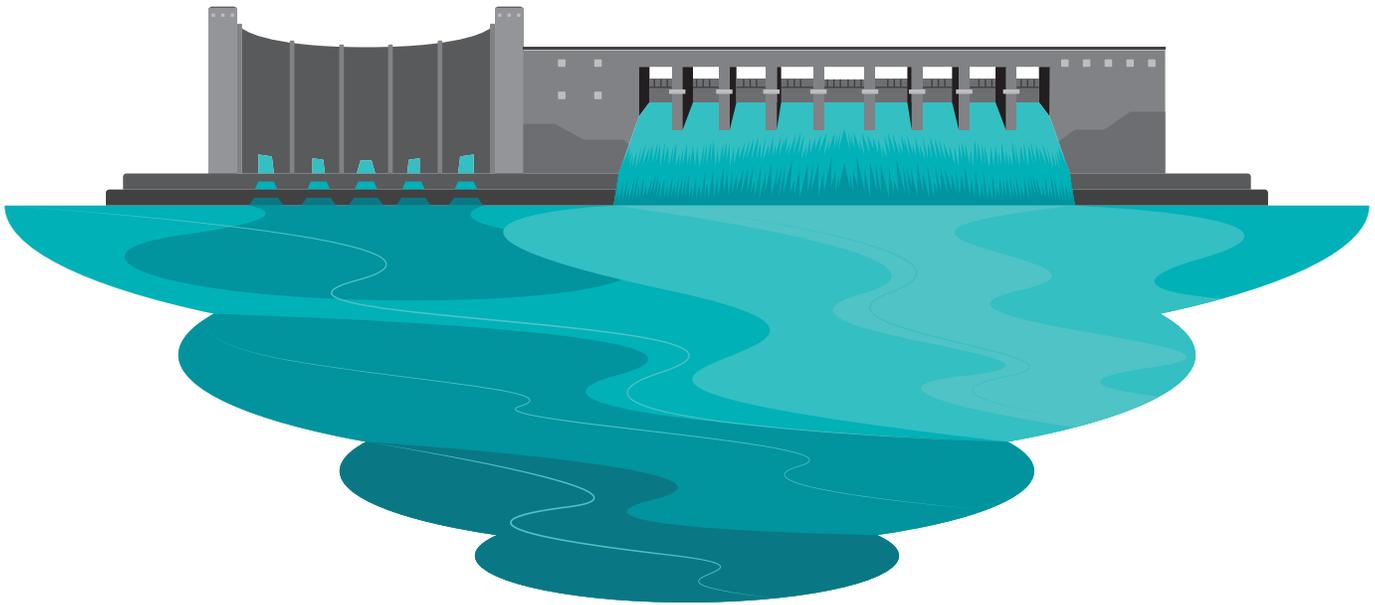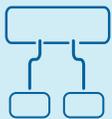# Responsible Reservoirs

The Tech Interactive at Home

Who says all the fun has to happen at The Tech Interactive? This computational thinking activity will expand your problem-solving skills and can be done anywhere!

Introduction

Decisions about the environment are never easy. There are many factors involved that offer benefits and drawbacks. For example, although riding public transportation is beneficial to the environment, it can be inconvenient and costly. In this activity, you'll play a game that shows this complicated cause and effect relationship in action. You'll use decomposition to see what happens to two towns, one that has a hydroelectric dam and one that does not. By the end of the game, you'll have to make a decision for yourself. Dam or no dam?

Subject:
Environmental Science

Age:
10+

Time:
20+ minutes

Key Concepts:
Computational thinking, decomposition, cause and effect, human and environment interaction, hydroelectric power

Decomposition is when you break down problems into smaller manageable problems. Decomposition is a problem-solving skill used a lot in computational thinking and computer science.

Real-World Examples

- When you clean your room, you might organize it into categories or areas to clean: clothes, books, toys, etc.

- When you plan a vacation, you might break down the tasks that need to be done for your vacation: choose dates, book flights, plan activities, etc.

- When making an environmental decision, you might look at the different factors involved: weather, population, natural disasters, cost, human activity, reliability, etc.

The Tech Academies

Materials

- Pencil or pen
- Game Score, to keep track of events/data
- Scenario cards
- Tokens (these can be anything: beans, coins, paper clips, etc.)

Instructions

Scenario

You are the mayor of a growing town that is considering building a dam to generate hydropower, but you don't have enough information to make a decision. Play the Responsible Reservoirs game to help you understand the environmental and human factors involved in such a decision. After playing the game and seeing the experiences of two other towns, you will make a decision that you believe will have the best outcome for your town.

