NISE Net Online Workshop

Moon Adventure Game –
An introduction to a new challenge-based game for science and children's museums

Tuesday, October 27, 2020

Agenda:
- Why Games and Game Goals
- Challenges and Materials
- Professional Development Resources
- Prototyping and Evaluation Experiences
- Discussion/ Questions

Welcome!

As we wait to get started with today's discussion, please:

Introduce yourself! Type your name, institution, and location into the Chat Box

Questions? Feel free to type your questions into the Chat Box at any time throughout the webinar or use the raise your hand function in the participants list and we'll unmute your microphone.

Today's discussion will be recorded and shared on nisenet.org at:
nisenet.org/events/online-workshop

Workshop Overview

- **Why Games and Game Goals**

  Rae Ostman & Jeannie Colton, Arizona State University, Tempe, AZ

- **Challenges and Materials**

  Ethan Kruszka & Brandon Phan, Science Museum of Minnesota, St. Paul, MN

- **Professional Development Resources**

  Catherine McCarthy, Arizona State University, Tempe, AZ

- **Prototyping and Evaluation Experiences**

  Alyson Smith & David Gamez, Arizona Science Center, Phoenix, AZ

  Dean Frias, Arizona State University, Tempe, AZ

  Darrell Porcello & Matt Jorge, Children's Creativity Museum, San Francisco

- **Discussion / Questions**

Workshop Overview

- ## Why Games and Game Goals
  Rae Ostman, Arizona State University, Tempe, AZ
  Jeannie Colton: Arizona State University, Tempe, AZ

- ## Challenges and Materials
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- ## Professional Development Resources
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- ## Discussion / Questions

Games in Museums

WHY GAMES?

Learning from Games

Strengthen 21st century skills

- Collaboration

- Innovation

- Critical Thinking

- Problem-solving

Game Design

- **Social:** Designs that foster positive social interactions

- **Multigenerational:** Challenges that are fun for all ages

- **Familiar:** Games with simple rules to quickly and easily engage participants

- **Learning:** Mechanics of game should align with learning objectives

Learn more:

Gaming and the NISE Network: A Gameful Approach to STEM Learning Experiences

https://www.nisenet.org/catalog/gaming-guide

MOON ADVENTURE GAME

A hands-on collaborative experience for STEM learning in museums and planetariums.

Players will work together to solve a series of challenges grounded in real science about living and doing research on the Moon.

Learning Objectives

1. Strengthen 21st century skills related to collaboration, innovation, critical thinking, and problem-solving

2. Increase their interest in Moon and space exploration

3. Develop a sense of science identity and confidence related to learning about the Moon and space science

4. Learn new content knowledge about the Moon and/or space exploration

Grounded in Real Science

The challenges are based on real scientific concepts connected to lunar exploration.

This game has been reviewed by NASA scientists working on lunar missions, experts on interactive gaming, and museum educators. The game has been tested and evaluated with public audiences.

NASA Partner

Audience

Designed for in-person play

- 3–6 participants in a museum setting, with support from an educator

- Families with children and students grades 4–8

- Adaptations available for younger audiences and larger groups

Time

- **Setup:** 10–15 minutes

- **Gameplay:**
  about 25 minutes

- **Resetting the game between groups:**
  5–15 minutes (depending on sanitizing needs)

This game takes about **25 MINUTES**
Este juego dura aproximadamente 25 minutos

Game Flow

Facilitators read through the game **Facilitator Narrative Script**, provide cues for players to move on to the next challenge, and lead a reflection once the game is completed.

There are **five challenges** that players must work together to overcome.

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Welcome

The facilitator introduces the story and invites participants to play the game. The facilitator begins a conversation about what humans would need to live and do research on the Moon.

Challenge 1:
Make a Travel Plan for Your Rover

Players will identify specific locations on the lunar surface where they will send their remote-controlled rover to collect data. Players will write the coordinates on the Rover Travel Plan. Players will then use the map coordinates to unlock the rover data bank.

Challenge 2:
Match Rover Data to Locations on the Map

Outpost sensors have detected strange seismic readings in the area. Using the coordinates from Challenge 1, players will unlock the rover's data bank to access the seismic data their rover has collected. Players will accurately position the data location overlays on the lunar surface map. Players will then match the data blocks on the lunar surface map to reveal a message.

