

Hazard Literacy Center

Hazard Literacy Education Program

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In the Wake of the Typhoon: Who Recovers First?



1. Program Overview

This education program treats a typhoon disaster not merely as a natural phenomenon but as a matter of decision-making in which the chances of recovery differ according to whom limited resources are allocated to "first" during the post-damage recovery process. It focuses in particular on the point that, even when the same typhoon passes through, the speed and level of recovery can differ according to housing type (apartments, ageing detached houses, semi-basement units, vinyl greenhouses), whether one holds insurance, and one's access to recovery support.

Learners become the recovery command headquarters of the fictional "Typhoon City," taking on the roles of mayor, recovery team leader, finance officer, and citizen representative, and they allocate a limited 100 personnel, a budget of 10 billion won, and 50 pieces of equipment across four affected districts. Through individual decisions and group negotiation, they respond to unexpected events such as a second downpour, media coverage, and budget cuts, and finally they quantitatively calculate each district's "recovery indicator" to determine the outcome. In this process, learners experience the difficulty of just resource allocation and critically reflect on the problem of "just recovery" from the perspectives of environmental justice and disaster justice.

Grade Level	Middle and high school students	Instructional Methods	Lecture, simulation game, group negotiation and debate
Learning Environment	Regular classroom (a space that allows group work)	Duration	150 minutes total (50 min × 3 sessions)
Required Materials	Activity sheets; writing tools; sets of district, role, and event cards; a resource-allocation board; a recovery-indicator scoring sheet; (optional) smart devices and slides		

2. Learning Objectives (Hazards Literacy Framework)

① Understand the causes and progression of typhoons, and explain the relationship between rising sea-surface temperatures and typhoon intensity on the basis of scientific evidence.

② Compare domestic and overseas cases of typhoon damage to analyse how, even in the same typhoon, damage and recovery appear differently according to housing type, insurance, and access to recovery support.

③ In a simulation game that allocates limited recovery resources across four districts-passing through individual decisions, group negotiation, and responses to unexpected events-experience the difficulty of just decision-making.

④ Analyse the game outcome (the recovery indicator) to understand the problem of inequality in the recovery process from the perspective of disaster justice, and propose rules to protect the disaster-vulnerable.

Learning Objectives	Knowledge & Understanding		Reasoning & Skills					Values & Attitudes			Psychology & Emotion			Behavioral & Practical Enagement		
	A1	A2	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	E1	E2	E3
Objective ①	O	O	O													
Objective ②		O		O	O			O								
Objective ③						O	O		O			O	O	O		
Objective ④									O		O				O	O

3. Key Concpets

- How typhoons form (sea-surface temperature, atmospheric circulation, track) and how they progress
- The cause-process-result-recovery structure of a disaster
- Spatial and class-based differences in disaster damage and recovery
- Disaster vulnerability and socio-economic conditions (housing type, insurance, social networks)
- The justice of allocating scarce resources (the tension among efficiency, equity, and speed)
- Disaster justice and "just recovery"
- Becoming aware of one's priority of values through a decision-making simulation

4. Program Sequence

Learning Activities	
Introduction	·Watch part of a Hurricane Katrina documentary (When the Levees Broke, 2006) and record the decisive factor that separated those who left from those who stayed in the same city. ·Pose the questions: "Are the people who bear responsibility and the people who suffer harm the same?" and "Who recovers first?" ·- Guide learners to see a typhoon disaster as a social and structural problem beyond a natural phenomenon.
Activity1	·Using IPCC AR6 and Korea Meteorological Administration materials, confirm the relationship between sea-surface temperature and typhoon intensity and summarise it in one sentence. ·Read the four district cards of Typhoon City (scale of damage, social vulnerability, insurance, standard recovery need) and record what looks most unfair. ·After briefing on the resources (personnel 100, budget 100, equipment 50) and the allocation rules, each learner writes an intuition-based first allocation.
Activity2	·Divide the roles (mayor, recovery team leader, finance officer, citizen representative) and move from individual allocation → group negotiation → consensus proposal. ·Draw an event card and readjust resources to fit the changed situation. ·Use the recovery-indicator formula to obtain each district's recovery score and assign a High/Medium/Low rating.
Wrap-up	·Gather the group results to identify the "least-recovered district," and interpret its cause as a social and structural problem rather than an individual one. ·Compare the outcomes of efficiency-oriented and equity-oriented allocation, and propose "rules to protect the disaster-vulnerable" for the next disaster.

