



Gamestar Mechanic

GAME DESIGN AND SYSTEMS THINKING

A toolkit designed to introduce the guiding principles of game design and systems thinking, using Gamestar Mechanic, an online digital learning platform and game environment. By repairing, balancing, designing and play-testing each others' digital games in a Web-based environment, students are introduced to design methods and encouraged to reflect on the game environment as a model of a system. The design tools require no programming skills, and the activities in this toolkit can be performed using the Free Edition of the online game.

AUTHOR

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BENCHMARKS

CURRICULUM

CROSS CURRICULUM PRIORITIES

TEACHING LEVEL

English, Media Studies, ICT, SOSE, Science

Australia and Australia's engagement with Asia, Sustainability

3-6, 7-10, 11-12

EXPECTED DURATION



The activities suggested in this toolkit should take about 40 mins. each, however they can be broken into singular activities, or extended into a longer unit of study.

EXERCISES

1. Introduction to Gamestar Mechanic
2. What Makes a Good Game?
3. Balancing and Designing Mini-games
4. Play-testing, Sharing & Critiquing Games
Attachment: Prompts for Assessment

RESOURCES FOR COMPLETION

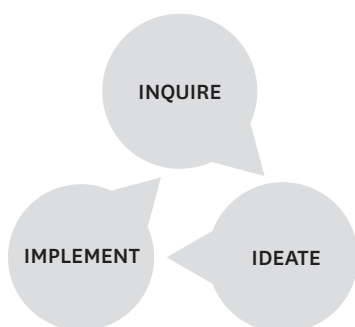
- Computer for each student (or pairs of students if computers are limited) in class
- Internet connection with access to www.gamestarmechanic.com
- All students will need to be registered with usernames and passwords. This can be initiated by the teacher in advance:
 - a) teacher creates an 'institution' at www.gamestarmechanic.com/teachers/setup
 - b) students create their own accounts using the link provided to the teacher during institution setup (this way, students do not need to enter their own email addresses)
- Pencil or pen for each student
- Post-It notes or A4 lined paper for every student (or student group) to make notes, and brainstorm in the prototyping, critique and discussion sections
- Whiteboard and markers for class discussion
- Data projector for demonstrating login and features of Gamestar Mechanic

A separate activity and discussion area should be set up away from the computers, for analogue games and reflective discussion.

RESOURCES FOR DOCUMENTATION

Pens and unlined A4 paper for recording ideas, brainstorming and responding to reflective questions at the end of each exercise

DESIGN AND CAPABILITIES



Capabilities for creating successful learners, confident and creative individuals, and active and informed citizens.

Literacy



Numeracy



ICT capability



Critical and creative thinking



Personal and social capability



Ethical behaviour



Intercultural understanding



Visit [Design Minds](#) for more info on design phases.

Visit the [Australian Curriculum website](#) for more info on general capabilities.

Introduction

TO GAMESTAR MECHANIC



40 minutes

Inquire
Ideate
Implement



METHOD

All class exercise

ACTIVITY

Gamestar Mechanic is designed to help students learn about the principles of game design in a scaffolded learning environment in which they adopt the role of a game designer. Using a set of digital objects that can be clicked and dragged onto a game space, students first repair “broken” games and then develop their own games, using the available tools to personalize and add complexity. This Design Minds toolkit adapts material from the online Gamestar Mechanic learning guide and associated teaching material to focus on design thinking and systems thinking through online and analogue activities.

Task:

This activity introduces students to the components of Gamestar Mechanic by playing through the first quest, episodes 1 and 2. They are encouraged to complete the quest to episode 5 by exercise 3.

To commence the first quest all students will need to be registered with usernames and passwords. This can be initiated by the teacher in advance:



- a) teacher creates an ‘institution’ at **www.gamestarmechanic.com/teachers/setup**
- b) students create their own accounts using the link provided to the teacher during institution setup (this way, students do not need to enter their own email addresses).

Once registered, students can begin working through episodes 1 and 2.

REFLECTION

Students are asked to write their answers to the following critique questions below. Alternatively teachers can facilitate a brief class discussion:

Prompts for reflection:

- How did you find the experience?
- What part was the most interesting?
- Are there any unclear terms?
- How was the game altered when an element was changed? (This question introduces the idea of a *dynamic system*).



Have you considered?

Creating a blog for students to record their reflections and have their peers and teachers comment?

Or, for homework why not get the students to complete Episodes 3-5 of the Quest and in the process choose their favourite game and identify the components and behaviours of that game?

