STEM Gaming in Museums

Making the Right Moves

NISE
NATIONAL INFORMAL STEM EDUCATION NETWORK

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www.nisenet.org

Session Introduction

- Quick advice on game development & facilitation. (15 min)
- Let's play some STEM games! Dive into to our favorite examples. (10 min)
- Rapid reflections on the four game examples. (5 min)
- Now its your turn to adapt your groups game example or come up with a new game based on today's session. (20 min)

Walk away with good examples and practices for STEM games.


WHY
GAMES?


WHY GAMES?
social
critical thinking
motivation
imagination
goals & feedback
fun
control
absorbing
engaging
creative

NISE Network and Gaming

- **2017 NISE Net guide looked at when games were most effective in 12 years of hands-on activity development.**

We favor game designs that **foster positive social interactions** between visitors.

We use **familiar games with simple rules** to quickly and easily engage visitors.

We design **experiences that are fun for all ages** by creating gaming challenges that are appropriate for young children, as well as older children and adults.

bit.ly/acm2018game for our SLIDES & RESOURCES

- **Learning can emerge from competition.**
- **Everyone gets a turn.**
- **Present important information in a variety of ways, to work for different age levels.**

- **Role playing works for all ages.**
- **Experimenting with no rules in gameplay may surprise some visitors, but the freedom can also open new doors.**

We favor game designs that **foster positive social interactions** between visitors.

We use **familiar games with simple rules** to quickly and easily engage visitors.

- **Museum games modeled on popular games may be so familiar that they don't need facilitation.**
- **Simple games are more likely to be remixed and customized by visitors.**
- **Don't be afraid of fun.**

- **Facilitator energy level is sometimes critical for a fun learning**
- **Don't discount the power of popular culture.**

- **Storytelling and games are a natural fit.**
- **Guessing games build and reinforce skills.**

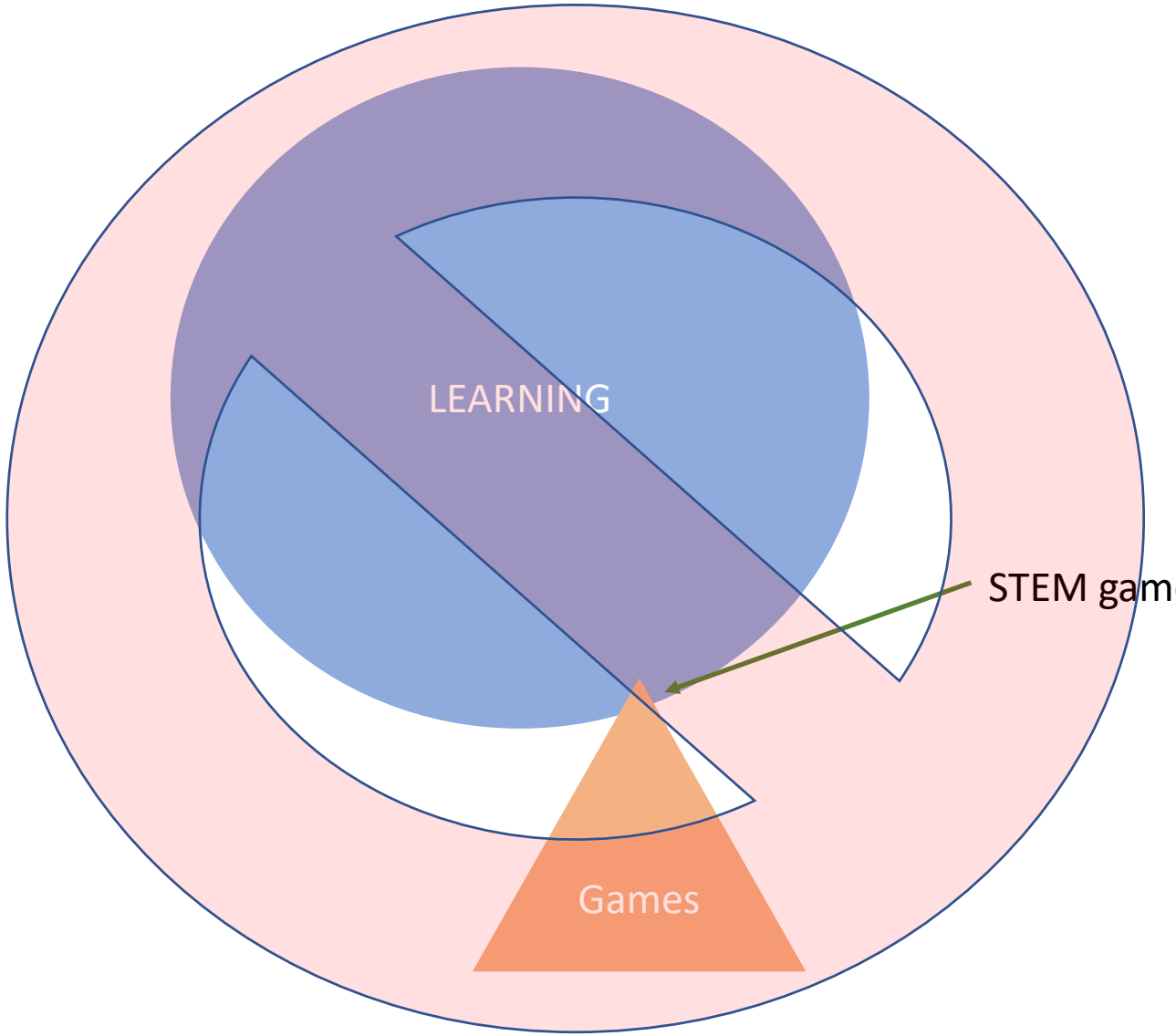
We design **<u>experiences that are fun for all ages</u>** by creating gaming challenges that are appropriate for young children, as well as older children and adults.

