Facilitator Resources for:

INTERCONNECTIONS: Understanding Systems through Digital Design

SCRIPT CHANGERS
DIGITAL STORYTELLING WITH SCRATCH

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foreword by Linda Booth Sweeney
Overview & Explanation

For your convenience, we have gathered together here the projection sheets, cards, and formal assessment used in supporting the activities found in *Script Changers*. See the Design Challenges within the book for detailed information on how these materials may be used. The headings and page numbers match the same within *Script Changers*, but note that some can be used more than once throughout the Design Challenges.

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*NOTE: Within the book you may see a handout listed as suitable for duplication or projection. If you wish to project any, those items may be found within the Youth Handouts and Worksheets collection.*

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**Cards**

(Cut apart and laminate for durability)

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Posters

Items used throughout the book
THE ICEBERG
Looking below the Waterline

EVENTS
Reactive & Responsive

PATTERNS OF BEHAVIOR
Adaptive & Proactive

SYSTEM STRUCTURE AND MENTAL MODELS
Creative & Transformative

MORE LEVERAGE
**CONNECTION CIRCLE**

Use the circle below to map connections within the system.

1. First, list the important elements of the system around the outside of the circle. Keep in mind that your elements should be things that increase or decrease over time in the system.

2. Then use arrows to start mapping the connections between the elements in terms of one causing another to increase or decrease. Remember to:
   a. Use arrows to indicate the “direction” of the relationship (which element is causing, which element is being affected).
   b. Use plus (+) and minus (−) signs near the heads of the arrows to indicate whether the relationship is causing an increase or decrease in the affected element.
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Appendix C

Script Changers
Formal Assessment
Appendix C

SCRIPT CHANGERS ASSESSMENT

Name: ___________________________   Date: ___________________________

1. What is the relationship between the following three things? You can explain your answer in words or pictures.
   (a) studying, (b) grades, and (c) interest in the subject matter.
   Based on your answer, what do you think would happen to studying and grades if your interest in the subject matter went down?

2. Think of an example of a system you are a part of or have observed in your community that is an example of either reinforcing or balancing feedback (or both). Briefly draw a picture or a model of the elements in that community, and explain how those elements interconnect.

   What would happen to the system if one of the elements was removed?
3. Marla was reading a book called The River Ran Wild. The story tells about the Nashua River, which was bright and clean, and had many fish and wildlife living on it. But as a community settled around the river, things began to change. The abundant fish in the river caused more people to come and join the community. As time passed, towns were built, which attracted more people. Mills were built on the river, using the water to power the millwheels, and to take advantage of the fact that there was an existing community that could provide the mill with workers. The rivers were also used as a place to dump mill waste. Eventually these towns grew into cities, which attracted people more quickly than ever, and the increase in people (and thus mills) caused more pollution than ever.

(a) What kind of relationship can we see in this story? What are the elements of the system, how are they interacting, and what are the consequences?

A woman named Marion Stoddard organized her neighbors and her community to try to clean up the Nashua River, even though it seemed like an impossible task. Children brought jars of dirty river water to show to politicians. They told their parents, “We just want this river the way it was when you were kids. You could swim in it. You could fish in it.” Eventually people listened, so laws were passed to stop the paper mills from dumping chemicals and dyes into the river. The people also worked to get the first Clean Water Act passed—in Massachusetts.

(b) What did Marion Stoddard do to change the system? What did she identify as the leverage point? From the perspective of a system, how could you explain how her change impacted the way the system that you described in part A was working?
4. What is the relationship between the amount of grass that is growing in a field, the number of rabbits who live in the area (rabbits eat grass), and the number of wolves in the area (wolves eat rabbits). Explain your answer in either words or pictures.

(a) If someone decided to kill all the wolves, what would happen to the rabbits and the grass?

(b) Is this an example of balancing feedback or reinforcing feedback? (circle the one that is correct)
Design Challenge
One

Scratch Building Blocks Cards

Cut out, fold in half, and laminate for durability
Show and hide a sprite so it only appears when you want.

**SCENE 1:**

![Image of a sprite on a road and building]

**SCENE 2:**

![Image of a building with a sprite]

**GET READY**

Choose at least one sprite:

[Image of a sprite]

**TRY THIS CODE**

Click the A and B buttons to make your sprite show and hide:

- **when b key pressed**
  - show
- **when a key pressed**
  - hide

**DO IT**

- Click the A and B buttons to make your sprite show and hide.

