

Hazard Literacy Center

Hazard Literacy Education Program

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The Cry of the Parched Earth: Climate Change and Drought



1. Program Overview

This program is a data-analysis-based education program for high school students that helps learners understand the concept and characteristics of drought and explore current and future drought patterns through the analysis of climate data. Learners connect the issue of drought to their own lives by watching a video and sharing their thoughts, then learn foundational concepts—the definition, types, characteristics, and impacts of drought—through a lecture. In the subsequent inquiry activity, students examine how climate change may affect future drought, infer past-to-present changes in drought patterns by analyzing climate maps, and predict future drought based on future climate scenarios. The activities are structured into the stages of raising awareness of drought, understanding concepts, analyzing data, predicting the future, and presenting and wrapping up; through this process, students experience interpreting various climate data and using it to explain the potential for drought to change. Students also come to recognize that drought does not appear uniformly across all regions, but varies according to a region's climatic and environmental conditions. This program combines lecture and data analysis, and aims to help students understand drought not merely as a natural phenomenon but as a hazard connected to climate change, and to build the ability to interpret it based on scientific evidence.

Grade Level	Middle and high school students	Instructional Methods	Classroom (with computer access)
Learning Environment	Classroom (with computer access)	Duration	Total 75 minutes (1 session)
Required Materials	Activity sheets, writing tools, computers		

2. Learning Objectives (Hazard Literacy Framework)

① Understand and be able to explain the definition, types, characteristics, and impacts of drought.
② Be able to interpret how drought has changed over time and how it may appear in the future, based on climate change and climate data.

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

3. Key Concepts

- Definition and types of drought
- Causes and impacts of drought
- The relationship between climate change and drought
- Interpreting climate data and predicting the future
- The cause–change–impact relationship of hazards

4. Program Sequence

Stage	Contents
Introduction (10 min)	-Watch a drought-related video -Write down and share impressions and thoughts about the video
Lecture (20 min)	-Lecture on the definition, types, characteristics, and impacts of drought -Time allocation may vary depending on the scope and depth of content
Inquiry (30 min)	-Explore the impact of climate change on future drought patterns -Analyze climate maps to infer changes in drought up to the present -Predict future drought based on future climate scenarios
Wrap-up (15 min)	-Present analysis findings -Summarize -Preview of the next session

5. Theoretical Background and Activity Design for Disaster Education

Drought is a condition in which precipitation over a given period is significantly lower than average, resulting in prolonged water shortage. It is not simply a meteorological phenomenon involving reduced rainfall, but a complex hazard that affects agriculture, daily life, industry, and ecosystems as a whole. In particular, as climate change brings about rising temperatures, increased evapotranspiration, and shifting precipitation patterns, the frequency, duration, and intensity of drought may change, and some regions may face increasingly severe drought risk in the future. For this reason, drought should be understood not solely in terms of current weather conditions, but in conjunction with long-term climate change.

In addition, because drought develops gradually, it may not be immediately noticeable in the way that floods or earthquakes are. Over time, however, it can lead to a range of problems, including water supply shortages, declining agricultural productivity, changes to forests and ecosystems, and conflicts over water use between regions. Drought should therefore be understood not as a simple natural phenomenon, but as one that emerges from the interplay between changes in the climate system and the structure of human water use. Because the extent of damage and how it is experienced can differ significantly—even under the same drought conditions—depending on a region's climate characteristics, water resource conditions, and capacity for social response, the ability to interpret patterns of change and impact based on data is essential.

Building on this perspective, this program is designed to help learners explore current and future drought patterns through a range of climate data, rather than simply memorizing the concept of drought. In the introduction stage, students watch a drought-related video and write down and share their impressions and thoughts about drought, allowing them to connect the issue of drought to their own lives. In the lecture stage, students then learn the basic concepts—definition, types, characteristics, and impacts of drought—laying the foundation for the inquiry activity.

In the inquiry stage, students focus on how climate change affects future drought patterns: they analyze climate maps to infer how drought has changed up to the present, and predict future drought based on future climate scenarios. Through this process, students interpret visual data, identify relationships among data sets, and connect present change to future possibility. This helps students understand drought not as an isolated event, but as a long-term, complex hazard connected to climate change.