GAMEFULLY EMPLOYED

EFFECTIVELY INCORPORATING STEM GAMING INTO YOUR CURRICULA

Max Cawley (Max.Cawley@lifeandscience.org)

Museum of Life + Science



So You Want to Design A STEM Game?

Why? Who? How? When?

PROCESS

((What about this process is already game-like?))

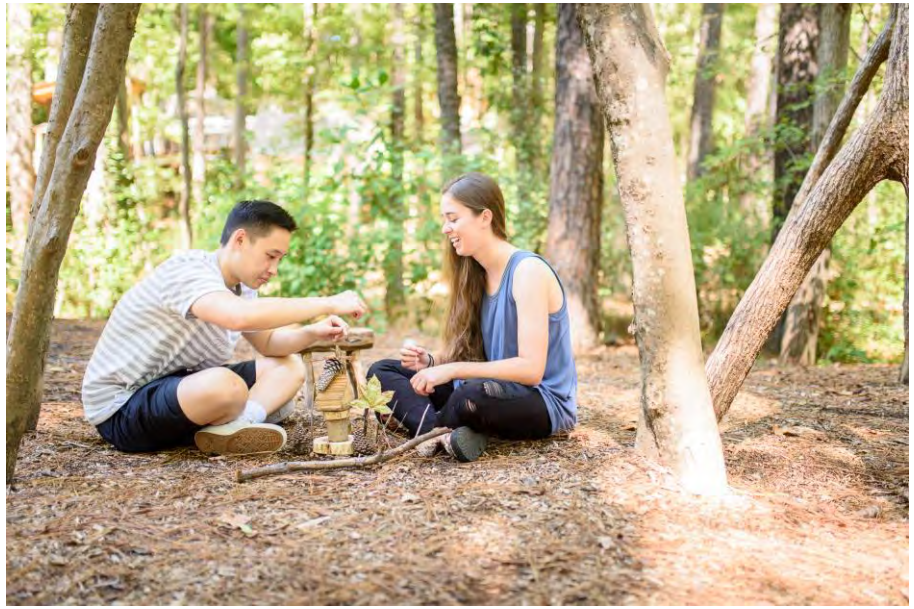
- Exploration
- Limited Resources
- Problem-Solving
- Risk and Challenge
- Iterative
- Dramatic
- Imaginative
- Locomotive

GAMES ARE:

- Opportunities for deep learning
- Highly engaging
- Challenging

GAMES ARE NOT:

- “Chocolate-Covered Broccoli”
- Time-wasting
- Stressful



What Should My Game Do?

