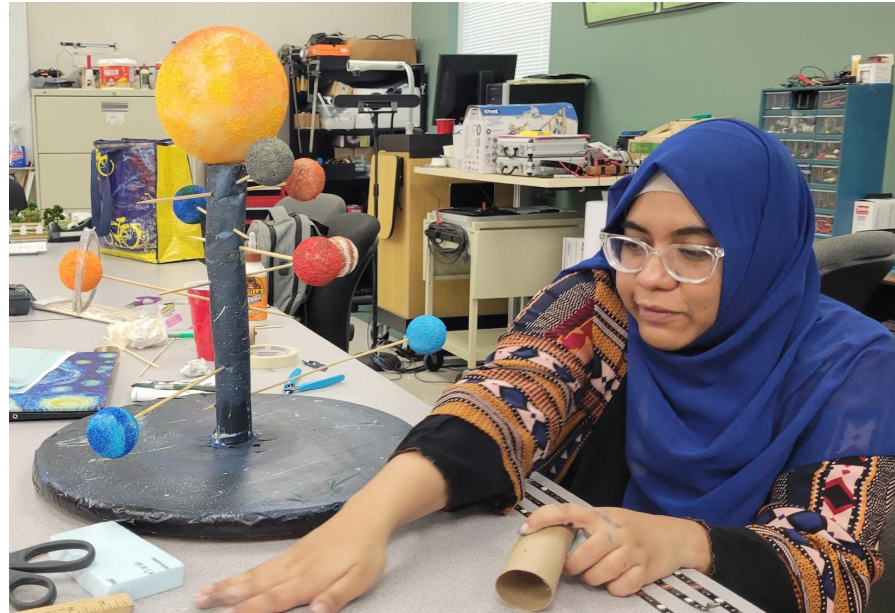


Solar System - K-6 Presentation

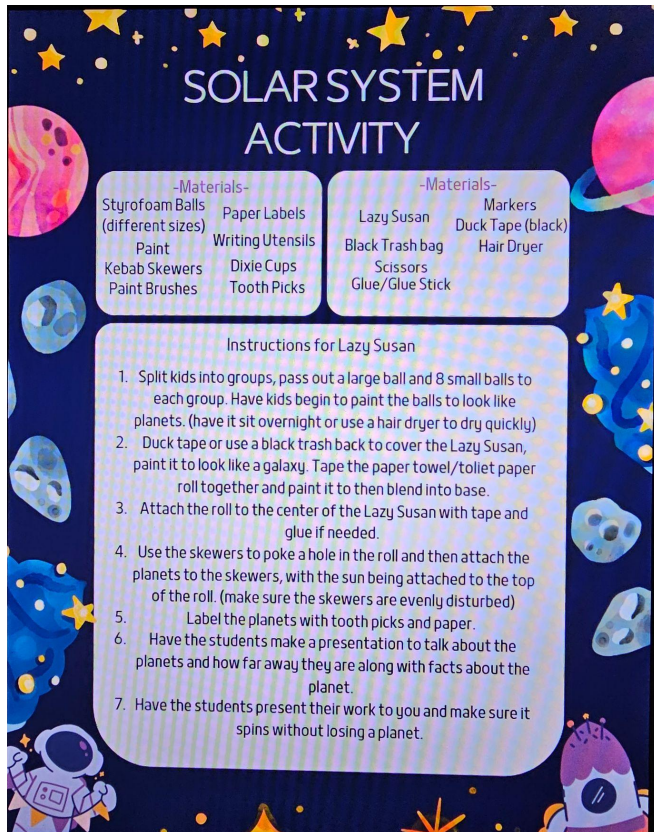
Grade level presentation

Solar System Lesson

Activity and Demo



K6 Lesson Plan

A colorful poster for a solar system activity. The background is dark blue with yellow stars, a pink planet with a ring, and a blue galaxy. At the bottom, there are illustrations of an astronaut and a rocket. The title 'SOLAR SYSTEM ACTIVITY' is in white. Below the title are two material lists and a large instruction box.