**EXTRA TIP**

Remember if a sprite is hidden at the end of a program, to add a show block at the beginning so it shows when it plays again.

Also, hide and show blocks can be paired with other orange control blocks, like broadcast and receive blocks.

[Image of broadcast and receive blocks]

Original content provided by the Scratch Team from the MIT Media Lab

[http://scratch.mit.edu](http://scratch.mit.edu)
**MOVING ANIMATION**

Animate a character as it moves

**GET READY**

Click to open the sprite library

Choose a sprite that has 2 or more costumes

**TRY THIS CODE**

when [clicked]

forever

next costume

wait (0.5) sec

move 5 steps

if on edge, bounce

**EXTRA TIP**

Does your sprite look upside-down?
You can change its rotation style

Click the

left-right

don’t rotate

all around

http://scratch.mit.edu
Sometimes when you’re telling stories in scratch, you have different scenes and settings in different parts of the story.

**BACKDROP 1:**

![Image](image1.png)

**BACKDROP 2:**

![Image](image2.png)

---

**GET READY**

Click on the “stage” area near where the sprites are located.

**TRY THIS CODE**

`when space key pressed`

`next backdrop`

**DO IT**

Hit the space bar to change your backdrop!

**EXTRA TIP**

Different combinations of the orange “when” control blocks and purple “looks” blocks can also make backdrop changes happen!

`when this sprite clicked`

`next backdrop`

`when I receive Got!`

`switch backdrop to brick wall!`

---

http://scratch.mit.edu
**GLIDE**

**Move smoothly from one point to another**

http://scratch.mit.edu

---

**GET READY**

- Import a costume or paint your own

---

**TRY THIS CODE**

- Try different numbers
  - Horizontal position: 
  - Vertical position: 

**DO IT**

- Click on the green flag to start

---

**EXTRA TIP**

- To see a sprite’s x and y position
  - The x position is shown here
  - Here are the x and y positions on the stage

Original content provided by the Scratch Team from the MIT Media Lab
Hey! I didn't know hippos could fly!

What do you want your sprite to say?

http://scratch.mit.edu

Original content provided by the Scratch Team from the MIT Media Lab.
Use broadcast and receive blocks to make sprites have a conversation.

Hey!!

Hi! How are you?

Try this code:
- When the green flag is clicked, say "Hey!!" for 3 seconds.
- When an object receives "Say Hi", broadcast "Hi! How are you?" and wait.

Do it: Press the green flag to watch the story unfold!

Extra tip:
Use the drop-down menu in the broadcast block to create new commands that can be linked to other scripts. You can also use broadcast blocks to change a sprite’s costume, change backdrops, or to start a different set of scripts you’ve set up.

http://scratch.mit.edu
You can create a new Sprite by:
- Drawing your own Sprite.
- Using a Sprite from the existing library.
- Importing your favorite pictures, or even using a webcam to create a character.

Add any character to your project.

http://scratch.mit.edu
Duplicate a costume

Use the paint tools to make the new costume look different

GET READY

TRY THIS CODE

DO IT

Click on the green flag to start

Make a simple animation

ANIMATE IT

http://scratch.mit.edu

Original content provided by the Scratch Team from the MIT Media Lab
Appendix D

Systems Thinking
Concept Cards
SYSTEMS THINKING CONCEPT CARDS: SCRIPT CHANGERS

01.
IDENTIFYING A SYSTEM

Identifying a system and distinguishing it from other kinds of things that aren’t systems. Specifically, a system is a collection of two or more elements and processes that interconnect to function as a whole. Speed and comfort in a car, for example, are created by the interactions of the car’s parts and thus are “greater than the sum” of all separate parts of the car. The way a system works is not the result of a single part but is produced by the interaction among the elements and/or individual agents within it. A key way to differentiate things that are systems from things that aren’t is to consider whether the overall way something works in the world will change if you remove one part of it.

02.
IDENTIFY THE WAY A SYSTEM IS FUNCTIONING

The function of a system describes the overall behavior of the system—what it is doing or where it’s going over time. A system’s function might emerge naturally based on interconnections among elements, or it might be the result of an intentional design (in which case, we might also refer to the function of a system as its goal). Regardless, the function of a system is the result of the dynamics that occur among elements’ interconnected behaviors.

