INDIE GAME REVOLUTION

Sponsored by Nintendo

EMP Museum Gallery Guide for Educators

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ABOUT THE EXHIBITION

The most exciting and creative work in contemporary video game culture is featured in *Indie Game Revolution*. As the vanguards of the industry, the independent video game community is pushing past conventional boundaries and in the process expanding the definition and cultural impact of this fast growing medium.

The exhibition features 20 playable games currently unreleased or released within the last year from independent developers, along with interpretive displays and films contextualizing the indie scene within the wider video game community. Through a dynamic and immersive space, EMP invites visitors to witness the present and future of gaming as it unfolds.

INTRODUCTION FOR EDUCATORS

"We need young Americans like you to master the tools and technology that will change the way we do just about everything. Don't just buy a new video game, make one. Don't just download the latest app, help design it. Don't just play on your phone, program it."

—Barack Obama, President of the United States of America

As educators, it is our job to prepare young learners with the skills needed to participate in a global community of thinkers and creators. Game-based learning harnesses the power of play to do just that. Integrating game-based learning into your lessons and teaching students how to create games of their own is easier than you might imagine. This educator guide will help you look at video games in a whole new way—as tools for learning, text for analyzing, and a vibrant media form that you and your students can have fun creating.

BENEFITS OF PLAYING AND CREATING VIDEO GAMES IN THE CLASSROOM

- Marked increase in the depth of engagement and level of motivation (Source: http://linked.eun.org/c/document_library/get_file?p_l_id=23126&folderId=24047&name=DLFE-756.pdf)
- Appeals to a variety of learning styles: visual, auditory, and kinesthetic alike
- Develops skills essential for twenty-first century learners competing in a global marketplace of ideas: systems-based thinking, STEM subject content, information and technology literacy, spatial thinking, critical thinking, team work, problem solving, social-emotional intelligence, empathy, and a host of other cognitive benefits
- Interactive role-playing and simulation offers a safe environment in which to explore real world scenarios, envision content in context, and navigate the outcomes of choices through trial and error that rewards curiosity, risk-taking, and perseverance
- Transforms students from passive consumers of content into active, critical, and creative participants capable of authoring their own digital media

EDUCATIONAL STANDARDS

In addition to their value in developing essential twenty-first century skills, lessons related to coding and game design can be used in the instructional fulfillment of many national and state standards.

Next Generation Science Standards
http://www.nextgenscience.org/next-generation-science-standards

- Science and Engineering Practices
    - Analyzing and interpreting data

    - Obtaining, evaluating, and communicating information
    - Developing and using models
- Cross Cutting Concepts
    - Cause and effect
    - Patterns
    - Systems and system models

CCSS Math Standards
http://www.corestandards.org/Math/

- Represent and interpret data
- Summarize and describe distributions
- Investigate patterns of association in bivariate data

CCSS ELA
http://www.corestandards.org/ELA-Literacy/

- Production and distribution of writing
    - Develop and strengthen writing by planning, revising, and editing

WA State Arts Standards
http://www.k12.wa.us/Arts/Standards/pubdocs/VisualArtsStandards.pdf
http://www.k12.wa.us/Arts/Standards/pubdocs/MusicStandards.pdf

- EALR 1: Component 1.4: Applies, practices, and analyzes the relationship and the interactive responsibilities of the artist and/or performer and audience in a variety of arts settings and performances.
- EALR 2: The student uses the artistic processes of creating, performing/presenting, and responding to demonstrate thinking skills in dance, music, theatre, and visual arts.
- EALR 3: Component 3.1: Uses the arts to express feelings and present ideas in dance, music, theatre, and visual arts.
- EALR 3: Component 3.2: Uses the arts to communicate for a specific purpose in dance, music, theatre, and visual arts.

CASE STUDIES

Quest to Learn in New York City, New York

A pioneering public school in New York City that offers a promising new model for student engagement.
http://www.instituteofplay.org/work/projects/quest-schools/quest-to-learn/

Media and Texts:

- Digital Media: New Learners of the Twenty-First Century
  http://vimeo.com/21043303
- Powering a Revolution: Quest to Learn School
  http://vimeo.com/97236603
- MinecraftEDU: The Craft of Digital Citizens
  http://vimeo.com/49772320
- What Happens When School Design Looks Like Game Design
  http://blogs.kqed.org/mindshift/2014/07/what-happens-when-school-design-looks-like-game-design/

Nordahl Grieg Upper Secondary School in Bergen, Norway

A school for the future based in sharing and constructing knowledge together.