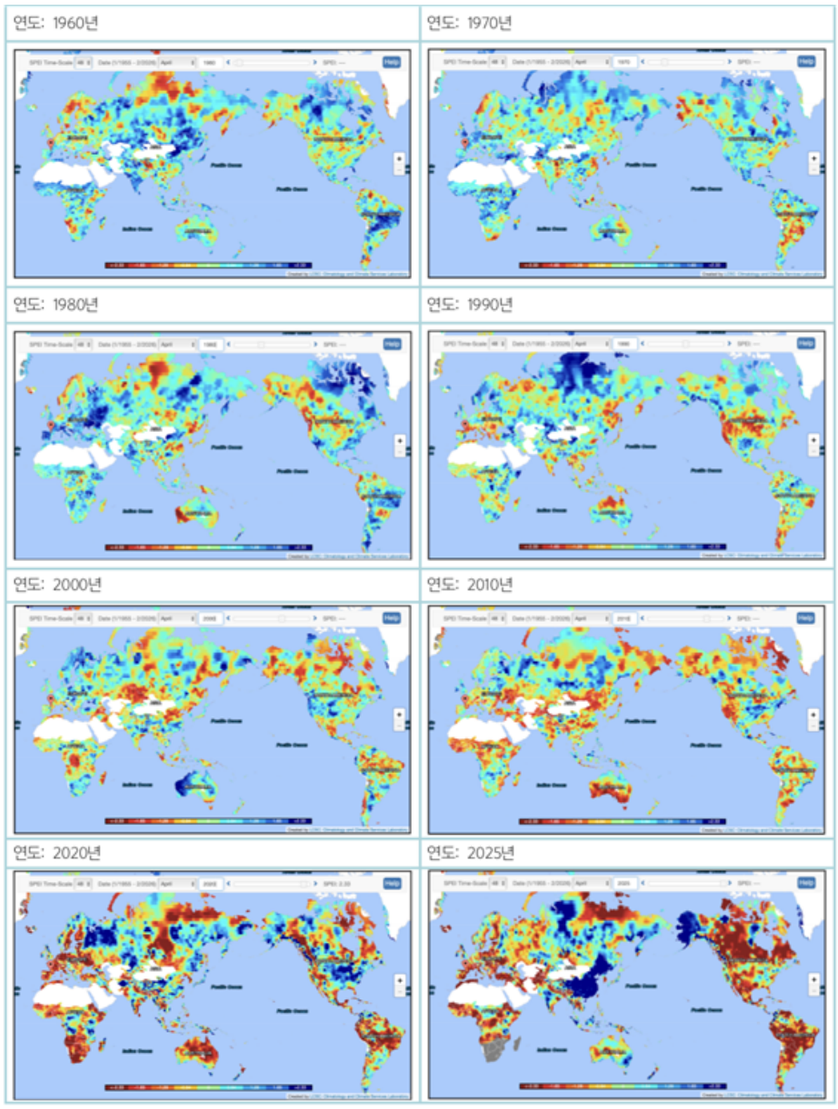

Figure 1. Example inquiry-stage activity sheet. Ten-year interval changes in the drought index from 1960 to 2025.

6. Instructional Considerations

The depth and level of explanation should be adjusted according to the school level of the learners. For middle school students, instruction should focus on basic concepts such as the definition, types, and impacts of drought; for high school students, it is advisable to extend the discussion to include the mechanisms of transition between drought types. In addition, drought should be taught as a complex system involving multiple interacting factors—reduced precipitation, rising temperatures, increased evapotranspiration, climate change, and water use practices—rather than being framed simply as a lack of rainfall.
In data analysis activities, students should first be guided to identify basic elements such as axes, legends, units, and time-series trends when reading maps or graphs. When interpreting time-series change graphs in particular, it is important to guide students to carefully read the meaning of the horizontal and vertical axes, the trend indicated by changes in values, and the significance of changes at specific points in time. Instructors should also encourage students to move beyond simply reading data by prompting deeper interpretation and inference through questions such as, "Why is drought more severe in certain regions?" and "How might current changes affect the future?" Students should be guided to understand that drought does not occur uniformly across all regions, but that its patterns and impacts vary according to a region's climatic and environmental conditions. In addition, students should be guided not to draw conclusions from a single source of data, but to synthesize multiple data sets and scenarios when interpreting changes in drought and their significance.

7. References

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- United Nations Disaster Relief Organization. (1980). Natural disasters and vulnerability analysis. United Nations.

1 Opening Reflection

- What is drought?

- What have you generally thought about drought?
- Has drought felt close to your own life? Have you ever thought of drought as dangerous?

- Write freely about any thoughts or feelings that come to mind while watching the video.

2 Inquiry

- Research how drought patterns have changed around the world, and capture and paste map images (screenshots) below.

Year:	Year:
Year:	Year:
Year:	Year:
Year:	Year:

- Based on the maps you found, think about the spatial distribution of drought.

- Based on the maps you found, think about how drought has changed over time.

- Does drought occur similarly across the world, or unevenly?

- Write down at least one piece of additional information you would like to look into.

The following is a climate change projection scenario from IPCC AR6. Based on this, predict what future drought patterns might look like.

※ What is IPCC AR6?
The Sixth Assessment Report (AR6) published by the Intergovernmental Panel on Climate Change (IPCC).