- Enable and empower learner to make decisions
- Allow learners to get better at your game with practice
- Show immediate (or near immediate) rewards and consequences to actions
- Balance agency of decision-making with randomness

What Should My Learner(s) Do?

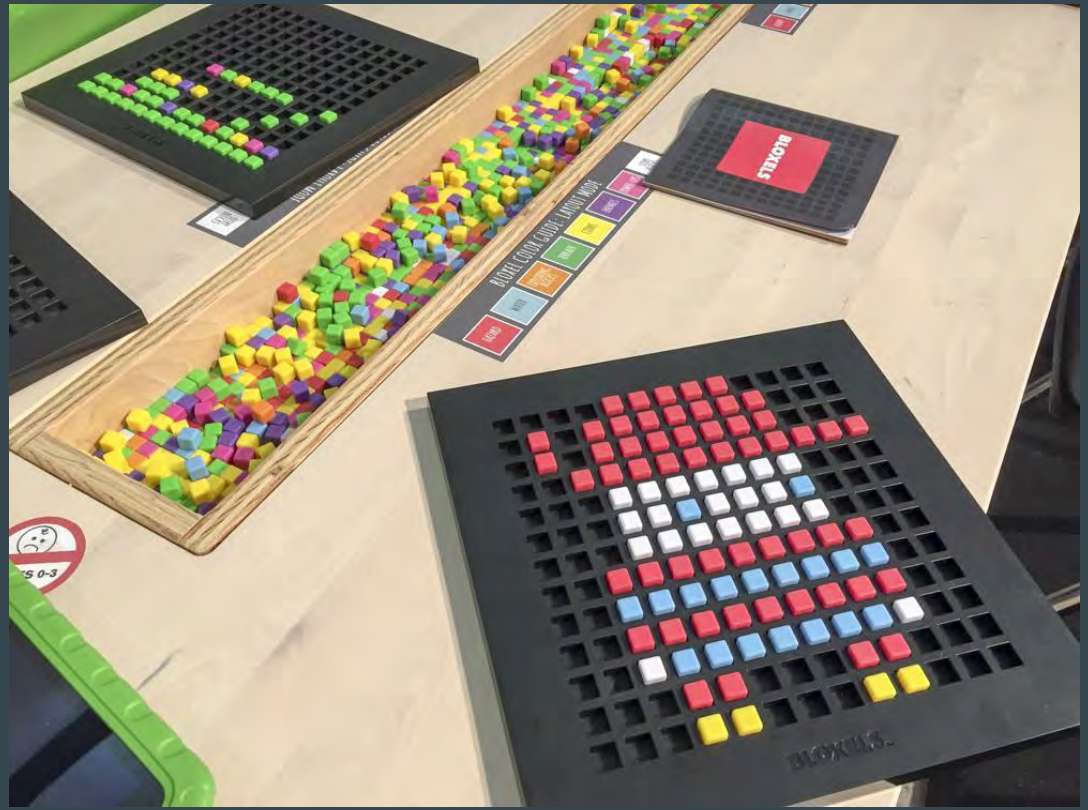
- Embrace their failures, and turn them into iterations
- Build a sense of agency, confidence, and decisiveness
- Take on new roles, identities, and responsibilities
- Use their existing knowledge and values to inform
- Build relationships with others and the game content
- Feel like they're playing!!