DOCUMENTATION

Scan students’ journal reflections and include in an online wiki for the project

Introduction

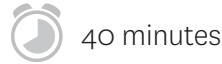
TO GAMESTAR MECHANIC CONT.

IMAGES

Screen shots from Gamestar Mechanic, courtesy of Institute of Play. Used with permission.



What Makes a Good Game?



40 minutes

Inquire
Ideate
Implement



METHOD

All class exercise

ACTIVITY

This exercise should be organised in a separate space from the computer lab, to encourage students to think about the design of games away from the lure of the screen. The goal of this exercise is to introduce the idea of a game as a system:

a. (15 minutes) Students play a non-digital game, either in small groups (rock paper scissors), or as a class (musical chairs, musical statues etc). Before playing the game, the group(s) should go over the rules, writing them down if necessary.

b. (15 minutes) Discuss what makes a good game, with the teacher using the prompts for reflection below and introducing a *systems* vocabulary as it emerges in the discussion:

- System
- Function
- Goal
- Components
- Behaviours
- Interconnections

c. (10 minutes) Students are asked to make a list of things that make a good game, including analogue games and videogames.



Have you considered?

Try playing rock-paper-scissors with additional components (e.g. bomb, water, fire).

Challenge the students to modify another existing analogue game in a similar way or encourage them to invent their own.

REFLECTION

Prompts for reflection:

- What was the goal of this game? (e.g. to win three rounds of rock-paper-scissors; to be the last one standing)
- Was the goal of the game part of the function? (i.e. did the game work?)
- What are the components of the game and what behaviours do they have? (e.g. hands are shaped into game pieces, pieces have a rank)
- How do the behaviours and components work together? (the chairs and people interact because the players need to sit down; the playing space changes each round as the number of chairs decreases; the music signals players to move or sit).



Have you considered?


Ask students to identify other systems in society (e.g. school and the system, function, goal, components, behaviours and interconnections). These could be recorded in a two column table comparing aspects of systems in particular games versus those in a societal system.


Using a blog, set up by the teacher, students can comment on each other's reflection and the teacher can provide feedback on reflection and student comments.

DOCUMENTATION

Scan students' journal reflections and include in an online wiki for the project

Balancing and Designing Mini-games

 40 minutes

Inquire
Ideate
Implement 

METHOD

All class exercise

ACTIVITY

- a. (30 minutes) This exercise resumes the online activity with the first quest, with the goal to have students begin to design their own games. Students should complete the five episodes (if they haven't already) and use the workshop section to develop their first game.
- b. (10 minutes) Students are asked to begin keeping track of the revisions they make to their Gamestar minigame, by using or creating the form contained in the *reflection* section of this exercise below.



Have you considered?

Encourage the students to continue to develop their game for homework or to work together outside of class time.

REFLECTION


Ask students to begin keeping track of the revisions they make to their Gamestar minigame using the following form:

First draft	Second draft
<i>Game space</i> What does the layout look like? How does it work?	<i>Game space</i> What does the layout look like? How is it different from the first draft?
<i>Components</i> What components are you using? (Avatar, blocks, items, sprites). What can they do?	<i>Components</i> What components are you using? What can they do? How is this different from the first draft?
<i>Goal</i> What is the goal? Is it achievable?	<i>Goal</i> What is the goal? Is it achievable? Are there choices or strategy? What did you change from the first draft?
<i>Balance</i> Is the game balanced? Is it challenging? Are there choices or strategy? What could be changed?	<i>Balance</i> Is the game balanced? Is it challenging? Are there choices or strategy? What did you change from the first draft?
<i>Mechanics</i> What is the core mechanic? (Collecting points, jumping across platforms, shooting aliens). Is it simple?	<i>Mechanics</i> What is the core mechanic? (Collecting points, jumping across platforms, shooting aliens). What did you change to make it better? Is it better?
<i>Feedback</i> How does your game give the player feedback?	<i>Feedback</i> How does your game give the player feedback now?
<i>Idea</i> What idea or logic does the game express in its design? Is it integrated or random?	<i>Idea</i> Is the game more integrated than in the first draft? What did you change?

DOCUMENTATION

Scan students' journal reflections and include in an online wiki for the project

Play-testing, Sharing & Critiquing

 40 minutes

Inquire
Ideate
Implement 

METHOD

All class exercise

ACTIVITY

This exercise requires students to play-test and critique each others' games, introducing the concept of *iterative prototyping* and giving constructive feedback.

a. Discussion: the Art of Constructive Criticism (5 minutes)

Organise class into pairs, each to present and playtest each other's game. As a class, develop a list of rules for giving feedback to each other (e.g. use positive language, precede cold feedback with warm feedback, give specific examples to support your points). Don't get personal, or take things personally. Failure is a key part of design success.

b. Play-test (25 minutes)

Presenters set up the game they made in the last lesson, and invite the playtester to play it. An effective method for playtesting is for the presenter to simply watch the play without giving any comments or suggestions. This way they will see what their game looks like to someone who did not design it.