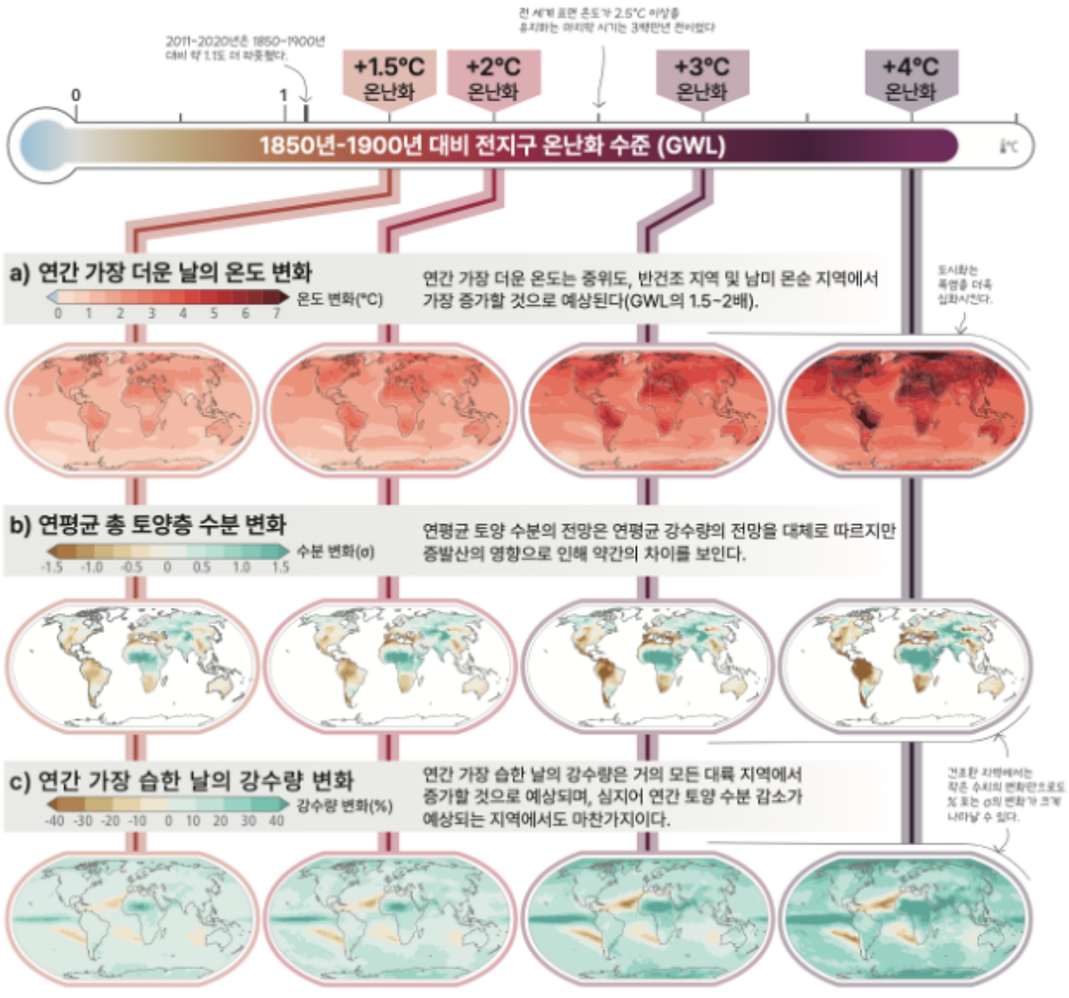

그림 SPM.2: 연간 최대 일일 기온의 예상 변화, 연간 평균 총 토양 수분 및 1850~1900년 대비 1.5°C, 2°C, 3°C, 4°C의 지구온난화 수준에서 연간 최대 일일 강수량. 예상되는 **(a)** 연간 최대 일일 온도 변화(°C), **(b)** 연평균 총 토양층 수분 변화(표준 편차), **(c)** 연간 최대 1일 강수량 변화(%). 패널은 CMIP6 다중 중앙값 변화를 보여준다. 패널 (b)와 (c)에서 건조 지역의 큰 양의 상대적 변화는 작은 절대적 변화에 해당할 수 있다. 패널 (b)에서, 단위는 1850~1900년 동안 토양 수분의 연간 변동성의 표준 편차이다. 표준 편차는 가뭄의 심각도를 특성화하는 데 널리 사용되는 척도이다. 1 표준 편차만큼의 예상되는 토양 수분의 감소는 1850~1900년 동안 약 6년에 한 번씩 발생한 가뭄의 전형적인 토양 수분 조건에 해당한다. WGI 인터액티브 아틀라스는 (https://interactive-atlas.ipcc.ch/) 이 그림에 제시된 지구온난화 수준 범위에 걸쳐 기후 시스템의 추가 변화를 탐색하는 데 사용할 수 있다. [*그림 3.1, Cross-Section Box.2*]