Media and Texts:

- Literature, Ethics, Physics: It's All In Video Games At This Norwegian School
  http://blogs.kqed.org/mindshift/2014/07/literature-ethics-physics-its-all-in-video-games-at-this-norwegian-school/
- Nordahl Greig Upper Secondary School
  https://www.youtube.com/watch?v=d0DjI4u8OEg

Ludic Learning in Toronto, Canada

Playing to learn and learning to play.

Texts:

- An Indie Education: Gone Home and Why Independent Games Belong in Classrooms
  http://www.ludiclearning.org/2014/03/19/an-indie-education-gone-home-and-why-independent-games-belong-in-the-classroom/

HELPFUL LITERATURE

- Why Games and Learning?
  http://www.instituteofplay.org/about/context/why-games-learning/
- Teens, Video Games, and Civics
  http://gamesandimpact.org/wp-content/uploads/2012/05/PIP_Teens_Games_and_Civics_Report_FINAL.pdf
- Research Roundup: Outcomes of Game-Based Learning
  http://journalistsresource.org/studies/society/education/outcomes-of-game-based-learning-research-roundup
- The Benefits of Playing Video Games
  https://www.apa.org/pubs/journals/releases/amp-a0034857.pdf
- The Impact of Console Games in the Classroom
  http://www2.futurelab.org.uk/resources/documents/project_reports/Console_Games_report.pdf
- Are Video Games Good For Learning?
  http://cmslive.curriculum.edu.au/verve/_resources/gee_paper.pdf
- Video Games and the Future of Learning
  http://ddis.wceruw.org/docs/08%20ShafferSquireHalversonGee%20PDK.pdf
- From Player to Designer: Engaging and Empowering Youth through Making Games
  http://gamesandimpact.org/wp-content/uploads/2012/02/Leveling-Up_SeptOct2011_R1-1.pdf
- Echoing Histories: Impressionism, Indie Games, and Artistic Revolutions
  http://videogametourism.at/content/echoing-histories-impressionism-indie-games-and-artistic-revolutions

BARRIERS TO ACCESS: SHIFTING PARADIGMS, OVERCOMING THE OBSTACLES, AND DEBUNKING MYTHS ABOUT GAMES

- Moving Learning Games Forward: Obstacles, Opportunities, and Openness (MIT)
  http://education.mit.edu/papers/MovingLearningGamesForward_EdArcade.pdf
- Games in the Classroom: Overcoming Obstacles (Mind/Shift)
  http://blogs.kqed.org/mindshift/2014/09/games-in-the-classroom-overcoming-the-obstacles/
- Reality Bytes: 8 Myths About Video Games Debunked (PBS)
  http://www.pbs.org/kcts/videogamerevolution/impact/myths.html
- Impact Based Research: Closing the Gap Between Game-Based Learning Research and Sustainable, Scalable Real-World Impact
  http://gamesandimpact.org/wp-content/uploads/2014/05/IBR-Process_WS.pdf
- Connecting Digital Games to Learning
  http://www.edweek.org/dd/articles/2010/06/16/03games.h03.html
- Video Games and Education: Overcoming the Stigma
  http://www.ludiclearning.org/2014/03/12/video-games-and-education-overcoming-the-stigma/

GETTING STARTED

- Practical Steps
  http://blogs.kqed.org/mindshift/2014/09/using-games-for-learning-practical-steps-to-get-started/
- Four Ways to Teach with Video Games
  http://currents.cwrl.utexas.edu/2010/lieberman_four-ways-to-teach-with-video-games
- Participate in the Hour of Code
  http://csedweek.org/educate/hoc
- Take the STEM Challenge
  http://www.stemchallenge.org/