03.
DISTINGUISHING THE GOAL OF A SYSTEM

The goal of the system is what it was intentionally designed to do. Sometimes this might be the same as the functioning of the system, other times the goal and the function are not aligned. A given system might have multiple goals or purposes that are at play simultaneously and sometimes come into conflict. Being able to understand a system’s purpose or goal gives a sense of its ideal state from a particular perspective.

04.
IDENTIFYING ELEMENTS

Identifying the parts of a system that contribute to its functioning. Elements have certain qualities and/or behaviors that determine how they interconnect with other elements, as well as define their role in the system. Without being able to effectively identify the parts of a system, it’s hard to understand how a system is actually functioning and how it might be changed.

05.
IDENTIFYING BEHAVIORS

Identifying the specific actions, roles, or behaviors that a component of a system displays under various conditions. Being able to identify behaviors becomes important when we change systems, as often a component will look the same after the change, but its behavior will be different.
06. IDENTIFYING INTERCONNECTIONS

Identifying the different ways that a system’s parts, or elements, interact with each other through their behaviors, and through those interactions, change the behaviors of other elements.

07. PERCEIVING DYNAMICS

Perceiving a system’s dynamics involves looking at a higher level at how the system works. Dynamics in a system are often characterized by circles—patterns that “feed back” on another. These are called feedback loops.

08. CONSIDERING THE ROLE OF SYSTEM STRUCTURE

Understanding how a system’s elements are set up in relation to one another gives insight into the behavior of a component. A system’s structure affects the behaviors of its elements and the overall dynamics and functioning of a system. For instance, how a city’s highway system is structured affects overall traffic patterns and car movement within it. Being able to see a system’s structure gives insights into the mechanisms and relationships that are at the core of a system, which can be leveraged to create systemic changes.

09. MAKING SYSTEMS VISIBLE

When we learn to “make the system visible”—whether modeling a system on the back of a napkin, through a computer simulation, a game, a picture, a diagram, a set of mathematical computations, or a story—we can use these representations to communicate about how things work. At their best, good pictures of systems help both the creator and the “reader” or “audience” to understand not only the parts of the system (the elements), but also how those elements work together to produce a whole.

10. SYSTEMS DIAGRAM

This diagram is used to visualize the dynamics that occur between elements in a system, intended to capture how the variables interrelate. One way of diagramming a feedback loop uses an “R” with a clockwise arrow around it to indicate a reinforcing feedback loop. A “B” with a counterclockwise arrow around it would indicate a balancing feedback loop, which “counters” something in a system. The plus sign indicates an increase in that amount of a component in a system, and a minus sign indicates a decrease in the amount of a component in a system. There are other ways to create systems diagrams, but the most important thing about a good systems diagram is that it not only shows the elements in a system, but is able to show the relationships between the elements through the arrows, symbols, and text.

11. FEEDBACK LOOPS

Relationships between two or more elements of a system, where actions by these elements interact in a circular fashion: something that element A does affects element B, which then circles back and affects element A. There are two types of feedback loops, balancing and reinforcing.
### REINFORCING FEEDBACK LOOPS

Relationships where two or more elements of a system cause each other to increase, such as in escalation cycles, or decrease, such in resource drain cycles, in a way that’s “out of control” or creates a “snowball effect.” Reinforcing loops encourage a system to reproduce certain behaviors, though these behaviors always “exhaust” themselves after the resources fueling the growth or diminishment run out. This is also called “limits to growth.” There are two types of reinforcing feedback loops: “vicious” cycles and “virtuous” cycles.

### VICIOUS CYCLE

Reinforcing feedback loops that cause a negative outcome in terms of the perceived goal of the system. One thing to keep in mind is that the same thing might be a vicious cycle to one person, but a virtuous cycle for another person who has different goals.

### VIRTUOUS CYCLES

Reinforcing feedback loops that cause a positive outcome in terms the perceived goal of the system. One thing to keep in mind is that the same thing might be a virtuous cycle to one person, but a vicious cycle for another person who has different goals.

### BALANCING FEEDBACK LOOPS

Relationships where two or more elements of a system keep each other in balance, with one (or more) elements leading to increase, and one (or more) elements leading to decrease. These processes keep a system at the desired state of equilibrium, the system goal. Usually, balancing feedback processes stabilize systems by limiting or preventing certain processes from happening. Having a sense of how balancing feedback loops operate can give a person a sense of what will make a system stable.