5. Theoretical Background and Activity Design for Disaster Education

Korea is affected by typhoons every summer and early autumn, and casualties and property damage from strong winds and concentrated rainfall recur. Recently, rising sea-surface temperatures and the effects of climate change have been reported to increase typhoon intensity and the variability of typhoon tracks. The IPCC Sixth Assessment Synthesis Report (2023) states that over the past 40 years the proportion of intense tropical cyclones in the major categories (Category 3-5) has increased (likely), that the proportion and maximum wind speeds of intense tropical cyclones are rising (high confidence), and that human-induced climate change is increasing the heavy rainfall that accompanies typhoons (high confidence). The WMO's State of the Global Climate 2024 (2025) likewise reports that 2024 was the first year in which the global mean temperature exceeded 1.5°C above pre-industrial levels (1.55±0.13°C, the highest in 175 years of observation) and that disasters such as typhoons and floods produced the largest number of displaced people in the past 16 years. The case of Typhoon Yagi in 2024, which left great damage in Vietnam, the Philippines, and southern China, illustrates this trend.

Yet the burden of climate change is not distributed evenly. The IPCC AR6 Synthesis Report (2023) reports that roughly 3.3 to 3.6 billion people live in contexts highly vulnerable to climate change, and that between 2010 and 2020 the mortality rate from floods, droughts, and storms was about 15 times higher in highly vulnerable regions than in less vulnerable ones (high confidence). This shows that the consequences of a disaster are not a natural accident but a product of social conditions.

Disaster research has emphasised that not only "differences in damage" but the "difference in recovery" itself is both a consequence of social inequality and a process that reinforces it (Tierney, 2014). Through a synthesis of sociological research, Fothergill and Peek (2004) showed that a disaster is not an "occasion of equality" that levels all members, but that-owing to the location and form of one's residence, building structure, social exclusion, and the like-the poor suffer greater harm at every phase of a disaster (preparedness, response, recovery, reconstruction). Such inequality in recovery can be interpreted from the perspective of disaster justice, which encompasses distributive, procedural, and interactional dimensions (Lukasiewicz & Baldwin, 2014); and the way the chaos immediately following a disaster concentrates resources on the visible and politically powerful also connects with Klein's (2007) discussion.

- The logic behind the game's numbers

- This game translates the theory above into a quantitative decision-making problem. First, the sum of the four districts' standard recovery needs (personnel 120, budget 120, equipment 60) is set at about 1.2 times the available resources (100, 100, 50), so that meeting every district to the standard is fundamentally impossible (enforced scarcity). Second, a self-recovery adjustment (A ?15 / B +10 / C ?5 / D +15) is applied to reflect the reality that "the same resources yield different degrees of recovery." The most vulnerable District A (semi-basement and rooftop units) has weak insurance and social networks, so it recovers more slowly with the same support and needs more resources to reach the same result. Third, as a consequence, if one allocates "efficiently" on the basis of the visible scale of damage or economic ripple effects alone, District A is pushed to the back of the queue and reaches a Low recovery rating; whereas if one guarantees the vulnerable districts to the standard and economises on districts with ample self-recovery capacity, the whole reaches recovery. Through this contrast, learners become aware of how "efficient intuition" reproduces inequality, and they understand that equity differs from mere equal distribution (equality).

6. Instructional Considerations

- Avoid giving the impression that the game has a "correct allocation," and respect the differing value criteria of each group and role. Make clear that the recovery scoresheet is only a tool for comparing and reflecting on outcomes, not a device for ranking moral superiority.
- When the game result shows a pattern in which "groups with weaker voices (semi-basement residents, older adults, migrant workers, etc.) are structurally placed at the back of the queue," guide learners to interpret this as a result of social and institutional conditions rather than an individual student's moral failing.
- Avoid reducing the cause of typhoon damage to a single factor such as "strong winds and heavy rain," and guide learners to understand that housing environment, infrastructure, and socio-economic conditions operate together.
- Do not let differences in recovery be interpreted as "a lack of individual effort," and guide learners to consider structural factors such as insurance, support systems, administrative resources, and social networks together.
- Make clear that the unexpected events are a device for experiencing "the uncertainty of reality" rather than for stoking competitiveness, and place the weight on the reflection of the debrief rather than on winning or losing.

7. References

- Fothergill, A., & Peek, L. A. (2004). Poverty and disasters in the United States: A review of recent sociological findings. Natural Hazards, 32(1), 89-110.
- IPCC. (2023). Climate change 2023: Synthesis report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, H. Lee & J. Romero, Eds.). IPCC.
- Klein, N. (2007). The shock doctrine: The rise of disaster capitalism. Metropolitan Books.
- Lukasiewicz, A., & Baldwin, C. (2014). Voice, power, and history: Ensuring social justice for all stakeholders in water decision-making. Local Environment, 19(9), 1042-1054.
- Tierney, K. J. (2014). The social roots of risk: Producing disasters, promoting resilience. Stanford University Press.
- World Meteorological Organization. (2025). State of the global climate 2024. WMO.

