

Erasmus+ Project

**ECOSTAND - Simulation Training and Gaming to Raise
Awareness about Climate Change and to behave appropriately in
case of Natural Disasters for Secondary Schools**

N° 2023-1-RO01-KA220-SCH-000156665

TRAINING MATERIALS

Natural Disasters Response and Climate Action

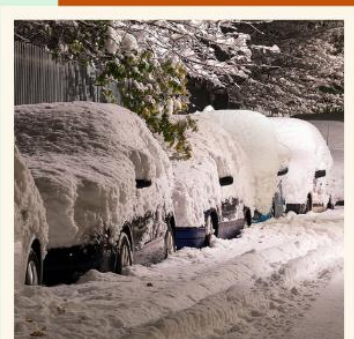


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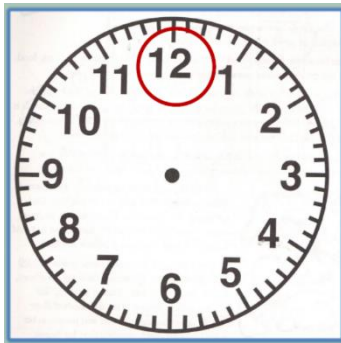


1 MODULE 1 - Response and climate action in case of snows

1.1 ACTIVITY 1: Snowstorm, freezing rain and avalanche: what are they? what is their impact? where can they happen?

[SNOWFLAKES - Dr Binocs | Best Learning Videos For Kids | Dr Binocs | Peekaboo Kidz \(youtube.com\)](#)

Meeting Game: The trainer gives the participants a drawing with a clock. Everyone must schedule a meeting with one of their colleagues. During the meetings, for 5 minutes, the two of them share knowledge about the subject proposed by the trainer.



The subjects propose are:

at 1 o'clock: What are the main factors contributing to the formation of a snowstorm?

at 2 o'clock: How do you differentiate between a snowstorm and a regular blizzard?

at 3 o'clock: What are the primary risks associated with freezing rain, and how do they form?

at 4 o'clock: What are the consequences of freezing rain on infrastructure and the environment?

at 5 o'clock: What precautions should people take during a snowstorm or freezing rain to protect themselves?

at 6 o'clock: How are avalanches predicted and monitored?

at 7 o'clock: What factors increase the risk of avalanches in a particular mountainous area?

at 8 o'clock: What technologies and equipment are used to prevent avalanches and protect populated areas?

at 9 o'clock: How does climate change influence extreme weather phenomena such as snowstorms and avalanches?

at 10 o'clock: What are the main effects of snowstorms and avalanches on local communities and the regional economy?

at 11 o'clock: What steps should be taken to survive an avalanche situation, and how can the emergency be managed?

At 12 o'clock is the meeting with the trainer and they have to debate the answer to: Which of the 4 natural disasters related to snow seem more dangerous to you?

1.2 ACTIVITY 2 - What is a winter storm? What is an avalanche?

[What Are Winter Storms? | How to Survive a Winter Storm? | What is a Blizzard? | Dr. Binocs Show \(youtube.com\)](#)



[What Causes an Avalanche? | How To Survive An Avalanche | Natural Disaster | Dr Binocs show - YouTube](#)

In order to use *Jigsaw method*, the trainer will divide the group of participants into 4 teams. The study topic is divided into 4 subtopics, and from each team there will be at least one person who will study a subtopic.

Subtopics: 1. Snowstorm

2. Freezing rain

3. Avalanche

4. Blizzard

Blizzards

Snowstorm

Freezing rain

Avalanche

Snowstorm



A snowstorm is a weather event characterized by heavy snowfall, often accompanied by strong winds and reduced visibility. These conditions can make travel hazardous and can lead to significant disruptions in daily life.

Snowstorms can indeed be challenging to forecast accurately, primarily due to the complex interactions between various atmospheric conditions required for snowfall. Factors such as temperature, moisture content, and wind patterns all play crucial roles in determining whether and how much snow will fall in a particular area. Additionally, small changes in these factors can lead to significant differences in the intensity and duration of snowfall, making precise predictions difficult.

