


## LESSON PLAN

### INFORMATION

<b>Learning Objectives</b>	<b>Cognitive Process:</b> To understand - at the end of the lesson Students should have a better idea about science really works and how scientists use data to test models and scientific ideas
<b>Grade and Age :</b>	11th grade - 16-17 old
<b>Keywords:</b>	heatwave, climate change, data
<b>Structure:</b>	Back and forth flow of knowledge
<b>Interactive Type:</b>	Active
<b>Interactive level:</b>	High
<b>Cost:</b>	
Free of charge	

### DESCRIPTION

<b>TITLE -</b>	<b>Extreme Climate Events: preparing for disaster</b>
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## MAIN IDEA

During this lesson, students will analyse temperature and precipitation data over their city, identifying heatwaves, droughts and compound events. They will study a very urgent theme, not just globally but also locally, given the ever-increasing number of heatwaves and droughts occurring in the north of Italy. The experiences of the scientist will illustrate the importance of interpreting data correctly. It is crucial that students learn that interpreting historical environmental data allows them to create models and forecasts which help society prepare for them in the future.

## Phase and Activities

**ENGAGE:** the purpose of the engage phase is to pique students interest and get them personally involved in the lesson

### **SEGMENT 1 (2 minutes)**

#### **Introduction**

Scientist introduction

Difference between weather and climate.

Definition of extreme events (rare, unusual, causing damage)

### **ACTIVITY 1 (3 minutes - 1 min per question) by students**

**What do you know about extreme events?**

Scientist present a Mentimeter with 3 questions:

- 1) List names of extreme events
- 2) How often do they occur (every year, 1-5 years, >5)?
- 3) Heatwaves - who is most at risk?

TOOLS: Computer, webcam, personal devices, microphone

TOTAL DURATION - 5 MINUTES

**EXPLORE:** the purpose of the EXPLORE phase is to provide students with an opportunity to communicate what they have learned

**SEGMENT 2 (4 minutes) by Scientist**

**Examples and facts on extreme events**

Discussion with students of mentimeter results

Images (floods/drought/hurricanes etc)

Add extreme events not listed, facts on changes in event occurrence with climate change

**ACTIVITY 2 (6 minutes - 2 mins per group) By students**

**Extreme events in Students' city or local area**

Ask students to bring photos/articles/info on past extreme events in their locale area. Students are grouped by event, each group presents their event (type, location, consequences, duration). What do extreme events look like? How would you describe them e.g. a heatwave? How would you know it is happening? Is this type of event more common?

TOOLS: Computer, webcam, personal devices, microphone

TOTAL DURATION - 10 MINUTES

**ELABORATE:** the purpose of the ELABORATE phase is to allow students to use their new knowledge and continue to explore implications.

**SEGMENT 3 (4 minutes) By Scientist**

**Records of temperature over Torino and Europe.**

Discuss how we define heatwaves.

Plots of average conditions and temperature during heatwaves, maps.

Show plots for Torino, students' city.

**ACTIVITY 3 (10 minutes) By students**

**Plotting and analysing temperature data.**

Provide data for number of HW days per year for London, Lecce, Milano, Moscow. Students plot time series in Excel. Identify key years, trends. Share figures with teacher.

TOOLS: DATA sets, Computer, microphone, personal pc.

**SEGMENT 4 (4 minutes)**

**Discussion of HW records in European cities.**

How are the events changing in time, scale of events, comparison between cities. How many countries experience HWs together? How can a HW in another country affect us?

**Preparing for extreme events**

Introduce activity in planning for extreme events

**ACTIVITY 4 (7 minutes + 3 minutes for student feedback)**

**Preparing for extreme events.**

Split the class into groups/tables. What can be done in each example?

Example 1 (Headteacher/Principal): On Sunday evening, schools receive a heavy snow warning for Monday.

Example 2 (Mayor): At the beginning of August, the mayor is told that mid-August might bring the hottest day on record.

Example 3 (Farmer): In January, farmers are told that drought conditions will begin in the spring.

TOOLS: paper sheets, pens, pencil or shared Twinboard

TOTAL DURATION - 25 MINUTES

**EVALUATE:** the purpose of the EVALUATE phase is for both teachers and students to determine how much learning and understanding has taken place

**ACTIVITY 5 (5 minutes) by scientist AND STUDENTS**

**Summary and Conclusions**

How to become a climate scientist/expert on extreme events.

Students will encouraged to demonstrate their impression.

Questions and Answers

TOOLS: Computer, webcam, personal devices, microphone

TOTAL DURATION - 5 MINUTES

## SUGGESTION READING AND LINKS

Check out research from the CMCC Foundation

[www.cmcc.it](http://www.cmcc.it)

Regional heatwave information and warnings - in Italian

<https://www.arpa.piemonte.it/temi/ambiente-salute/ondate-calore>

Windy app: check atmospheric and oceanic conditions near you with weather forecasts and radar

<https://www.windy.com/-Waves-waves?waves,45.413,11.881,5,p:favs>

World Weather Attribution - are extreme events near you caused by climate change?

<https://www.worldweatherattribution.org/>