Iowa Environmental Game Jam
"People play everywhere except in school"  Malcolm Bauer
Games and good game design are learning systems that:

- Encourage problem solving and critical thinking skills.
- Create interesting complex problems.
- Improve student motivation as well as the educational outcomes.
- Teach concepts that have been historically hard to teach and difficult for students to learn.
What the research says……

Teachers who use games more often report greater improvement in their students’ core and supplemental skills.

Educational games may help place students in a frame of mind that is conducive to learning.

Games can improve critical thinking and reading skills.

Game-based learning in the classroom can encourage students to understand subject matter in context; as part of a system.
Where to start:

Roll out game play in the classroom and other learning situations.
Card Games

Board Games

The Fishbowl
Beat the Uncertainty: Coastal Resilience

Teacher Instructions
Checklist
Uncertainty Booklet
Record Sheet

https://oceanservice.noaa.gov/education/beat-uncertainty.html
STEM Games and Simulations
http://flyrussell.com/reviews/

WolfQuest
role-play a wolf in Yellowstone National Park in this “first-person shooter”...

WikiWatershed
Description: includes a watershed simulator. URL: wikiwatershed.org Creators: Stroud...

Web Adventures
Description: CSI-style mystery games, primarily with medical or biology themes....

Weather and Climate Applets from CIMSS
Description: several weather, climate, and atmosphere Java applets. URL:...

WeatherWise (WXWISE)
Description: large collection of Java applets covering weather-related topics....

Virtual Astronomy Laboratories
Description: twenty virtual laboratories for an introductory astronomy course. A user...
Check it Out!

https://www.edutopia.org/game-based-learning-resources

http://pbskids.org/games/science/

Students create their own 3D virtual worlds through the first-person sandbox-style game called Minecraft. https://education.minecraft.net/

NASA Space Place https://spaceplace.nasa.gov/menu/play/

Invention Playground from USPTO for preschool students http://www.invent.org/inspire/invention-playground-pre-k/
What's Wrong in Waterville?

https://boec.biotech.iastate.edu/resource/waterville-woodchip-bioreactors/
Game Design for Educators

Quest Designed Games

FROM ADVENTURES TO ACHIEVEMENTS: QUESTS

What if teachers could harness their creativity and knowledge to engage students in new and exciting ways? What if teachers supported each other in becoming designers of their own games for learning?

From the experts in game-like learning at Quest Schools, this design pack will immerse you in learning about Quest’s game design tools and exciting collaborative curriculum model.
Parts of a Game

- Goal - How do you win?
- Challenge – Obstacles that make playing fun
- Core Mechanics – What does the player have to do?
- Components- What materials are needed?
- Rules – How do you play?
- Space – Where is the game played?

Challenge: Can you name the parts of your favorite game?
What are the Game Parts of Your Favorite Game?

Before designing a game, it is important to practice identifying parts of familiar games. In the example below, the parts of Rock, Paper, Scissors are identified. After you read the example, pick a game and try to break it down into its six parts.

<table>
<thead>
<tr>
<th>ROCK, PAPER, SCISSORS</th>
<th>NAME OF YOUR FAVORITE GAME:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td><strong>Goal</strong></td>
</tr>
<tr>
<td>To “throw” the winning shape: rock, paper, or scissors.</td>
<td></td>
</tr>
<tr>
<td><strong>Challenge</strong></td>
<td><strong>Challenge</strong></td>
</tr>
<tr>
<td>To anticipate which shape your competitor will throw—rock, paper, or scissors—so that you can throw the shape that beats it.</td>
<td></td>
</tr>
<tr>
<td><strong>Core Mechanics</strong></td>
<td><strong>Core Mechanics</strong></td>
</tr>
<tr>
<td>Players “throw” an object, meaning they make the shape of an object with their hand and extend their arm to “throw” it.</td>
<td></td>
</tr>
<tr>
<td><strong>Components</strong></td>
<td><strong>Components</strong></td>
</tr>
<tr>
<td>Three shapes: rock, paper, and scissors; one hand from each player</td>
<td></td>
</tr>
<tr>
<td><strong>Rules</strong></td>
<td><strong>Rules</strong></td>
</tr>
<tr>
<td>- Each person throws a shape with one hand. - Rock (a fist) beats scissors (a V-shape made with one finger extended), scissors beats paper (flat hand), paper beats rock. - Whoever wins gets a point. If it is a tie, each person throws a shape again. The person who wins two out of three rounds wins.</td>
<td></td>
</tr>
<tr>
<td><strong>Space</strong></td>
<td><strong>Space</strong></td>
</tr>
<tr>
<td>The space is anywhere enough space exists for two people to stand facing each other and extend one arm.</td>
<td></td>
</tr>
</tbody>
</table>
What is a Game Jam?