FREE TOOLS AND SOFTWARE

- **GameStar Mechanic**
  Gamestar Mechanic teaches kids the principles of game design and systems thinking in a highly engaging environment. It is designed for ages 7-14 but is open to everyone, whether in a school environment or at home.
  http://gamesandimpact.org/games/gamestar-mechanic/
- **Kodu**
  Kodu lets kids create games on the PC and Xbox via a simple visual programming language. Kodu can be used to teach creativity, problem solving, storytelling, as well as programming. Anyone can use Kodu to make a game, young children as well as adults with no design or programming skills.
  http://www.kodugamelab.com/
- **Scratch** (ages 8-16) and **Scratch Jr.** (ages 6-7)
  With Scratch, you can program your own interactive stories, games, and animations—and share your creations with others in the online community. Scratch helps young people learn to think creatively, reason systematically, and work collaboratively—essential skills for life in the twenty-first century. Scratch is a project of the MIT Media Lab.
  http://scratch.mit.edu/
  http://www.scratchjr.org/
- **Stencyl**
  Stencyl is a powerful game creation toolset, centered on an intuitive block-snapping interface and a friendly, helpful community. With Stencyl, students can produce their own games without programming, play

them on their computers and mobile devices, and distribute them for anyone to play on the iOS App Store and Google Play.
http://www.stencyl.com/education/faq/

- **Twine**
  Twine is an open-source tool for telling interactive, nonlinear stories. You don't need to write any code to create a simple story with Twine, but you can extend your stories with variables, conditional logic, images, CSS, and JavaScript when you're ready. Twine publishes directly to HTML, so you can post your work nearly anywhere. Anything you create with it is completely free to use any way you like, including for commercial purposes.
  http://twinery.org/
- **Tynker**
  Tynker is an online platform that easily and successfully teaches students how to code through the activities they already love: games and stories. Students learn the fundamentals of programming and design through Tynker's intuitive visual programming language without the frustrations of traditional syntax.
  http://www.tynker.com/

GUIDANCE FOR SELECTING GAMES

With a seemingly infinite number of games available on so many different platforms, finding games to use in the classroom can feel a little overwhelming at first. Thankfully there are some great tools for discovery out there with educators specifically in mind.

First, check out these articles from **Mind/Shift** on what makes a game great, and tips on how to avoid the "chocolate covered broccoli"—thinly-disguised educational software that fails to be successful at being both fun and educationally valuable:

- http://blogs.kqed.org/mindshift/2014/08/how-to-choose-a-learning-game/
- http://blogs.kqed.org/mindshift/2012/04/whats-the-secret-sauce-to-a-great-educational-game/
- http://www.joanganzcooneycenter.org/2014/09/05/need-help-picking-the-right-learning-game-some-things-to-consider/

Then, explore the resources below to find games that will fit your students' needs:

- **Educade**
  A wonderful resource to connect teachers to lesson plans and games. Filter by age, subject area, and platform.
  http://educade.org/
- **Graphite**
  Helps teachers find apps that relate to specific common core standards for Math and Language Arts.
  http://www.graphite.org/standards/common-core
- **Playful Learning**
  Filters games by age, learning subject, and cost.
  http://playfullearning.com/games

GAMES TO TRY IN THE CLASSROOM

- **Minecraft**
  http://minecraftedu.com/
- **Portal 2**
  http://www.teachwithportals.com/index.php/about/

- **Fold It!**
  http://gamesandimpact.org/games/foldit/
- **Civilization V**
  http://gamesandimpact.org/games/civilization/
- **Radix Endeavor**
  https://www.radixendeavor.org/
- **Evoke**
  http://www.urgentevoke.com/
- **Dragon Box**
  http://wewanttoknow.com/dragonbox-edu/