### STOCKS & FLOWS

Stocks are an accumulated amount of something within a system (like money in a bank account, fish in a pond, trees in a forest, or jobs in an economy), and flows are the rate at which stocks in a system change either through increasing or decreasing (money comes in and out of a bank account due to wages paid, interest, and purchases. Fish come in and out of a pond due to birth rates, death rates, and fishing rates, etc.). Stocks are always nouns; they’re the “stuff” of systems, while flows are always verbs; they’re the “movement” of systems. Understanding stocks and flows gives someone an insight into how different parts of the system change over time.

### LIMITED RESOURCES

In any system, it is important to understand which resources are finite, ones that will run out at a certain point. Keeping in mind which resources are limited helps people make decisions about how best to maximize resources.
18. NESTED SYSTEMS

Systems that are a smaller part of other systems. Almost all systems are nested within larger systems. With nested systems, a larger system will affect the way that a subsystem behaves, and the subsystem will affect the way that the larger system behaves. Having a sense of nested systems helps people keep an eye on how systems interconnect and are always part of bigger pictures.

19. DYNAMIC EQUILIBRIUM

A state in which stocks and flows are balanced so the system is not varying widely, but still has internal dynamic processes that are continually in flux even though the system is stable overall. For example: in economics dynamic equilibrium might be used to talk about the constant flux of money movement in otherwise stable markets; in ecology, a population of organisms stabilizes when birth rate and death rate are in balance.

20. DESIGNING A SYSTEM

Creating a system through engaging in an iterative design process, one that entails iterative cycles of feedback, troubleshooting, and testing. One of the most effective means of developing systems thinking is to regularly create and iterate on the design of systems, and doing so in a way that creates opportunities for students to think about generic systems models that apply across multiple domains and settings.

21. FIXES THAT FAIL

Any kind of solution to a problem that fixes the problem temporarily but fails to fix it in the long term, and might even make it worse over time. Fixes that Fail are often put in place quickly, usually without much reflection on what consequences they’ll have for the system. They’re important to see since they’re often the ways that people respond to problems in a system.

22. LEVERAGE POINTS

Particular places within a system where a small shift in one thing can produce big changes in everything. Leverage points are difficult to find because they often lie far away from either the problem or the obvious solution. It is because of the multitude of cause and effect relationships, feedback loops, and system structures that a seemingly small change can be amplified, often in unexpected ways. Not every place in a system is a leverage point—sometimes changing one thing in a system will produce only small effects not felt throughout the system. Leverage points are important since they let us know where to focus our energies when we try to change systems.

22. UNINTENDED CONSEQUENCES

The unexpected result of an action taken in a system that the actor taking that original action did not want to happen. Unintended Consequences are often the result of fixes that fail or someone aiming to find a leverage point in a system but not considering long-term implications to those actions—someone failed to keep in mind time horizons. Having a good sense of potential unintended consequences means that someone will carefully consider before too hastily intervening in a system.
23. CONSIDERING HOW MENTAL MODELS SHAPE ACTION IN A SYSTEM

The ability to consider the assumptions, ideas, and intentions that a given actor might have in relation to a system, and how these affect that actor’s behavior within the system. Mental models are often correct about what elements are included in a system, but frequently draw wrong conclusions about a system’s overall behavior.

24. LOOKING AT A SYSTEM FROM MULTIPLE PERSPECTIVES

The ability to understand that different actors in a system will have different mental models of the system and consider each of these perspectives when engaging in action within a system. This is also called “thinking across the table.”

25. CONSIDERING MULTIPLE LEVELS OF PERSPECTIVE

The ability to move fluidly between different levels of perspective within a system, from events, to patterns to system structures, to mental models. The most visible level of systems are events, visible instances of elements interacting in a system. Using the metaphor of a system as an iceberg, events are “above the waterline” – they’re easy to see. When we start to think “below the waterline,” we start to see three other levels of perspective: patterns (recurring sets of events), structures (ways the elements are set up in a system which give rise to regular patterns), and mental models (which shape systems structures). Switching between different levels of perspective when looking at a system deepens understanding of how a system operates.

26. TIME DELAYS

The time lag between an action in a system and the evidence of its effects. For example, there’s a long delay between the point when you plant a seed in the ground and the appearance of a fruit-bearing tree.