Session 1: Recovery Command HQ — Prepare to Deploy



Topic	Differences in typhoon-recovery resource allocation and their causes
What will we learn?	① Understand how typhoons form and develop, and explain the relationship between sea-surface temperature and typhoon intensity. ② Analyze how, even in the same typhoon, damage and recovery differ depending on housing type, insurance, and access to recovery support.

1 Clue Video — Who Gets Left Behind?

- Watch the Hurricane Katrina documentary When the Levees Broke (2006) and write the one decisive thing that separated 'those who left' from 'those who stayed' in the same city.

2 The Power of Typhoons — Why They Keep Getting Stronger

- Look at the 'sea-surface temperature–typhoon intensity' relationship in IPCC, WMO, and Korea Meteorological Administration data, and describe the relationship in one sentence (directly proportional / inversely proportional / unrelated).

3 Reading the Four Neighborhoods — District Cards for Typhoon City

- Read the four district cards and identify each district's 'most vulnerable group' and its standard recovery needs. (in order of personnel / budget / equipment)

District	Damage & vulnerable group	Vulnerability	Insurance	Standard recovery (P/B/E)	Self-recovery
A. Semi-basement & rooftop units	800 households flooded; concentrated older single-person and welfare-recipient households	9/10	Very low (15%)	35 / 30 / 12	−15
B. Downtown market	350 shops flooded; small-business livelihoods; heavy media attention	5/10	Fairly high (65%)	25 / 50 / 12	+10
C. Rural township	Greenhouses and livestock sheds collapsed; two access roads cut off	7/10	Fairly low (partial)	35 / 25 / 24	−5
Total	Available resources: Personnel 100 · Budget 100 · Equipment 50			120 / 120 / 60	

1) With the same amount of resources, which of the four would struggle the longest and hardest? Give the reason in one sentence.

4 Resources and Rules — What We Have

- Typhoon City has 100 personnel, a budget of 10 billion won, and 50 pieces of equipment. The four districts' combined standard needs are about 1.2 times the available resources, so you cannot meet every standard in full. Write down one thing about the rules that puzzles you most or seems unfair.

Session 2: Recovery Command HQ — Rebuild the City with Limited Resources

Topic	Allocating limited resources and reflecting on inequality in recovery
What will we learn?	① Experience the difficulty of just decision-making through roles, negotiation, and unexpected events. ② Analyze recovery indicators to understand inequality in recovery from a disaster-justice perspective, and propose rules to protect the vulnerable.

1 Role Cards — The Four People in Our Group

Role	Goal	Argument in negotiation
Mayor	Fast, visible recovery results	"Let's fix the most visible damage first."
Recovery team leader	Quick, efficient on-site recovery	"Let's concentrate personnel and equipment where they'll be most efficient."
Finance officer	Sensible control of a limited budget	"Let's cut support where areas can recover on their own."
Citizen representative	Protecting the disaster-vulnerable; equity	"Let's guarantee the standard level to the weakest areas first."

2 Recovery-Indicator Formula

Recovery score = (allocated personnel ÷ standard personnel)×40 + (allocated budget ÷ standard budget)×40 + (allocated equipment ÷ standard equipment)×20 + self-recovery adjustment

· Each item counts only up to a fulfillment rate of 1.0 (100%); anything above that is wasted.
· Rating: 70+ = High (back to normal) / 40–69 = Medium (partial recovery) / below 40 = Low (stalled recovery)

3 Allocation Decisions — Individual → Group Negotiation → Applying Events

- Record each stage's allocation in the table (totals: Personnel 100 · Budget 100 · Equipment 50). Also note below who conceded what during negotiation.

Stage / District	A (P/B/E)	B (P/B/E)	C (P/B/E)	D (P/B/E)
Individual allocation				
Group agreement				
After applying events				

Who conceded what during the negotiation?

4 Unexpected Events — When the Situation Changes

- Write the unexpected event your group drew and how you moved resources 'from where to where' in response.

Example events: ① Second heavy-rain warning (low-lying A re-flooded) · ② Media spotlight (public attention on downtown B) · ③ Grant cut (total budget reduced) · ④ Wave of volunteers (personnel increases) · ⑤ Severed road (C road repair must come first) · ⑥ Late report (additional migrant-worker damage in D).

Event drawn	What changed	Resource shift (from → to)

5 Recovery-Indicator Results — How Our City Fared

- Use the formula to calculate each district's recovery score and assign a rating.

District	Standard (P/B/E)	Allocated (P/B/E)	Fulfillment score	Adjustment	Total	Rating
A. Semi-basement & rooftop units	35 / 30 / 12			−15		
B. Downtown market	25 / 50 / 12			+10		
C. Rural township	35 / 25 / 24			−5		
D. Industrial complex	25 / 15 / 12			+15		

6 Debrief — If Another Typhoon Comes

- Propose in one sentence a 'rule to protect the disaster-vulnerable' that would prevent this pattern in the next typhoon.