Snowstorms typically form when cold air masses from the north or west collide with moist air masses from the south or east. As these air masses meet, the warm air is forced to rise over the cold air, creating an unstable atmosphere. If the temperature is low enough, the moisture in the air condenses and forms ice crystals, which then grow into snowflakes and fall to the ground. The intensity of the snowfall depends on factors such as the temperature, moisture content, and dynamics of the atmosphere. Strong winds can also play a role in shaping the characteristics of a snowstorm, leading to drifting snow and blizzard conditions.

Questions to answer:

1. What is a snowstorm? Are snowstorms hard to forecast? What causes snowstorms?



2. What is a freezing rain? Are freezing rains hard to forecast? What causes freezing rains?

Freezing rain



Freezing rain is a type of precipitation that falls as liquid raindrops but freezes upon contact with surfaces that are at or below freezing temperatures, such as the ground, trees, roads, and power lines. Unlike snow, which falls as ice crystals, freezing rain forms when raindrops encounter a thin layer of below-freezing air near the ground, causing them to freeze upon impact.

Forecasting freezing rain can be challenging due to the precise temperature conditions required for its formation. It requires a shallow layer of cold air near the surface with warmer air aloft, allowing rain to fall as liquid before freezing upon contact with surfaces at or below freezing temperatures. Small changes in temperature profiles or atmospheric dynamics can significantly affect whether precipitation falls as freezing rain, snow, sleet, or rain, making accurate forecasts difficult.

Freezing rain can create hazardous conditions, leading to icy roads, sidewalks, and power outages due to the weight of ice accumulation on trees and power lines. Therefore, accurate forecasting and timely warnings are crucial to mitigate the impacts of freezing rain events.

Freezing rain



Several factors can contribute to the formation of freezing rain:

Temperature Inversion: Freezing rain often occurs when a layer of warm air aloft traps a layer of colder air near the surface, creating a temperature inversion. Precipitation falls as rain through the warm layer and then encounters the cold layer near the ground, where it freezes upon contact.

Warm Fronts: Freezing rain can occur along the leading edge of a warm front, where warmer air overrides a layer of colder air near the surface. As the warm air rises over the cold air, precipitation falls as rain but freezes upon contact with surfaces at or below freezing temperatures.

Cold Air Damming: In some cases, freezing rain can result from cold air damming, where cold air becomes trapped against mountains or elevated terrain, preventing warmer air from moving in. Precipitation falling into this cold air mass can freeze upon contact with surfaces.



3. What is an avalanche? Are avalanches hard to predict? What causes avalanches?

Avalanche



An avalanche is a rapid flow of snow down a slope, often triggered by various factors such as weather conditions, snowpack stability, and human activity. Avalanches can vary in size and intensity, ranging from small sloughs of loose snow to large, destructive slides capable of burying buildings and causing fatalities.

Predicting avalanches accurately can be challenging due to the complex interplay of factors involved in their formation. While modern avalanche forecasting techniques and tools have improved significantly, there's still inherent uncertainty due to the dynamic nature of snowpack stability and the influence of various environmental factors.

To mitigate the risk of avalanches, avalanche forecasters use a combination of field observations, weather data, snowpack assessments, and avalanche terrain analysis to assess avalanche danger and provide forecasts and warnings to the public. However, due to the inherent variability of snowpack conditions and weather, predicting avalanches with absolute certainty remains a significant challenge.

Avalanche



Several factors can contribute to the initiation and triggering of avalanches:

Snowpack Stability: Avalanches typically occur when the stability of the snowpack is compromised. This instability can result from a variety of factors, including changes in temperature, wind-loading, snowfall rates, and the presence of weak layers within the snowpack. Weak layers can form due to differences in snow crystal types, density, or temperature gradients within the snowpack.