27. TIME HORIZONS

The overall period of time that you look at something in order to understand it. For example, if we only look a complex system like an economy for a short period of time, we might misunderstand how it’s behaving and miss the effects of actions taken far into the past.
Appendix E

Script Changers Challenge Cards
UNDERSTANDING SYSTEMS: DIGITAL DESIGN FOR A COMPLEX WORLD

SCRIPT CHANGERS CHALLENGE CARDS

Script Changers Challenge Cards make your students take their Scratch coding to the next level! Each of the challenges offers inspiration for open-ended projects and offers hints that will help them dive right in. Challenges are rated from easy to hardcore and come with some hints to help get things started. Use with youth that come early to meetings or classes, have an extra lunch break and want to go deeper, or for youth that finish early during group projects.

OVERVIEW
This deck contains 4 different categories of challenges from which to pick:

CATEGORIES
GOING DEEP IN SCRATCH
All of these challenges aim to extend and deepen skills and areas of Scratch that youth might not explore through the storytelling activities included in the book.

BE A FAN!
All of these challenges aim to have youth bring in their existing interests in pop culture to create fan-based projects in Scratch that make them think about existing stories and characters in new ways.

REMIXING SCRATCH PROJECTS
All of these challenges aim to have young people learn to remix and appropriate parts of existing Scratch projects that they find in the Scratch online community.

A NEW CHAPTER
All of these challenges aim to have young people create new kinds of stories. They can be used with Scratch, but also with other storytelling platforms including film, audio/podcasting, comics and other multimedia storytelling tools.

LEVELS
- EASY
- MEDIUM
- HARD
- HARDCORE
**01 DANCE PARTY**

**LEVEL**
EASY

**CATEGORY**
GOING DEEP IN SCRATCH

Create a project that has characters dancing to music.

**EXPLANATION**
Scratch can be great for bringing together character movement with music. Using certain blocks, it’s possible to create a Scratch “dance party.”

**HINTS**
Write your own music using the SOUNDS blocks. You can also import music files under the “Sounds” tab on a sprite or on the stage. Use combinations of costumes, LOOKS and/or MOTION blocks to make your sprites dance.

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**02 FRIENDLY STORY**

**LEVEL**
MEDIUM

**CATEGORY**
GOING DEEP IN SCRATCH

Write a short story that involves two characters. Ask a friend or two to help you record the dialogue.

**EXPLANATION**
You can collaboratively create stories in Scratch by getting your friends involved. You can act as a director, asking them to do multiple recordings until you get the dialogue to sound just the way you want.

**HINTS**
Find a nice quiet place to record so that your friends’ voices will come through. A good approach is to create a separate sound file for each line of the dialogue so that you can easily manipulate the timing of specific parts of the dialogue with the “play sound until done” block.

---

**03 DRAW SOMETHING**

**LEVEL**
EASY

**CATEGORY**
GOING DEEP IN SCRATCH

Create a project using Sprites that you only draw yourself.

**EXPLANATION**
It’s pretty easy to create a project in Scratch using things from the Scratch library, but can you do it by drawing the sprites yourself?

**HINTS**
You can use the “Paint new sprite” button for this challenge, but if drawing on the computer isn’t your thing, you can draw on paper and then scan or take a digital picture of your drawing to import it into Scratch. This is actually what professional animators do!
04 CLASSIC ARCADE

LEVEL HARD

CATEGORY GOING DEEP IN SCRATCH

Re-create a classic arcade game like PacMan, Pong, or Space Invaders in Scratch.

EXPLANATION
See if you’re able to think through the rules and design of a classic arcade game, and make a version of it in Scratch. If you’ve never played one or it’s been a long time, search the web or look at example projects in the Scratch community.

HINTS
The CONTROL and EVENTS blocks are really helpful when making games. Use the “when _____key pressed” blocks in conjunction with MOTION blocks to create a Sprite that you can move around with your arrow keys. The SENSING blocks are also useful in games, particularly the “touching color ____” blocks.

05 AMAZING MAZES

LEVEL HARD

CATEGORY GOING DEEP IN SCRATCH

Create a maze game in Scratch.

EXPLANATION
Scratch lets you create games, see if you’re able to think up an idea for a game that involves making your way through mazes.

HINTS
The CONTROL, EVENTS and SENSING blocks are really helpful when making games. Use the “when _____key pressed” blocks in conjunction with MOTION blocks to create a character that you can move around, and the “touching color ____” and “forever if” blocks to create the conditions so that your character can’t move across walls.

06 NEVER ENDING STORY

LEVEL MEDIUM

CATEGORY GOING DEEP IN SCRATCH

Make a story in Scratch that never ends.

EXPLANATION
First, come up with a story whose ending could cause the whole story to start again. Then figure out a way to make that actually happen in Scratch, so that when the last scene in the story happens, it loops back to the beginning, and the whole thing keeps repeating itself.