Design Your Own Video Games

Workshops from Children's Creativity Museum, San Francisco, CA

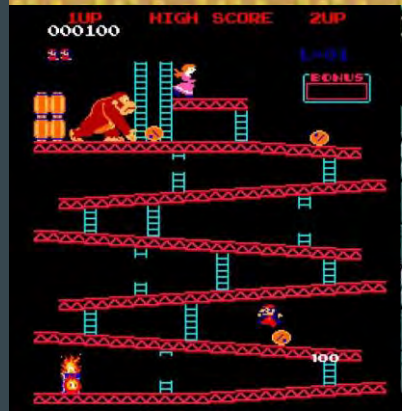
DESIGN YOUR OWN VIDEO GAME WORKSHOPS

- Partnered with Pixel Press to create drop-in workshops
- Used small, colorful plastic blocks for content creation
- Leveraged visitors familiarity and passion for platform video games
- Empowered visitors to create their own content and narratives without having to focus on game mechanics



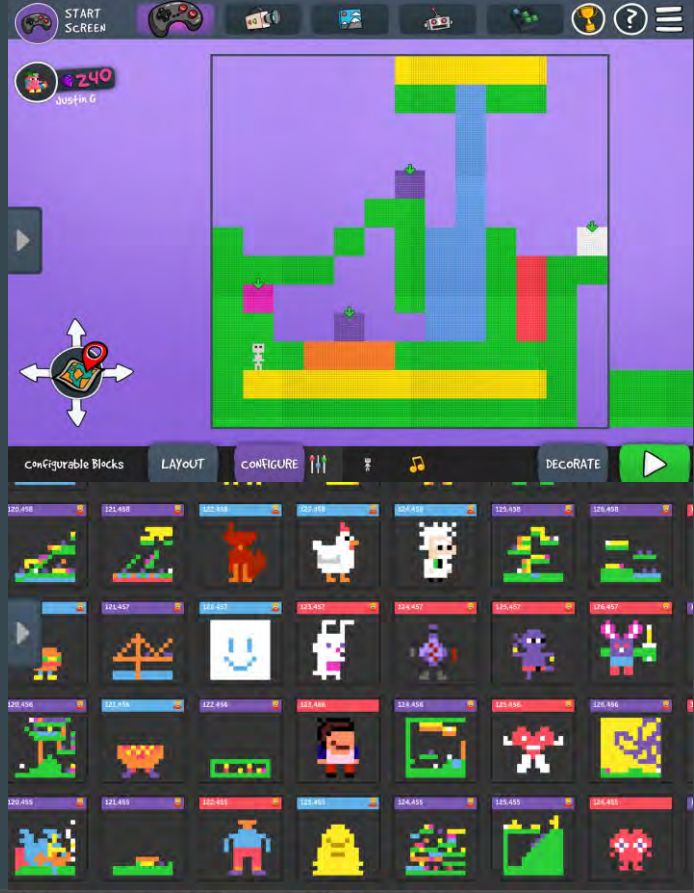
Characteristics of Platform Video Games

- Player-controlled main character
- Run and jump to avoid obstacles and defeat enemies
- Collect points or coins
- Power-ups can affect player abilities
- Character has limits on how far it can jump and how high



Visitor-made Video Games

- Visitors were able to create endless variations of platform games
- Some focused on level design
- Others created characters and game artwork
- Wide range of ages were able to participate individually and collaboratively



WHAT WORKED?

Successful because it leveraged an existing, familiar game mechanic

WHAT WORKED?