Goal

Observe the effects of natural and human activity to decide whether a dam is beneficial to your town.

Game Set Up

1. Find someone to play with (family member, friend), in person or virtually.
2. Decide who will be Town A and Town B. You can flip a coin to decide!
3. Each player starts with 5 tokens.
4. During game play, players will exchange tokens with their partners.

Play and Reflect

1. Player 1 draws a scenario card and reads the scenario. Take or give a token to Player 2 based on the results. Write the results on the Game Score.
2. Player 2 draws a scenario card and reads the scenario. Take or give a token to Player 1 based on the results. Mark the results on the Game Score.
3. Repeat steps 1 & 2 until all scenario cards are played.
4. Compare how many tokens you and your partner ended up with.
5. Reread/review the scenario cards.
6. Use the reflection questions on the Game Score to discuss what happened and what events led to the result.
7. As mayor, what would you decide for your town? Talk to your friend or family member about your decision.

Sample "Responsible Reservoirs" Game Score		
	Player 1 **Town A** **Has a Dam** __Funky Town__ **(name of town)**	**Player 2** **Town B** **Does Not Have a Dam** __Mos Eisley__ **(name of town)**
Start	5 tokens	5 tokens
Scenario 1: __Drought__	*Plenty of water when there's a drought* *(5+1 tokens)* **6 tokens**	*No water saved up during a drought* *(5-1 tokens)* **4 tokens**

Keep Playing

Use one of these options to keep playing the game.
- Make more cards with different scenarios for the towns based on research of the effects of hydroelectric dams.
- Play a similar game on Scratch! See if you can alter the code to make your own computer program to demonstrate cause and effect!

Explore More

- As mayor, you have made your decision and are ready to present it at a town meeting. You know some people may disagree with your decision. How can you convince them to support you? Which scenario cards would you use to persuade others? Use your findings to make a video, poster or speech to gain support.
- Research water systems near you. Is there hydropower on any rivers or dams in your community? If so, how has it impacted the town and environment? To start learning more about Hydropower check out this video.

In collaboration with

SJSU | COLLEGE OF SCIENCE

The Tech Academies

The Tech Interactive at Home

thetech.org/athome

Responsible Reservoirs Game

Game Score		
 (water drops image)	**Player 1** **Town A** **Has a Dam** _____ **(name of town)**	**Player 2** **Town B** **Does Not Have a Dam** _____ **(name of town)**
Start	5 tokens	5 tokens
Scenario 1: _____		
Scenario 2: _____		
Scenario 3: _____		
Scenario 4: _____		
Scenario 5: _____		
Scenario 6: _____		
End **How many tokens remain?**		

Reflection

After playing, discuss the reflection questions with your partner.

- Is there a way to "win" at this game? Why or why not?

- How would the environmental factors affect your decision to build a dam?

- How would the human factors affect your decision to build a dam?

	(Circle one)	
Decide: As mayor would you build a dam in your town?	YES	NO
What are the factors you considered as you made your decision?	□ Weather Conditions □ Tourism □ Food	□ Population □ Natural Disasters □ Other _____

- Why did you decide to build a dam (or not)?

- How does your decision affect wildlife? How do your decisions affect the lifestyle of your residents?

- What would your perspective be if you were a contractor, civil engineer, farmer, or resident of the town? What factors might be most important to you?

Scenario Cards

Town A: (dam) There is a **drought**, but the community has plenty of water stored.
➕ **(take a token)**

Town B: (no dam) No water saved up.
➖ **(give a token)**

Town A: (dam) There's so much **rain**! You have to release more water from the reservoir and it floods the town.
➖ **(give a token)**

Town B: (no dam) The river carries the water away with no flooding.
➕ **(take a token)**

Town A: (dam) Tourists enjoy the lake created by the dam for **water sports** like jet skis
➕ **(take a token).**

Town B: (no dam) There is no lake for tourists to enjoy.
➖ **(give a token)**

Town A: (dam) There isn't enough water in the river for **trout or salmon**.
➖ **(give a token)**

Town B: (no dam) There is plenty of water in the river for trout and salmon.
➕ **(take a token)**

Town A: (dam) The **population** of your town is growing and you need to restructure your power grid. The dam produces enough electricity to make this happen.
➕ **(take a token)**

Town B: (no dam) You are unable to restructure your power grid to provide efficient energy for your growing population.
➖ **(give a token)**

Town A: (dam) An **earthquake** has damaged the dam and water is spilling out, endangering your town's buildings.
➖ **(give a token)**

Town B: (no dam) Your town is safe because the river is not greatly affected by the earthquake.
➕ **(take a token)**