Legends of Learning & IGDA

Game Design Challenge

About the Game Design Challenge

With many schools adopting a virtual or hybrid plan this school year, students are missing out on the opportunity to engage in hands-on STEM experiences with their friends and classmates. To help fill this void, and encourage learning, computational thinking, and fellowship, Legends of Learning and International Game Developers Association (IGDA) are hosting a month-long Game Design Challenge. This virtual experience will enable K-12 students to learn more about game development and practice critical thinking while expanding their portfolios.

This packet contains lesson plans for the Game Design Challenge to assist teachers with integrating this experience into their classrooms if they would like their students to follow along. Each lesson week will also have at least one live-streamed talk for students to watch as well.

We are excited to provide all learners with an opportunity to design a game, no matter their device-access, age, or previous experience. Depending on the grade level and experience of the participating students, there will be two different tracks they can participate in:

- Fully build out a video game, using their choice of platform
    - Examples: CORE, Unity, Game Maker, Scratch, RPG Maker
- Create a paper prototype and game design document

Lesson 1: Game Development Concept & Planning

The first step of any large project is to determine the base components of the project and make a plan on how to bring those together. In this lesson, students will work to create an initial design for their game. Then they will make a plan to bring that design to life.

Objective

Students will:

- Develop skills needed to plan projects and timelines
- Develop critical thinking and creative problem-solving skills
- Practice project management
- Utilize knowledge from other studies in a new context
- Practice technical writing skills

Materials:

- Appendix A: Game Design Document & Timeline

Procedure

To encourage fellowship and collaboration, students can work independently or in teams for this project. No more than 4-5 students should be on a single project.

1. Talk with students about games, including video games, tabletop / board games, and sports / playground games. Have them discuss components of games that they appreciate and that make them fun. Guide them towards discussing:
    a. Score / winning / objective tracking
    b. Story, lore, and setting / environment
    c. Characters
    d. Rules and game mechanics
    e. Key items
2. Discuss the major steps of game development:
    a. Develop a concept / design
        i. The first stage of game development is to determine a first approach of all of the game components we discussed earlier-- the mechanics, setting,

story, objectives, characters, and items. Not all games make use of all of these components, but you should consider whether your game would benefit from each of them and, if so, what you would like each of them to be.

b. Plan how to create that design
    i. Once you have an initial design, you need to plan your approach to bring that game to life -- which components need to be built and in what order, which tools you need to use, and how the work will be distributed.
c. Create a prototype of that design
    i. Game developers always create prototypes of games before fleshing out the entire game. Prototypes are used to test gameplay mechanics to ensure they are fun before spending a lot of time on art and other efforts that may have to be changed.
    ii. A prototype should explore a full “game loop”, which is the set of core mechanics and behaviors in a game. In Pong, this would be passing the ball between players and scoring a point. In Fortnite, this would be building structures, gathering items, and fighting another player.
d. Produce/develop the full game
    i. Once the prototype has proved the game’s concept is fun, the next step is to build out the full game with art and other features.
e. Test and polish the game
    i. Once you create the game, you then need to test it with other players. After receiving the players’ feedback, polish the features that could use extra attention, whether it is because they are confusing to players or because they need more emphasis and flare.
f. Market the game
    i. The final step is an important aspect that many people do not consider -- marketing the game to others. You can create the most fun game in the world, but, if no one hears about it, no one will play it.
    ii. Marketers identify the audience the game will appeal to most, then seek how to interest those people within the channels that they frequently visit.

3. Provide students with Appendix A and ask them to create an initial design concept for their game. Students are likely to be extremely excited and involved with this step, so

either time-box the amount of time they can use (e.g. “You have 30 minutes to create an initial design”) or move on to the next step of the lesson the next day.

4. Ask students to use Appendix A to plan out steps and a timeline of their efforts. If you expect your students to struggle with this task, it might be best to take them briefly through the creation of an example timeline together as a class.

Questions

Ask your students the following questions to assist with their efforts:

1. What is your favorite part of your design?
2. What do you think the risks are of this project?
3. Are there any components you can remove or deprioritize to give your game a better chance of being completed?

Lesson 2: Game Prototyping

In this lesson, students will work to bring their games to life and test out their design idea. It is important for students to understand that ideas are not perfect at the start and that their designs will come to life with iteration and patience.

Objective

Students will:

- Learn how to follow their own plans
- Practice critical thinking and creative problem-solving skills
- Utilize knowledge from other studies in a new context
- Practice project creation skills

Materials:

- If your students will be making paper prototypes:
    - Paper
    - Scissors
    - Pens, pencils, or markers
- If your students will be making digital prototypes:
    - Computer
    - Game engine and/or code editor of their choice
        - Examples: CORE, Unity, Game Maker, Scratch, RPG Maker

Procedure

This lesson does not require a strict set of procedures, but is focused on empowering students to pursue their projects. Each class will need different materials and support based on their age and the type of projects they are creating.

1. Remind students that the goal this week is to create a prototype-- a full “game loop” of their design, which is the set of core mechanics and behaviors in their game.
2. Ask them to review their design and timeline and to make any changes they feel are necessary after further review to keep their project fun and on schedule.
3. Allow students to begin building their paper or digital prototype

Lesson 3: Game Development

In this lesson, students will finish the main development of their game ideas. They should have a fully playable game by the end of this section.