Challenge 3:
Extract Water from Frozen Lunar Material

A moonquake cracked the outpost oxygen tanks, so players will need to produce oxygen using water extracted from frozen lunar material. The frozen lunar material is dangerously cold, so players must use the grabber tools to search the cold storage bin and find the ice. Players will then insert the icy material into the water extractor. Once all icy material blocks have been inserted, three vials of water will be released for use in the next challenge.

Challenge 4:
Fill Your Oxygen Tanks

Players will open the Emergency Oxygen Supply Kit and use the process of electrolysis to split water molecules into hydrogen and oxygen. Players will be able to observe tiny bubbles, indicating oxygen molecules are being released from the water.

Challenge 5: Reconnect the Power Supply

The moonquake damaged the connecting wires to the power supply and the outpost is running on backup batteries. Players will use conductive materials to complete the circuit and restore power to the damaged outpost. Players will hear the equipment restart, indicating power is restored to the outpost.

Wrap-up and Reflections

Players celebrate their team's accomplishments! Players have worked together to survive the moonquake and restore power to the outpost. The facilitator will engage players in a conversation about living on the Moon and discuss how NASA scientists and engineers are working to send humans to the Moon.

Getting Started
Kit Overall and Welcome

Challenge 2: Match Rover Data to Locations on the Map

Challenge 1:
Make a Travel Plan for Your Rover

Challenge 3: Extract Water from Frozen Lunar Material

Challenge 4:
Fill Your Oxygen Tanks

Assembly and Repair Materials

Challenge 5:
Reconnect the Power Supply

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Professional Development Resources

- **Quick Start Guide** – 1 page

- **Game Guide** – 95 pages

- **Facilitator Narrative Script**
  - Early Childhood Adaptation
  - English & Spanish language versions

- **Digital Materials**

  COMING SOON

  https://www.nisenet.org/moongame

Professional Development Resources

Training Videos

- Facilitator Training Videos

- Content Training Videos

- First-Time Setup Video

- Promo Video

COMING IN NOVEMBER!

https://vimeopro.com/nisenet/moon-adventure-game

How can I get this game?

- 350 copies of the game will be shipped this fall to **Explore Science: Earth & Space 2020 toolkit awardees**

- Part A shipped in January 2020

- Part B will include the Moon Adventure Game and activities about the Moon

DIY Version of the Game

The Game Guide includes:

- Printing DIY files and instructions

- Materials DIY lists

Please keep in mind that if you are creating your own DIY version of the game, there is a great deal of flexibility with materials.

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Prototyping and Evaluation

Alyson Smith & David Gamez,
Arizona Science Center,
Phoenix, AZ

Intentional design for

- **Collaboration**

- **Team Work**

Prototyping and Evaluation

Prototyping and testing with different audiences

Prototyping and Evaluation

Formative evaluation data collected in different locations

Prototyping and Evaluation

Dean Frias
Arizona State University, Tempe, AZ

Iterative changes

Prototyping and Evaluation

Dean Frias
Arizona State University, Tempe, AZ

Iterative changes

Review by Scientists and Educators

Review and feedback from NASA, lunar scientists, and educators from children's and science museums

Prototyping with Young Children

Darrell Porcello & Matt Jorge
Children's Creativity Museum
San Francisco, CA

Prototyping with Young Children

Role of Facilitator

Early Childhood Version of the Narrative Facilitator Script

Prototyping with Young Children

Role of Parents and Caregivers

Prototyping with Young Children

Celebrating Success!

Using the game during the Pandemic

- **Masks**

- **Social Distancing**

- **Spacing of activities**

- **Cleaning**

- **Changes to challenges:**
  Removed holding hands

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How to Participate in the Discussion

How to talk

- Raise your hand

- Keep yourself muted

- Keep the conversation constructive

- Reminder that today's session is being recorded

How to chat

- Enter your comments and questions into the chat box

Discussion Questions

- **NASA and Artemis connections**

- **Virtual use?**

- **Adapting - DIY files and materials**

- **Use in libraries?**

- **How to create astronomy games?**

Thank You

NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK

Upcoming NISE Network Online Workshops

Image credit: NASA

The Science behind the 2020 Explore Science: Earth and Space Toolkit B – Surviving in Space
Tuesday, November 17, 2020
2pm-3pm Eastern / 11am-12pm Pacific

Learn about how to get involved with a new community science project around heat waves, sea level rise, extreme precipitation, and drought
Tuesday, December 1, 2020
2pm-3pm Eastern / 11am-12pm Pacific

Learn more at nisenet.org/events

Get Involved

Learn more and access the
NISE Network's online digital resources
nisenet.org

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