Weather Conditions: Weather plays a crucial role in avalanche formation. Heavy snowfall, rapid temperature changes, strong winds, and rain can all contribute to snowpack instability. Warm temperatures can weaken the bonds between snow grains, while rapid loading from heavy snowfall or wind can stress the snowpack, increasing the risk of avalanches.

Terrain Features: The characteristics of the terrain, such as slope angle, aspect (orientation), and vegetation cover, also influence avalanche risk. Steep slopes with angles typically between 30 and 45 degrees are most prone to avalanches. Additionally, features like cliffs, gullies, and convex terrain can create terrain traps where avalanches are more likely to accumulate and cause greater damage.

Human Activity: Human-triggered avalanches are common and often result from recreational activities such as skiing, snowboarding, snowmobiling, and hiking. The weight and movement of people on the snow surface can stress weak layers within the snowpack, causing it to fail and trigger an avalanche.



4. Where are the blizzards? How do blizzards form and affect different areas? How can broadcasters help communities prepare for a blizzard? What is the difference between a blizzard and a snowstorm?

Within the expert groups, the participants answer the questions of their sub-theme, then they will return to the initial learning team. It is the stage of the team report: the experts transmit the assimilated knowledge, retaining in turn the information transmitted by their colleagues-experts in other sub-topics.

1.3 ACTIVITY 3 - How do we act in each of the cases presented above?

The participants watch the following films:

[What to do during a blizzard \(youtube.com\)](#)

[What to do if you're stuck on the road - YouTube](#)

[How to prepare for winter storm \(youtube.com\)](#)

Blizzards



Blizzards can occur in various regions around the world, but they are most commonly associated with areas that experience cold, snowy winters, such as the northern United States, Canada, northern Europe, Russia, and parts of Asia. However, blizzards can also occur in other regions under the right meteorological conditions.

Blizzards form when several factors converge to create a severe winter weather event characterized by strong winds, heavy snowfall, and reduced visibility. The primary conditions necessary for a blizzard include:

Snowfall: A blizzard begins with heavy snowfall, often accompanied by rapidly falling temperatures.

Strong Winds: Blizzards are defined by sustained winds of at least 35 mph (56 km/h) or greater, creating blowing and drifting snow.

Reduced Visibility: Blowing snow reduces visibility to less than 0.25 miles (0.4 km) for a period of at least three hours. Blizzards can have significant impacts on different areas depending on factors such as population density, infrastructure, and preparedness measures. In urban areas, blizzards can disrupt transportation networks, cause power outages, and pose safety hazards to pedestrians and motorists. In rural or remote areas, blizzards can isolate communities, making it difficult for emergency services to reach affected areas and for residents to access essential supplies.

Blizzards



Broadcasters play a crucial role in helping communities prepare for blizzards by providing timely and accurate weather forecasts, warnings, and safety information. They can:

Issue Weather Alerts: Broadcasters can issue blizzard warnings and advisories to inform the public about the impending severe weather conditions, including expected snowfall amounts, wind speeds, and potential impacts.

Provide Safety Tips: Broadcasters can offer advice on how to stay safe during a blizzard, such as staying indoors, avoiding unnecessary travel, and dressing warmly if venturing outside.

Share Emergency Information: Broadcasters can relay information about emergency shelters, road closures, and evacuation procedures to help residents stay informed and make informed decisions to protect themselves and their families.

The main difference between a blizzard and a snowstorm lies in the intensity of the snowfall and the accompanying winds. While both involve heavy snowfall, blizzards are characterized by sustained winds of at least 35 mph (56 km/h) or greater, along with blowing snow that reduces visibility to less than 0.25 miles (0.4 km) for at least three hours. Snowstorms, on the other hand, may not have the sustained high winds or reduced visibility criteria required to be classified as blizzards.



Working in 4 groups, the participants will design a poster with protection measures in case of snowstorm, freezing rain, avalanche, blizzard.

1.4 ACTIVITY 4 - What is the impact of the extreme phenomena of the cold season on the physical and mental state of people?