- Gathering of students or adults to make a game, digital or not.
- Participants rapidly prototype game designs.
- Share a common theme and constraints.
- Create a game from beginning to end in a limited time
- Allow deep dive into content.
Game Design: Tools of the Trade

Bag o’ Game Bits

Spinners
Dice (many shapes)
Small paper squares
Small mathematics cubes
Assorted game markers
Buttons
Large paper for game boards
Colored markers/paints/etc
Old game pieces
No Previous Gaming Experience Needed!

Hack-this-game
Modify an existing game in a new way.

Analog game
Board games, card games, or role-playing games.

Digital game
Games designed using simple digital tools (e.g., Scratch, Gamestar Mechanic, Pixel Press’ Floors and GameSalad) Unity, Java, and GameMaker.
Iowa Conservation Game Jam

https://iowaaee.org/ee-science-in-iowa/game-jam/

• Open to students in grades 3-12 (Grades 3-5, 6-8, and 9-12)

• Games can be analog (card games, board games, role playing games) or digital

• Teams of 2-5 students

All student teams submit their game description and up to a 4-minute video by March 31, 2024 to be included in judging.
The Iowa Environmental Game Jam is a collaborative effort between ICIEC, Iowa Project WILD, and will highlight conservation topics of interest in Iowa. Click a button below for information, videos, and other resources to help you and your students.

- Iowa Endangered Species
- Iowa’s Prairies
- Protecting Iowa Waters
- Iowa Invasive Species
- Renewable Energy
- Soil Health

https://iowaeed.org/ee-science-in-iowa/game-jam/
Suggested Teacher Timeline

Step 1: Content Exploration

- Foundational concepts of the content areas through classroom lessons.
- Introduce students to game design principles. (p. 12 of Design Pack)
- Explore different game types (board game, card game, simulation, digital game, role-play).
- Play games as a class and then discuss how the game was constructed, how it was played, how you can win, and what makes the game fun to play.
Suggested Teacher Timeline

Step 2: Game Brainstorm

- Allow students to explore resources in their chosen content area.
- Have materials available to aid brainstorming.
- Encourage students to list ideas that they have for game types and then a list of game content.
- Help students to narrow the focus of their game to allow for easier development.

Step 3: Game Design

- Ask students to complete the game design form (p. 15 from Design Pack)
- Have students finalize their game ideas and begin to build components.
- Have supplies available for the creation of the game.
Suggested Teacher Timeline

Step 4: Play-Testing

• Students play their own games.
• Allow time for students to edit and adjust their game.
• Have students play-test each other's games.

Step 5: Submit for judging

• Students create 4-minute videos about their game showing the main ideas, the components and how to play.
Milk and Cookies

Wateropoly
Active Games
Game-based assessments provide the opportunity to:

- Integrate learning into the assessment
- Motivate and encourage student perseverance
- Support teachers with data on students’ different learning styles
- Promote learning that is fun
- Improve students’ learning abilities while providing educators with real-time feedback to adjust lesson plans accordingly.

### Game Development: Assessment of Process

https://www.cmu.edu/teaching/assessment/assessmentlearning/groupWork.html

<table>
<thead>
<tr>
<th>Category</th>
<th>Rating</th>
<th>Comments, Examples, Explanations, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Participation</td>
<td>Attends meetings regularly and on time.</td>
<td></td>
</tr>
<tr>
<td>Time Management &amp; Responsibility</td>
<td>Accepts fair share of work and reliably completes it by the required time.</td>
<td></td>
</tr>
<tr>
<td>Adaptability</td>
<td>Displays or tries to develop a wide range of skills in service of the project, readily accepts changed approach or constructive criticism.</td>
<td></td>
</tr>
<tr>
<td>Creativity/Originality</td>
<td>Problem-solves when faced with impasses or challenges, originates new ideas, initiates team decisions.</td>
<td></td>
</tr>
<tr>
<td>Communication Skills</td>
<td>Effective in discussions, good listener, capable presenter, proficient at diagramming, representing, and documenting work.</td>
<td></td>
</tr>
<tr>
<td>General Team Skills</td>
<td>Positive attitude, encourages and motivates team, supports team decisions, helps team reach consensus, helps resolve conflicts in the group.</td>
<td></td>
</tr>
<tr>
<td>Technical Skills</td>
<td>Ability to create and develop materials on own initiative, provides technical solutions to problems.</td>
<td></td>
</tr>
</tbody>
</table>

**Scoring**

For each category, award yourself and each member of your team a score using this scale.