SUGGESTED SUBJECT AREA CONNECTIONS

- **Language Arts and Writing (Grades 9-12)**
  - **Setting Tone Through Code:** Mood and tone are literary devices that can be developed through the setting of a story and the perspective of the protagonist. How does the environment you explore in the game *Gone Home* create the mood? You explore the house as older sister Katie. How does the tone change when you listen to Sam's audio diaries? How might the story be different if it was set in a different time period?
    - Explore more ways to use *Gone Home* as a literary text: http://www.ludiclearning.org/2014/03/29/annotating-the-foyer-towards-a-close-playing-of-gone-home/
  - **Digital Storytelling:** The game *Ke$ha Crystal Warrior* was created with the program Twine and is part choose-your-own-adventure and part fan fiction. Use the program Twine to create your own interactive fictional game about a favorite famous figure.
  - **Creative Book Reports:** Use a tool such as Scratch to animate an important scene from a chosen book. Students can work in teams to create the character designs, a story board, and write the code.
  - **Unpacking Narrative Concepts and Story Structure:** Choose several games your students enjoy playing. Have students think about the role game player choice plays in these games, what aspects of the game the player controls, and how important story elements are conveyed through cinematic cut scenes or through gameplay. Have students create a short story to accompany their own independent game project.
- **History, Social Studies, and Ethics (Grades 6-8)**
  - **Citizenship and Ethical Decisions:** The game *Papers, Please* takes place in the fictional country of Arstozka. What real-world time and place do you think inspired the setting and why? What are the outcomes of following orders? What happens when you choose to defy the rules?
    - Lesson plan: http://gamesandimpact.org/wp-content/uploads/2014/09/PL_PAPERSPLEASE_20140912_v2.pdf
  - **Gaming Fact vs Fiction:** Have students play the popular game, *Oregon Trail,* then have them research the realities versus those depicted in this fictional game for actual travelers during the 1800s.
  - **Virtual Worlds Real Economics:** Discuss the economic systems created by games such as *World of Warcraft*. Have students think critically about what developers must do to maintain balance with the in-game economy.
- **Mathematics and Visual Art (Grades 3-5)**

- **Visualizing Art and Geometry:** *Monument Valley* is a beautiful game of impossible geometry and challenging puzzles. Talk with your students about the intersection of art and math by researching the life of M.C. Escher, learning Euler's formula, and creating a Mobius strip and tessellations.
- **Physics of Games:** Demonstrate the implementation of mathematic principles, including 2D and 3D coordinate systems, linear and circular equations, vectors, matrices, and trigonometry in the computer physics engines used in many popular games.
- **Design Your Own Characters and Game Elements:** Using principals of symmetry, have students design sprites (characters) to be used in their own video game to fit within a set x/y coordinate system.
- **Digital Self Portrait:** Using a coding program such as Scratch, have students design and animate a digital self-portrait that represents qualities of themselves they would like to express.

- **World Languages (Grades 6-8)**
  - **Learning Culture and Language through Gaming:** After playing the game *Never Alone*, reflect on what you've learned about the mythology, language, and community values of the Iñupiat people. What can you discover about this native Alaskan tribe?
- **Music (Grades 6-8)**
  - **8-bit Music Revival:** Have students listen to samples of classic 8-bit video game music. Discuss how the limitations of the electronic hardware could be both positive and negative. Introduce currently available software such FamiTracker (http://famitracker.com/) and Milkytracker (http://www.milkytracker.org/) that students can use to create their own chiptunes (8-bit music) as a standalone project or to accompany their own independent game.

ADDITIONAL RESOURCES

The resources below are provided to help you research, plan lessons, and stay current with educational trends in the area of integrating games into classroom instruction.

Books

- *Hanging Out, Messing Around, and Geeking Out: Kids Living and Learning with New Media* (The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning) http://www.amazon.com/gp/product/0262013363?ie=UTF8&tag=chanponorg&linkCode=as2&camp=1789&creative=9325&creativeASIN=0262013363

Web

- Edutopia
  http://www.edutopia.org/made-with-play-game-based-learning-resources
- MIT Education Arcade
  http://education.mit.edu/projects
- Mind/Shift
  http://blogs.kqed.org/mindshift/series/guide-to-games-and-learning/
- Glass Lab
  http://www.instituteofplay.org/work/projects/glasslab/
- Games for Impact
  http://gamesandimpact.org/newbies/
- Copyright and Digital Literacy
  http://www.digitalliteracy.gov/resources-by-term/106