Play-testers write down their experience of the game in response to the prompts below:

- What were the goals of your partner's game?
- How did the game meet those goals?
- What did you like about the game?
- Where were the problems with the game?
- Where were the disconnects, i.e. things not matching up?
- How might the game be improved?
- What did you learn about game design from playing and reviewing your partner's game?
- How will you change your own game in light of what you've learned?

c. Discuss (10 minutes)

As a class, discuss the 'Prompts for Reflection' outlined below. The teacher may wish to invite a few students to present their experience of the play-testing to the class, with the designer describing the game and the tester reviewing it.



Have you considered?

For a more advanced class or older age group, you may wish to spend a lesson discussing and exploring the concept of *iterative design* (the methodology for prototyping, testing, analyzing, and refining a product or process).



Jessie Cutt's from IDEO explains the value of failure in an iterative design process.

<http://designonline.org.au/content/fail-early-to-succeed-sooner>

Encourage students to publish their games on the Gamestar Mechanic website and ask their peers in the class or other classes to give feedback. Encourage the students to connect with other classes and schools across Australia or globally who are using Gamestar and share feedback and best practices.

Even better, why not hold a Gamestar Mechanic Competition within your school or amongst schools in your area?

Play-testing, Sharing & Critiquing

CONT.

REFLECTION

Students are asked to write their answers to the following critique questions below. Alternatively teachers can facilitate a brief class discussion.

Prompts for reflection:

- What did you learn about game design?
- A game system includes components and behaviours. What are the components and behaviours of the Gamestar Mechanic games you played?
- Why do you think designers put so much emphasis on testing and prototyping?
- Now that you are a game designer, how would you describe your approach to making a game? Story first? Game space first? Mechanics first (e.g. collecting)?
- Games are systems. What other kinds of systems do they resemble?
- How might Gamestar Mechanic be used to help students learn about other subjects, like biology, history or social studies?
- What would make Gamestar Mechanic better?



Have you considered?

Ask students to identify systems of a video game they have played that they thought was successful and make suggestions on how it could be improved.

More broadly, ask students to consider and identify a 'faulty' system from history, identify the aspects of this system using the systems vocabulary developed in Exercise 1, 'What Makes a Good Game?' and suggest how this system could be improved.



'The Crisis of Capitalism'. RSA Animate presents renowned academic David Harvey's analysis of the 'system' of capitalism questioning how it could be more responsible, just, and humane.

http://youtu.be/qOP2V_np2co

DOCUMENTATION

Scan students' journal reflections and include in an online wiki for the project.

IMAGES

Image courtesy of Institute of Play. Used with permission.



Prompts for Assessment

ATTACHMENT



SUMMATIVE

Consider creating a more formal version of the pair presentation in Exercise 4: 'Play-testing, Sharing & Critiquing'. Ask students to develop visual aids to demonstrate the game, explain the design process and incorporate feedback, iterative prototyping, links to other games and societal systems (each student would be involved in two presentations, one as game designer, one as tester).

FORMATIVE

Peer and self-assessment of student games using a 'Rubric' incorporating systems vocabulary. A four point scale for formative assessment of effective game design and reflection using the basic framework of:

1. Innovating
2. Applying
3. Developing
4. Developing and Beginning

For example:

Game Design

1. Incorporates all aspects of systems effectively and creates an original game
2. Incorporates all aspects of systems effectively
3. Incorporates some aspects of systems effectively
4. Incorporates one aspect of systems effectively

Teacher assessment of modes of reflection (journals, blogs, wiki):

1. Uses systems vocabulary accurately to reflect on own and other's game design, following class-devised protocols and makes links to other games and societal systems
2. Uses systems vocabulary accurately to reflect on own and other's game design, following class-devised protocols
3. Uses some systems vocabulary accurately to reflect on own and/or other's game design, following most class-devised protocols
4. Uses one aspect of systems vocabulary to reflect on own or other's game design, following some class-devised protocols



The Australian Curriculum's guide to General Capabilities in the area of critical and creative thinking provides useful prompts for assessing reflection on thinking, actions and processes.

<http://www.australiancurriculum.edu.au/GeneralCapabilities/Critical-and-creative-thinking/Continuum>