- 3 – better than most of the group in this respect
- 2 – About average for the group in this respect
- 1 – Not as good as most of the group in this respect
- 0 – No help at all to the group in this respect

(adapted from Goldfinch, 1994; Lejk & Wyvill, 2001)
### Making a Game

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Creativity</strong></td>
<td>The group put a lot of thought into making the game interesting</td>
<td>The group put some thought into making the game interesting and</td>
<td>The group tried to make the game interesting and fun, but some of</td>
<td>Little thought was put into making the game interesting or fun.</td>
</tr>
<tr>
<td></td>
<td>and fun to play as shown by creative questions, game pieces, and/or</td>
<td>and fun to play by using textures, fancy writing, and/or interesting</td>
<td>things made it harder to understand/enjoy the game.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>game board.</td>
<td>characters.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cooperative Work</strong></td>
<td>The group worked well together with all members contributing</td>
<td>The group generally worked well together with all members</td>
<td>The group worked fairly well together with all members contributing</td>
<td>The group often did not work well together and the game appeared</td>
</tr>
<tr>
<td></td>
<td>significant amounts of quality work.</td>
<td>contributing some quality work.</td>
<td>some work.</td>
<td>to be the work of only 1-2 students in the group.</td>
</tr>
<tr>
<td><strong>Accuracy of Content and Data</strong></td>
<td>Game content is accurate and utilizes real world data relevant</td>
<td>A few minor content errors, but still uses real world data.</td>
<td>Several errors in content present and use of data is not relevant.</td>
<td>Game is not about the specified content area and does not use real data.</td>
</tr>
<tr>
<td>Use</td>
<td>to the topic.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time Management</strong></td>
<td>Game is whole and complete by the due date.</td>
<td>Game is mostly complete, but is missing one or two key elements</td>
<td>Game is missing several key elements at the time it is due.</td>
<td>Game is essentially incomplete and is missing a majority of key elements at the time it is due.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at the time it is due.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Game Development: Assessment of Product

## 2021-2022 Game Jam Scoring Rubric

<table>
<thead>
<tr>
<th>Category</th>
<th>0-5 pts</th>
<th>10 pts</th>
<th>15 pts</th>
<th>20 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game Story/Theme based on an environmental science topic</td>
<td>Game story/theme relates minimally to an environmental science topic.</td>
<td>Game story/theme relates to an environmental science topic and resource conservation.</td>
<td>Game story/theme is based on an environmental science topic and resource conservation that is compelling.</td>
<td>Thought-provoking game about an environmental science topic and/or conservation with content that is compelling and original.</td>
</tr>
<tr>
<td>Accuracy of the Science</td>
<td>Many errors in the science information</td>
<td>Some science information inaccurate</td>
<td>Minor omissions or errors in the data/information</td>
<td>Science information is complete, understandable and accurate</td>
</tr>
<tr>
<td>Visual/Audio Merit for Quality, Innovation, Elegance</td>
<td>Visual/audio design is not appropriate for the game theme.</td>
<td>Some visual/audio elements are appropriate for the game theme.</td>
<td>Visual/audio elements fit the game well and show innovation.</td>
<td>Elegant visual/audio elements have an innovative style and appropriateness to the game design.</td>
</tr>
<tr>
<td>Game Play</td>
<td>Game goals or instructions are unclear</td>
<td>Several aspects of the game cause confusion, but the goal of the game is clear.</td>
<td>Minor glitches in game play, but overall a fun game with clear goals that integrate science content without being a game based on trivia.</td>
<td>Game play integrates and reinforces science content through interactive play that depends on the players' understanding of the science. Does not use trivia questions.</td>
</tr>
<tr>
<td>Inspires Action related to an environmental issue</td>
<td>Game does not include actions that can be done related to an environmental issue.</td>
<td>Game raises an awareness of specific local or global actions related to an environmental issue.</td>
<td>Game raises an awareness and encourages action related to an environmental issue.</td>
<td>Game encourages and rewards action related to an environmental issue.</td>
</tr>
<tr>
<td>Beta Testing the Game</td>
<td>Playtesting with just the design team</td>
<td>Classroom playtesting with students other than the design team.</td>
<td>Schoolwide playtesting</td>
<td>Community playtesting</td>
</tr>
</tbody>
</table>

**Total**

Game Total Score ___________________
Recognition and Prizes are Important!
GAMERS
Thinking outside the box since 1974
3000 BC
Need help?

exec@iowaee.org

Peg.steffen@gmail.com

https://iowaee.org/ee-science-in-iowa/game-jam/