Apps

- Edutopia

http://www.edutopia.org/blog/7-apps-teaching-children-coding-anna-adam

Videos

- Your Brain on Video Games
  http://www.ted.com/talks/daphne_bavelier_your_brain_on_video_games
- How Games Make Kids Smarter
  http://www.ted.com/talks/gabe_zichermann_how_games_make_kids_smarter
- Let's Teach Kids to Code
  http://www.ted.com/talks/mitch_resnick_let_s_teach_kids_to_code
- Gaming in the Classroom: How Games Can Improve Our Schools (PAX Prime 14)
  https://www.youtube.com/watch?v=M0aoC-wrVwA

GLOSSARY

A selection of definitions of terms in the context of games and games design from the Institute of Play. The full list can be found at: http://www.instituteofplay.org/about/context/glossary/.

CONNECTED LEARNING: A theory of learning that strives to connect and leverage all the various experiences, interests, communities and contexts in which learners participate—in and out of school—as potential learning opportunities.
CORE MECHANIC: The moment-to-moment activity of a player, repeated over and over throughout a game, such as trading, talking, shooting, guessing, or conquering terrain. Compelling core mechanics are a must in effective game design.
DESIGN THINKING: A set of skills, competencies, or dispositions relating to the highly iterative collaborative process designers employ when conceiving, planning, and producing an object or system.
EMBEDDED ASSESSMENT: A strategy for evaluating student performance using outputs that naturally occur in the course of day-to-day learning, create frequent opportunities for feedback and revision, and expose students to data that can inform their decision-making.
FORMATIVE ASSESSMENT: A strategy used by teachers and students during the learning process that provides feedback to inform decision-making and modify teaching and learning activities in which they are currently engaged. Often contrasted with summative assessment, which is used to assess achievement of learning outcomes.
GAME: A designed system in which players engage in artificial conflict, defined by rules and resulting in a quantifiable outcome. There are many different kinds of games, including card games, board games, computer games, video games, mobile games, dice games, online games, social games, role-playing games and physical games.
GAME DESIGN: A complex design activity that gives rise to games through the creation of rule sets, resulting in play.
GAME THEORY: A branch of economics that studies rational decision-making. It often looks at game-like situations, but is not a general theory of games or game design.
GAME-BASED LEARNING: A learning approach that emphasizes engagement, learning by doing, collaboration, reflection, iteration, frequent feedback, and sharing. This approach structures learning activities around real-world or fictional challenges that compel learners to take on a variety of roles as they actively identify and seek out the tools and multi-disciplinary information they need to generate solutions. Also known as Challenge-Based Learning.
GAMING LITERACIES: A set of skills, tools, and dispositions that come from the design, culture, and play of games, such as the ability to build worlds, to act within dynamic systems, to navigate complex information networks, and to engage in collaborative peer-to-peer learning. Other important gaming literacies include systems thinking, risk-taking, critical reflection, collaboration, meaning creation, non-linear navigation, problem identification, creative problem solving, and innovation.
INTEGRATED CURRICULUM: Curriculum that treats traditionally delineated content areas—like science, math, and English language arts—as integral parts of interconnected knowledge domains.

MOD: A modification to a game, made by the public or by developers, typically involving content additions, bug fixes, or entirely new games built on existing game platforms or software.
PEDAGOGY: The study or practice of being a teacher. Also used to refer to specific strategies or styles of instruction.
PLAY: A state of being or activity experienced by a person or group of people when game rules are set in motion. Often characterized as free movement within a rigid rule structure.
SITUATED LEARNING: A theory of learning as a complex activity embedded in social and physical contexts, rather than as an individual, purely cognitive process.
STEM: An acronym used to refer to teaching and learning around science, technology, engineering, and math. Sometimes listed as STEAM, with the A representing Arts.
SYSTEMS THINKING: A set of practices or habits of mind grounded in the view of all things as component parts of larger systems, best understood in relationship with each other and with other systems, rather than in isolation. Often identified as a key competency for success in the twenty-first century.
TWENTY-FIRST CENTURY COMPETENCIES: A set of skills or dispositions generally agreed to be critical to success in the twenty-first century, and not typically addressed in traditional educational models, such as system thinking, creative problem solving, collaboration, innovation, time management, identity formation, tenacity, and empathy.