HINTS
Use the “broadcast” and “receive” EVENTS blocks to create a sequence of steps. Then have the last step link to the first to create a loop. You can also use a combination of change costume blocks, like “next costume,” with a “forever” block to get the same effect.
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**Make a Scratch project that involves the “pick random __ to __” block in some way.**

**EXPLANATION**
Most Scratch projects play out exactly as you program them. But what if you added in some randomness? See if you can find a creative way to integrate the “pick random” block into a Scratch project.

**HINTS**
Think about how randomness can be applied in a Scratch project (e.g., a Magic 8-Ball). What sorts of things might be able to change randomly? Costumes? Movements? The appearance of sprites? The “pick random” block found in the OPERATORS palette can be inserted anytime you see an oval shape. Try using it in one of your existing projects inside one of your MOTION or CONTROL blocks. Also try adding it to your LOOKS and SOUND blocks too to see what happens!

**Make a Scratch project that acts like an “etch-a-sketch” allows a user to draw things using the arrow keys.**

**EXPLANATION**
The old etch-a-sketch was fun because it gave its user a very limited tool that actually made it a little difficult to draw, but when you did draw something it was that much more exciting when it turned out well. Can you recreate this sort of tool and experience in Scratch?

**HINTS**
Head onto the Scratch community to see how others have incorporated this sort of functionality into their projects. Draw inspiration, and get started on your own!

**Create a Scratch project that makes a user move their body to interact with it.**

**EXPLANATION**
Scratch’s “video” SENSING block allows you to use a webcam to sense a user’s movements. Use this block to make a whole new type of creative Scratch project.

**HINTS**
Try PEN blocks in combination with MOVEMENT blocks as the basis for a project like this. “Pen down” will need to be used every time you want to start drawing. Use the “clear” block to clear your screen and the other blocks to control the look of your pen marks.
**10 KALEIDOSCOPE**

**LEVEL**
HARDCORE

**CATEGORY**
GOING DEEP IN SCRATCH

Make a Scratch project that acts like a kaleidoscope to make new patterns depending on what the user does.

**EXPLANATION**
Kaleidoscopes combine many overlapping colors and movement in order to create a dazzling visual experience. Can you create an experience like this in Scratch?

**HINTS**
Use multiple sprites that have PEN blocks in them in combination with MOTION blocks as the basis for a project like this. “Forever if” blocks are helpful to create smooth drawings. Alternatively, try using your "Duplicate" button at the top of the screen to create multiple sprites that act the same way when keys are pressed or the mouse is moved.

**11 TYPEWRITER**

**LEVEL**
HARDCORE

**CATEGORY**
GOING DEEP IN SCRATCH

Make a Scratch project that reproduces the function of a typewriter by using the keyboard to input and edit text.

**EXPLANATION**
You might be used to using word processing programs to create text on a screen, but can you make a Scratch project that does this?

**HINTS**
Think about how the “stamp,” “costume switch,” and MOTION blocks might be used together in this kind of project.

**12 SWEET MUSIC**

**LEVEL**
HARDCORE

**CATEGORY**
GOING DEEP IN SCRATCH

Create a musical instrument in Scratch

**EXPLANATION**
Scratch’s SOUND blocks offer a lot of options that can let someone make a musical instrument.

**HINTS**
Create existing instruments (e.g., a piano or trumpet) or come up with entirely new ones!
13 BLOG IT!

**LEVEL**
MEDIUM

**CATEGORY**
GOING DEEP IN SCRATCH

Share your project in the Scratch online community and then embed, email, or link to your project on your blog or other social network.

**EXPLANATION**
Being able to repost your projects to communities outside of the Scratch website is one of the great parts of the Scratch online community. Give it a try to see if you can get some cross-traffic to view your project!

**HINTS**
Check out the “Link to the Project” on your project’s webpage in Scratch. The code is provided to embed your project as an image or an applet. You can also bookmark your project here too.

14 THAT SCENE...

**LEVEL**
MEDIUM

**CATEGORY**
BE A FAN!

Are you a fan? Recreate your favorite scene and even add yourself!

**EXPLANATION**
Create a project that recreates one of your favorite scenes or interactions from a book, comic, video game, TV show, graphic novel, or movie that you like.

**HINTS**
Consider what it is about that scene or interaction that makes you like it so much. Is there a way to get those aspects into Scratch, even if it’s not possible to totally recreate the whole thing? Take a picture of yourself in Scratch or import one from your computer’s hard drive to add yourself to the scene.

