
Presented by: Jordan Snyder

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6:30 p.m. – 8:00 p.m. Eastern time
Introducing today’s presenter…

Jordan Snyder
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AGENDA

- Standards + Grade Level
- The Moon
- Engineering Design Process
- On Target
- Feel the Heat
- Design Squad
- NASA Explorer Schools
GRADE LEVEL

6-12
SCIENCE AND TECHNOLOGY STANDARDS

- Changes of properties in matter
- Transfer of energy
- Apply the engineering design process
SCIENCE AND TECHNOLOGY STANDARDS

- Next Generation Science Standards
- Cutting edge of science curriculum
- Engineering
WHAT DO YOU KNOW ABOUT THE MOON?
IT’S COOL, BUT WHY GO?

Human Civilization

Extend human presence to the moon to enable eventual settlement.
IT’S COOL, BUT WHY GO?

Scientific Exploration

History of our solar system.
IT’S COOL, BUT WHY GO?

Global Partnerships

Let’s work together.
IT’S COOL, BUT WHY GO?

Testing for Future Endeavors

Tests to reduce risk of future endeavors.
IT’S COOL, BUT WHY GO?

Public Engagement

Because it’s interesting.
THE ENGINEERING DESIGN PROCESS
WHAT IS AN ENGINEERING DESIGN?

A. A way for you to be creative
B. Practical applications to real-world problems
C. A process for learning beyond the traditional textbook
D. All of the above
HAVE YOU EVER DONE ENGINEERING DESIGN IN A CLASS?

✔ Yes

✖ No
THE ENGINEERING DESIGN PROCESS

Step 1: Define the Problem

STEP 1:
Define Problem
THE ENGINEERING DESIGN PROCESS

Step 2: Identify the Limits
THE ENGINEERING DESIGN PROCESS

Step 3: Brainstorm

STEP 1: Define Problem

STEP 2: Identify Criteria/Constraints

STEP 3: Brainstorm Solutions
THE ENGINEERING DESIGN PROCESS

Step 4: Select Your Solution

STEP 1: Define Problem
STEP 2: Identify Criteria/Constraints
STEP 3: Brainstorm Solutions
STEP 4: Select a Solution
THE ENGINEERING DESIGN PROCESS

Step 5: Make a Model

- **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
THE ENGINEERING DESIGN PROCESS

Step 6: Test and Evaluate

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
THE ENGINEERING DESIGN PROCESS

Step 7: Share Results

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
THE ENGINEERING DESIGN PROCESS

Step 8: Redefine and Redesign

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
THE ENGINEERING DESIGN PROCESS

What does the circular nature tell you?

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
REPEATABILITY
WHAT OTHER METHOD DOES THIS REMIND YOU OF?

A. SOH CAH TOA
B. Web of Life
C. Scientific Method
D. Newton’s Laws
QUESTIONS OR COMMENTS
ON TARGET
INTRODUCTION/ENGAGEMENT

- Water on the moon
- Projectile spacecraft
- LRO
- Recreate LCROSS mission
SAMPLE ZIPLINE
SAMPLE DESIGNS
STUDENT MATERIALS

Each group will get:
- Index cards
- Marble
- Masking tape
- Paper clips
- Scissors

Students will also have:
- Fishing line
- Target
BRAINSTORM AND DESIGN

- How would you modify the cup?

- How could you remotely release the marble?

- When do you need to launch the marble?
HOW FAST SHOULD THE CUP TRAVEL?
WHAT ARE SOME OTHER THINGS TO THINK ABOUT DURING THE DESIGN PHASE?
TESTING AND SHARING RESULTS
DISCUSSION

- Reinforce learning
- Get feedback
- Assess understanding

Suggested questions
QUESTIONS OR COMMENTS
FEEL THE HEAT
What are some challenges to living on the moon?
MATERIALS

Each group will get:

- Lamp
- Light bulb
- Tubing
- Water supply cup
- Cup to collect water
- Cardboard backing

Students will also have:

- Electric hot water heaters
- Thermometer
SAMPLE WATER HEATER
BRAINSTORM AND DESIGN

• What color should you make the tube and background?

• How fast should the water flow through the tube?

• How can changing the orientation of the tube help the water absorb the sun’s heat?
THINGSTO CONSIDER

• Managing water leaks
• Recording temperatures
• Tricks to increase temperature
• Tube length adjustments
• Water flow adjustments
DISCUSSION

- Reinforce learning
- Get feedback
- Assess understanding
- Suggested questions
QUESTIONS OR COMMENTS
DESIGN SQUAD NATION

Design Squad Extension Activities and Videos

- More activities
- Educator friendly
- Video modeling of implementation
Why NES?
NASA + YOU = FUTURE
NASA Now classroom videos

- Words to know
- Discussion questions
- Career information
- Corresponding teaching materials
- Log your participation
Live video chat

explorerschools.nasa.gov
TEACHER RECOGNITION

STUDENT RECOGNITION

SCHOOL RECOGNITION
BECOME AN NES EDUCATOR TODAY!
Thanks to today’s presenter!

Jordan Snyder
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