In order to play **Bingo**, the trainer will give each participant a card:

B	I	N	G	O
Consequences	Hypothermia	Isolation	Depression	Winter blues
Strategies	Layer clothing	Stay active	Warm beverages	Socialize
Physical Well-being	Frostbite	Dry skin	Chapped lips	Sluggish metabolism
Mental Well-being	Seasonal Affective Disorder	Cabin fever	Anxiety	Stress
Resilience	Adaptation	Strong support system	Positive mindset	Self-care

The participants will tick, in turn, the box with the answer to the following questions:

Call Sheet:

1. What are some potential consequences of extreme cold weather on individuals' physical and mental well-being?
2. How can individuals cope with and maintain their overall health and resilience during extreme cold weather?
3. What are some strategies for preventing hypothermia and frostbite in extreme cold weather?
4. How does extreme cold weather affect individuals' metabolism and physical energy levels?
5. What are some potential mental health issues that can arise during extreme cold weather?
6. How can individuals combat feelings of isolation and cabin fever during extreme cold weather?
7. What are some self-care practices that can help maintain mental well-being during extreme cold weather?
8. How can individuals maintain a positive mindset and avoid seasonal affective disorder during winter months?
9. What are some ways to stay active and exercise during extreme cold weather?



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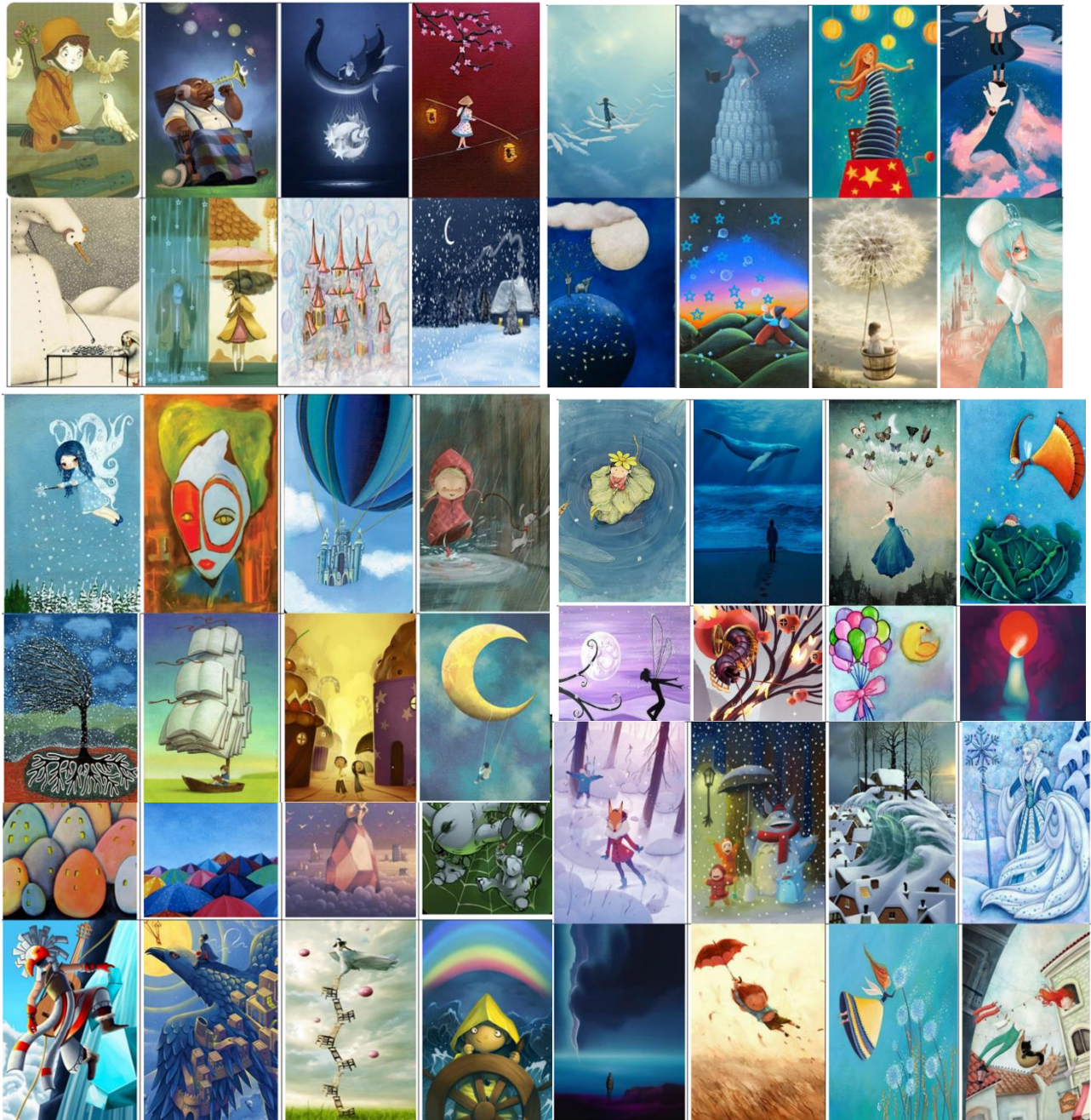
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10. How can individuals ensure they have a strong support system to help them through extreme cold weather?