15 FANFIC IN SCRATCH

**LEVEL**
MEDIUM

**CATEGORY**
BE A FAN!

Create a project that involves a character that you like and tells a story about a new situation they find themselves in.

**EXPLANATION**
Characters that you love don’t have to stay in the books, movies, or games where you found them. In this project you can be a super fan by extending the storyline and imagining new situations. This is commonly called “fan-fiction” and there are many different Internet sites devoted to fanfiction writers.

**HINTS**
Think about how that character has acted in the past and use that to imagine what sorts of ways he or she (or it!) would act in a new situation.
Create a project that involves characters from two different books, comics, video games, TV shows, graphic novels or movies.

**EXPLANATION**
Find two characters from separate television shows, video games, books, comics, graphic novels or movies that you’re a fan of and make a story where they interact.

**HINTS**
Think about how those characters have acted in the past and use that to imagine what sorts of ways they might act if they encountered each other in a new situation.

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Create a project that has sprites whose costumes only come from images on the web.

**EXPLANATION**
Don’t use sprites from Scratch for this one; instead, mash up images that you find on the Internet to create unique characters.

**HINTS**
If it’s available, using image-editing software like Adobe Photoshop or Aviary.com can make it easier to combine different images from the web.

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Create a project that tells part of the story of a video game that you play.

**EXPLANATION**
Think about a game that you like and what kind of storyline it has around it. Can you take a part of that story and bring it into Scratch?

**HINTS**
Do a search on the web (try Google Images) to see if you can import characters (look for sprite sheets) and backgrounds from the actual game into your project. To delete a solid area in Scratch, click the color area that looks like a white and gray checkered pattern and then choose the fill tool.
19
COSTUME SWAP

LEVEL
EASY

CATEGORY
REMIXING SCRATCH PROJECTS

Take an existing Scratch project and modify its sprites in an interesting way to create an entirely new project.

EXPLANATION
Head to the Scratch example project library or to the online community and find a project that catches your eye. Swap out the sprites and replace them with ones that change the original project in an interesting or funny way.

HINTS
Think about how the meaning and experience of the original project changes when you change visual elements. Does any part of the project stop working or making sense? In what way? How could you fix it? Remember to give your project a new title when you save it.

20
FRANKENSTEIN

LEVEL
HARDCORE

CATEGORY
REMIXING SCRATCH PROJECTS

“Mash up” or combine two existing Scratch projects to create a third.

EXPLANATION
Head to the Scratch example projects library or to the online community and find two projects that you think could be interesting if they were combined in some way. Use the “import project” and/or the “export sprite” functions to bring the content into Scratch and make these two existing projects into something entirely new.

HINTS
There are lots of different things you can reuse from different projects—combinations of scripts, sounds, sprites, specific costumes, backgrounds, and even types of interactions between sprites. Remember to give your project a new title when you save it.

21
BACKWARDS ENGINEERING

LEVEL
MEDIUM TO HARDCORE

CATEGORY
REMIXING SCRATCH PROJECTS

Find an existing Scratch project and “backwards engineer” it—recreate it without looking at its code.

EXPLANATION
Head to the Scratch online community and find a project that catches your eye. Without looking “under the hood” at the project’s code, try to re-create it from the ground up, sprites, sounds, scratch blocks and all.

HINTS
Pay attention to both the look and feel of the project, but also the interactions between sprites that are determined by the blocks. Are you able to make the project look and act the same?
22
I DON’T
LIKE YOUR
RULES

LEVEL
HARD

CATEGORY
REMXING SCRATCH PROJECTS

Take an existing game made in Scratch and change the rules.

EXPLANATION
Either by going to the “Games” folder in the Scratch library or through finding one in the Scratch online community, load a game and change the rules of an existing game.

HINTS
Start with something simple, like Pong or Pacman, and make your way up to more complex games!

23
CHOOSE
YOUR OWN
ADVENTURE

LEVEL
HARD

CATEGORY
A NEW CHAPTER

Create a “Choose Your Own Adventure” Story

EXPLANATION
Choose your own adventure stories create multiple pathways that a “reader” can take as they experience the story, with divergent storylines and even different endings.

HINTS
Think about what kind of things make a newscast look and sound like a newscast. Can you recreate those in your story? What are you doing to make sure the person that experiences it knows that it’s a newscast?

