NES: Engineering Design Challenge: Lunar Plant Growth Chamber

Presented by: Marti Phipps

February 29, 2012
ENGINEERING DESIGN CHALLENGE
LUNAR PLANT GROWTH CHAMBER

Presented by Marti Phipps
Video
STS - 118
What do we know about the moon?
What do we know about the moon?

What is the approximate distance from Earth to the moon?
What do we know about the moon?

What is the approximate distance from Earth to the moon?

How long are the days and nights?
What do we know about the moon?

What is the approximate distance from Earth to the moon?

How long are the days and nights?

Is there water on the moon?
Let’s pause for questions from the audience.
Lunar Farming

- How do you grow plants on the moon?
- And how do you start a farm on the surface of the moon?
Why a Plant Chamber?

- Allows plants to grow in a controlled environment
- Plants will play an important role in allowing humans to explore the moon and Mars
Materials Needed

- Education guides
- Miscellaneous material to construct the plant chamber (now would be a good time to clean out your cabinets)
- Seeds
Engineering Design Challenge
STEP 1: Define Problem

STEP 2: Identify Criteria/Constraints

STEP 3: Brainstorm Solutions

STEP 4: Select a Solution

STEP 5: Construct a Prototype or Model

STEP 6: Test/Evaluate the Solution

STEP 7: Share the Solution

STEP 8: Refine the Design

NSTA WEB SEMINARS
Step 1:

Identify Problem
Design and create a model or prototype of a plant growth chamber for an extreme environment.
Step 2: Identify Criteria & Constraints
Web search

- [http://resources.yesican-science.ca/iss07/experiment1.pdf](http://resources.yesican-science.ca/iss07/experiment1.pdf)

Objective

- To determine which “tropism” dominates, phototropism or geotropism, in a growing plant.
Step 3: Brainstorm Solutions
Let’s pause for questions from the audience.
Step 4:

Generate Ideas
Step 5: Construct Prototype/Model
Step 6:

Test/ Evaluate Solution
Share Solution
Step 8:

Refine the Design
Check it out:

Web search

http://www.raft.net/

http://www.trashforteaching.org/
Let’s pause for questions from the audience.
How Can You Use This?

Enter your ideas in the chat.
Elementary

- Moon Munchies -- Lunar Plant Growth Chamber (Grades K-4)
- Moon Power -- Energy and Power (Grades 1-5)

http://www.nasa.gov/audience/foreducators/foreducators/topnav/materials/listbytype/HEP_Moon.html
Middle School

- Lunar Colonization -- Energy and Power (Grade 6)
- Creating a Space Exploration Infrastructure -- Transportation (Grade 7)
- Space Transportation: Reshooting the Moon -- Transportation (Grade 8)

http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Packing_Up_for_the_Moon.html
High School

- Engineering Design for Human Exploration -- Energy and Power (Grades 9-12)
- Lunar Plant Growth Chamber (Grades 9-12)
- NASA: Moving Cargo -- Transportation (Grade 9)
- Transportation and Space: Reuse and Recycle -- Transportation (Grades 10-12)

http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Lunar_Plant_Growth_Chamber.html
Extensions

Water Filtration Challenge

Log Your Participation

Tell Us What You Think!

Take the Product Survey

Take the Electronic Professional Development Survey
Collaboration
Making Teaching Easy

Search for:
NASA Explorer Schools on facebook.

Follow us on Twitter:
@NESupdate
COLLABORATION

NASA Explorer Schools
This group is to facilitate discussion and collaboration among NES participants on the NES supported education modules.

- **Category**
  - Earth Climate Course: Modeling Hot and Cold Planets
    - Collaborate on using Modeling Hot and Cold Planets with students.
  - Engineering Design Challenge: Spacecraft Structures
    - Collaborate on using EDC: Spacecraft Structures in your class.
  - Engineering Design Challenge: Water Filtration
    - Collaborate on using the Water Filtration EDC with students.
  - GENESIS: Exploring Data - A First Look
    - Collaborate on using A First Look with students.
  - Lunar Nautics: Designing a Mission to Live and Work on the Moon
    - Collaborate on using Lunar Nautics with students.
  - Meet your NES staff
    - Hi! This is the staff working with the NASA Explorer Schools p... (more text)
  - Messenger: Cooling with Sunshades
    - Collaborate on using Cooling with Sunshades with students.
  - MY NASA DATA: Solar Cell Energy Availability
    - Collaborate on using Solar Cell Energy Availability from Around the... (more text)
    - Collaborate on using the High Power Paper Rockets activity i... (more text)
  - Smart Skies: Line Up With Math
    - Collaborate on using Line Up With Math with students.

- **TOPICS**
- **Posts**
- **Last Updated**
  - 5 6 Yesterday 12:59 PM marge marcv
  - 6 6 09/22/2010 04:10 PM Rachel Power
  - 6 09/22/2010 04:10 PM Rachel Power
  - 0 0
  - 6 6 09/22/2010 05:08 PM Rudo Kashiri
  - 4 4 09/24/2010 10:29 AM John Entwistle
  - 6 6 09/22/2010 03:57 PM Alicia Baturoni Cortez
  - 0 0
  - 6 6 09/22/2010 03:52 PM Rachel Power
  - 6 6 09/22/2010 04:31 PM Alicia Baturoni Cortez
Let’s pause for questions from the audience.
Thank You for Attending
Thank you to the sponsor of tonight's Web Seminar:

This web seminar contains information about programs, products, and services offered by third parties, as well as links to third-party websites. The presence of a listing or such information does not constitute an endorsement by NSTA of a particular company or organization, or its programs, products, or services.
Welcome to Your Personalized Learning Web Space!

Paul, you've already earned 1335 Activity Points!

You've recently earned:
- Ruby Aggregator
- Add Personal Resources
- Ruby Commenter
- Post 9 more comment/questions

Activity Progress Bar
- YourActivity Matters!
- It reduces your carbon footprint!

Welcome. Paul ★★ Admin | Log Out

With these resources you can build your professional development plan, track your activities, and assess your progress. You can start at "Explore Learning Opportunities" below or by creating your game plan with the PD Plan and Portfolio tool. You may also review an archived Web Seminar or a multimedia overview of the Learning Center.

Explore Learning Opportunities
- Advanced Search
- By Subject
- By Grade Level
- By State Standards

See all FREE Lesson Plans
- See all FREE Resources

http://learningcenter.nsta.org
National Science Teachers Association
Dr. Francis Q. Eberle, Executive Director
Zipporah Miller, Associate Executive Director
Conferences and Programs
Al Byers, Assistant Executive Director e-Learning

NSTA Web Seminars
Paul Tingler, Director
Jeff Layman, Technical Coordinator
Brynn Slate, Program Coordinator

LIVE INTERACTIVE LEARNING @ YOUR DESKTOP