Objective

Students will:

- Learn how to follow their own plans
- Practice critical thinking and creative problem-solving skills
- Utilize knowledge from other studies in a new context
- Practice project creation skills

Materials:

- Same materials from Lesson 2

Procedure

1. Remind students that their goal this week is to finish their game to the best of their ability. Stress that they can remove components from their game if they do not think they will finish them on time.
2. Ask them to review their work and timeline and to make any changes they feel are necessary after further review to keep their project fun and on schedule.
3. Allow students to begin working to complete their game prototype.

Lesson 4: Game Testing and Polish

In this lesson, students will bring together their projects to playtest, provide feedback, and finalize them. They will practice accepting and providing constructive criticism.

Objective

Students will:

- Provide constructive feedback
- Accept constructive criticism
- Practice technical writing skills

Materials:

- Same materials from Lesson 2
- Completed projects
- Appendix B: Game Feedback Form
- Appendix C: Game Feedback Collection
- (Optional) Appendix D: Submitting to Contest

Procedure

1. Congratulate students on their hard efforts so far, and note that bringing their own ideas to life is a challenging process.
2. Talk with students about playtesting and constructive criticism, as well as the importance of both.
    a. Playtesting is allowing a person to play your game while observing their interactions and feedback. The intent of playtesting is to understand the aspects of your game that are fun, particularly challenging, or confusing. Playtesting is an important part of the development process, as it helps developers understand how players will interact with their creation.
    b. Constructive criticism is a helpful way of giving feedback that provides specific, actionable suggestions.
        i. Examples of “bad” feedback:
            1. “This character looks ugly”
            2. “The gameplay isn’t fun”
        ii. Examples of constructive criticism:
            1. “The character would be easier to see with a brighter color palette”
            2. “I don’t feel like I am being rewarded for my actions”
3. Issue copies of Appendix B and Appendix C to each student.

4. Divide student groups into two: one group which will be showing their games and one group which will be playing the games. It is recommended to keep the number of game players to only one or two per game, so that the game group can fully observe the interactions with their game.
5. Ask students to playtest the games for a set time (5-10 minutes) while providing any helpful feedback and constructive criticism, and for the other students to record their observations of the playtesters on Appendix C.
6. At the end of the playtesting time, give the students a few extra minutes for the playtesters to record their thoughts on Appendix B and for the other students to finish up any of their Appendix C notes.
7. Have students rotate who is showing their game and playing the games until all have acted as playtesters and observers.
8. Ask students to share what they learned by playing and observing others playing their games.
    a. Did they find any interactions unexpected?
    b. What challenges or misunderstandings did players face?
    c. How could they use this feedback to improve their game?
9. Have students write two or three improvements that could be made to their game based on the feedback and observations.
10. Allow students to work on finalizing and polishing their games based on that feedback.
11. At the end of the lesson, congratulate them on their hard work and collaboration with their teams and playtesters.
12. (Optional) Guide students through the contest submission form using Appendix D.

Appendix A: Game Design Document & Timeline

Game Name: _____

Objective:	Mechanics:
Setting/Story:	Characters:

Timeline

Week 1: Game Development Concept & Planning

Week 2: Game Prototyping

What are the core mechanics of your game?

Week 3: Game Development

What do you need to add beyond the core mechanics?

Week 4: Game Testing and Polish

What final polish will you leave until last?

Appendix B: Game Feedback Form

Game Name:_____

What parts of the game did you enjoy most?
What parts of the game were confusing?
What do you wish there was more of?
What do you wish there was less of?

Appendix C: Game Feedback Collection

Game Name:_____

What did the player(s) not understand?
What did the player(s) like the most?
What should you keep or increase?
What should you change?

Appendix D: Submitting to Contest

If you would like to submit your game design to the *Dell Technologies Advancing Sustainability Game Design Challenge*, it must be submitted by 11:59 pm PST on April 15th, 2021.

To submit your game, fill out the form at: https://forms.gle/y5M5m718E5vdmmmY8

Please put all parts of your submission, including any design documentation, images, executable files, or videos, in a zipped folder and upload it in the form. This will be the material that is reviewed during the judging process, so please make it as understandable as possible to ensure your submission is judged correctly.

Paper Prototype/Design Recommended Materials:

1. Brief written introduction about the game
2. Design summary (e.g. Appendix A pg. 1)
3. Images or sketches of all game components
4. Images or sketches of the game in several gameplay states with explanations

Digital Game Recommended Materials:

1. Brief written introduction about the game
2. Design summary (e.g. Appendix A pg. 1)
3. Executable file of the game (if possible)
4. Gameplay video

The winning teams will be selected by May 13th, 2021. Each submission timely received and not otherwise disqualified will be scored on the following criteria out of a total of 1000 points:

- Creativity and Theme Integration of Game Design Concept: 0 to 350 points
- Completeness and Detail of Submission: 0 to 350 points
- Originality of Game Mechanics and Gameplay: 0 to 300 points

If you are not a student at a school, please put down your parent or guardian's information as the teacher's and list "Homeschool" for the school information.