24
NEWSCAST

LEVEL
MEDIUM

CATEGORY
A NEW CHAPTER

Create a story in the form of a newscast.

EXPLANATION
Newscasts are particular types of stories. You can create one about something happening in your neighborhood or in the world, or even something you made up.

HINTS
Before you get started, write out the different pathways and storylines on a draft. Start simple and try to create just one choice in your first story. The different “if” blocks found under the CONTROL palette are helpful for creating choices for your reader. The SENSING block, “ask ______ and wait” combined with the “if __ else__” and “=” block found under the OPERATORS palette can also be helpful for more advanced stories.
25
ALL ABOUT PERSPECTIVE

**LEVEL**
MEDIUM

**CATEGORY**
A NEW CHAPTER

Create a story about one event told from multiple perspectives.

**EXPLANATION**
Every story can be seen from many different perspectives. Create a story that shows how one event can be seen totally differently depending on who you are, where you’re from, or your experience of a certain event.

**HINTS**
Think about situations where people don’t agree about what happened, and how they might have come to see a situation differently. Can you create a story that gives various sides of a situation?

26
WHODUNNIT?

**LEVEL**
MEDIUM

**CATEGORY**
A NEW CHAPTER

Create a story about a mystery that eventually gets solved.

**EXPLANATION**
Make the experience of the story one that has some suspense, and gets the person who sees it to want to know the ending!

**HINTS**
Take inspiration from mystery stories you’ve read — what do the authors do to build suspense?

27
SUPPLY & DEMAND

**LEVEL**
HARD

**CATEGORY**
A NEW CHAPTER

Create a story about something in your local economy that shows how it’s a system.

**EXPLANATION**
All economies are complex systems. Create a story that shows how things like feedback loops, unexpected consequences or leverage points might play out in a local economy, like your neighborhood.

**HINTS**
Think about what kinds of components make up a local economy, like consumers, stores, manufacturers, workers in factories, etc., and what kind of interactions they have with one another. If there is a problem, how would you propose to solve it?
**28**

**GOING GREEN**

**LEVEL**

HARD

**CATEGORY**

A NEW CHAPTER

Create a story about something in the environment that shows how it’s a system.

**EXPLANATION**

The earth’s environment is a complex system. Think up a story that shows how things like feedback loops, unexpected consequences, or leverage points might play out in the environment.

**HINTS**

Think about what kinds of components make up the environment, like animals, plants, water sources, and, of course, human beings, and what kind of interactions they have with one another. Need to know more about different parts of the environment? Do an Internet search to find out more.

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**29**

**MR. SMITH GOES TO WASHINGTON**

**LEVEL**

HARDCORE

**CATEGORY**

A NEW CHAPTER

Create a story about democracy that shows how it’s a system.

**EXPLANATION**

Governments are complex systems. Think up a story that shows how things like feedback loops, unexpected consequences, or leverage points might play out in a democratically-governed country.

**HINTS**

Think about what kinds of components make up a democracy, like voters, elected officials, laws, different branches of government, and what kind of interactions they have with one another. Need to know more about the government? Do an Internet search to find out more about your local or federal government or the government in another part of the world.

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**30**

**YOU NEVER STEP IN THE SAME RIVER TWICE**

**LEVEL**

HARDCORE

**CATEGORY**

A NEW CHAPTER

Create a story in Scratch that plays out differently every time someone reads it.

**EXPLANATION**

Interactive stories don’t always have to play out in the same way — make a project that has multiple ways that it unfolds.

**HINTS**

Figure out how to use the “pick random” block in order to work on this challenge.
31 THROUGH YOUR LENS

Create a story that integrates pictures you took around your neighborhood.

EXPLANATION
Sometimes having real life pictures can show someone something that might be hard to convey just in words. Take pictures from where you live, and think about how they can help you tell a story.

HINTS
Think about the relationship between an image and the words that you’re layering on top of it, and how this might create something that neither could achieve on their own. You might also want to try to take pictures at various distances from the object you’re photographing and experiment with them in Scratch.

32 PSA

Create a story that’s in the style of a “Public Service Announcement,” or PSA.

EXPLANATION
A PSA is a message on TV, billboards, or other media (e.g., “Say No to Drugs!”) to help raise awareness and change public attitudes or behavior. Think of some kind of issue that you think the public should be better informed about and create a PSA around it. Aim to inform and empower; avoid scaring your viewers.

HINTS
Be sure to research your issue so that you’re giving people accurate information!