Collaboration between family members and strangers

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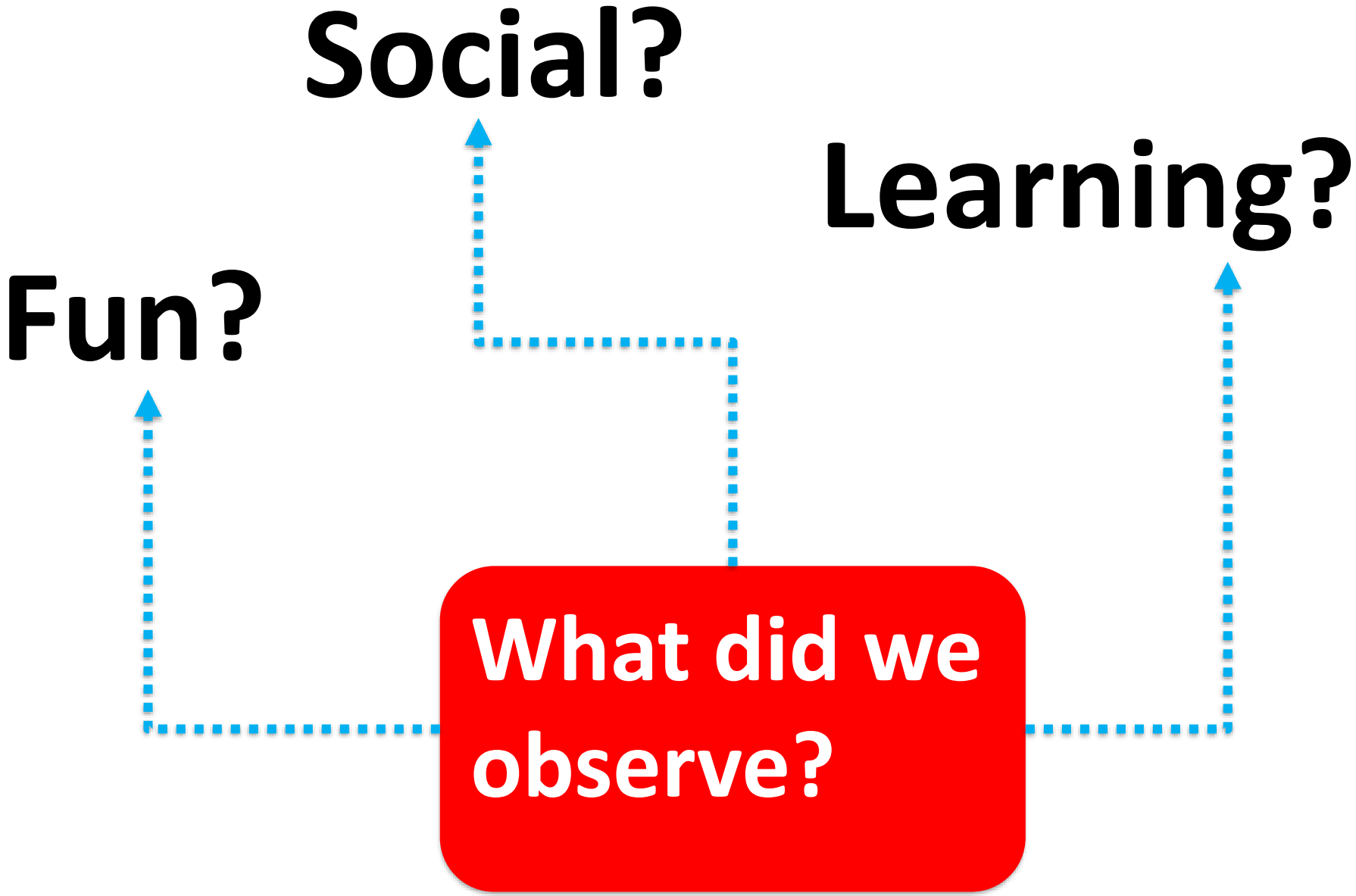
CHILDREN'S CREATIVITY MUSEUM

STEM GAME EXAMPLES (10 min)


Social?
Learning?
Fun?
What did we observe?

The Solar System

The Human Body

?

Types Of Trees

Nuclear Energy

Pick a STEM topic you love and modify a game…

STEM GAME CHALLENGE (20 min)

SHARE OUT AND????

NEW: Explore Science: Let's Do Chemistry Kit

Kit Overview document and how to apply:
http://www.nisenet.org/chemistry-apply

Applications due June 1, 2018

EXPLORE SCIENCE
Let's Do Chemistry

In collaboration with the American Chemical Society, the NISE Network has assembled a set of engaging, **hands-on experiences designed to stimulate** interest, sense of relevance, and feelings of self-efficacy about chemistry among public audiences.

Includes Atoms to Atoms!

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