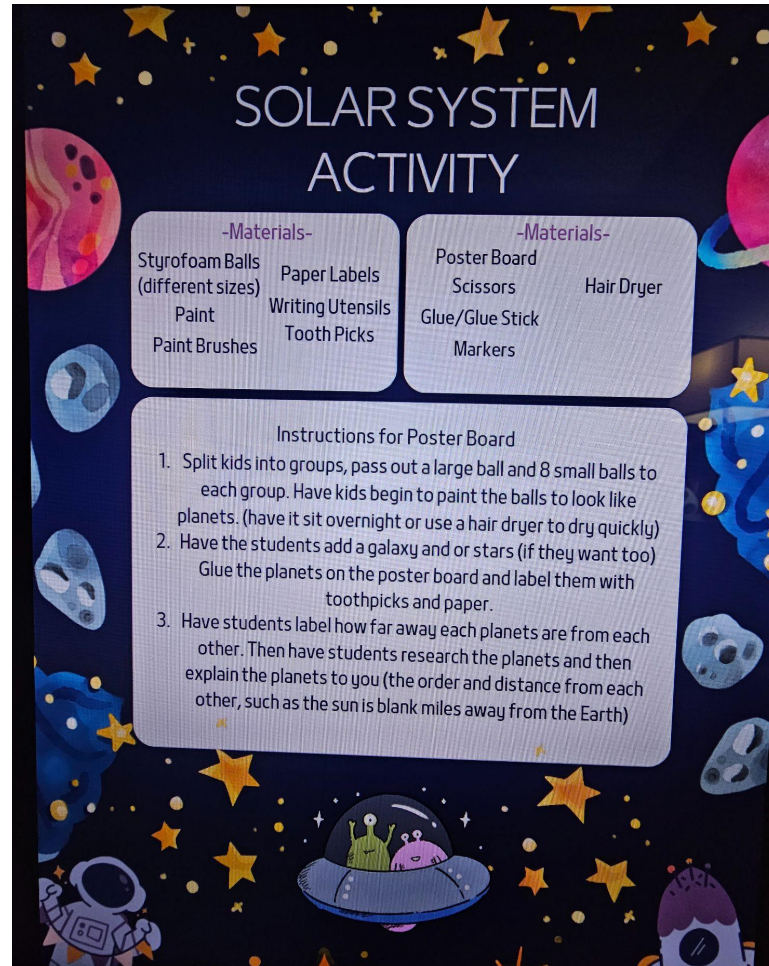
SOLAR SYSTEM ACTIVITY

-Materials-

Styrofoam Balls (different sizes)	Paper Labels	Markers
Paint	Writing Utensils	Duck Tape (black)
Kebab Skewers	Dixie Cups	Black Trash bag
Paint Brushes	Tooth Picks	Scissors
		Hair Dryer
		Glue/Glue Stick

Instructions for Lazy Susan

1. Split kids into groups, pass out a large ball and 8 small balls to each group. Have kids begin to paint the balls to look like planets. (have it sit overnight or use a hair dryer to dry quickly)
2. Duck tape or use a black trash bag to cover the Lazy Susan, paint it to look like a galaxy. Tape the paper towel/toilet paper roll together and paint it to then blend into base.
3. Attach the roll to the center of the Lazy Susan with tape and glue if needed.
4. Use the skewers to poke a hole in the roll and then attach the planets to the skewers, with the sun being attached to the top of the roll. (make sure the skewers are evenly disturbed)
5. Label the planets with tooth picks and paper.
6. Have the students make a presentation to talk about the planets and how far away they are along with facts about the planet.
7. Have the students present their work to you and make sure it spins without losing a planet.

A colorful poster for a solar system activity. The background is dark blue with yellow stars, a pink planet with a ring, and a blue galaxy. At the bottom, there are illustrations of an astronaut and a rocket. The title 'SOLAR SYSTEM ACTIVITY' is in white. Below the title are two material lists and a large instruction box.

SOLAR SYSTEM ACTIVITY

-Materials-

Styrofoam Balls (different sizes)	Paper Labels	Poster Board
Paint	Writing Utensils	Scissors
Paint Brushes	Tooth Picks	Glue/Glue Stick
		Markers
		Hair Dryer

Instructions for Poster Board

1. Split kids into groups, pass out a large ball and 8 small balls to each group. Have kids begin to paint the balls to look like planets. (have it sit overnight or use a hair dryer to dry quickly)
2. Have the students add a galaxy and or stars (if they want too) Glue the planets on the poster board and label them with toothpicks and paper.
3. Have students label how far away each planets are from each other. Then have students research the planets and then explain the planets to you (the order and distance from each other, such as the sun is blank miles away from the Earth)

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 make the vortex for the tornado allow proper air flow. 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:

We came together as a strong team who worked together and had fun and learned a lot from each other. None of us had good team experiences until professor Phillips class. We all became friends, we learned how to use our strengths and ideas and make it work. We learned in detail about solar system while working on the model and had some healthy fun banter about the facts about the solar system and universe, and those banter helped us learn new information.

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.

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

Not needed if you have them on your lesson plan and activity sheets.