The winner is the one who ticks all the boxes and shouts BINGO

1.5 ACTIVITY 5 – Evaluation of the module

The participants will choose one creative card and will give feedback starting from that card





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2 Module 2 - RESPONSE AND CLIMATE ACTION IN CASE OF HEAT WAVES

2.1 ACTIVITY 1: Explanation, causes and consequences

Canva:

https://www.canva.com/design/DAGCMS7dzo8/keBfPh1iDkSsu3rH5yCPoQ/edit?utm_content=DAGCMS7dzo8&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

2.2 ACTIVITY 2: Case study

2.1. Contextualisation: The trainer briefly describes the case study (example: heat wave in Europe in August 2023), including information on duration, intensity, areas affected and main impacts.

2.2. Discussion: A discussion will take place among the participants on the information provided. A series of pre-established questions can be used to stimulate and energise the discussion.

Presentation: <https://www.canva.com/design/DAGEYQY2uos/8emGoS2feCGDEgLFEF561A/edit>

Video: <https://www.youtube.com/watch?v=7eoXB3GDxYo>

Info: <https://www.metlink.org/resource/case-study-heatwave/>

(QUESTIONS)

1. How did the heatwave affect your community or region, and what measures were taken to protect the population?
2. Do you think the heatwave was an isolated event or part of a wider pattern of climate change? Why?
3. What do you think are the biggest challenges communities face in adapting to heatwaves and other extreme climate-related events?
4. What role can individuals, communities and governments play in mitigating the impacts of heatwaves and climate change in general?
5. What actions do you think should be taken at local, national and international levels to address the problem of climate change and reduce the frequency and intensity of heat waves?
6. What can be done to better prepare for future heat waves? What policies or actions could help mitigate the impacts of climate change?

2.3 ACTIVITY 3: Kahoot

<https://create.kahoot.it/details/c335506c-353b-4cfb-a8aa-502a95c0f424>

1. What is one of the primary causes of heatwaves?

- ☒ a) Increased urbanization
- ☐ b) Decreased greenhouse gas emissions



- ☐ c) Expansion of forests
- ☐ d) Reduced industrial activity
- 2. How do heatwaves typically affect human health?
 - ☐ a) Decrease the risk of heat-related illnesses
 - ☒ b) **Increase the risk of heatstroke and dehydration**
 - ☐ c) Improve overall physical fitness
 - ☐ d) Have no impact on human health
- 3. Which of the following is a recommended precaution during a heatwave?
 - ☐ a) Spending prolonged periods of time in direct sunlight
 - ☐ b) Wearing heavy clothing to protect from sunburn
 - ☒ c) **Staying hydrated and avoiding outdoor activities during peak heat hours**
 - ☐ d) Exercising vigorously during the hottest part of the day
- 4. How can urban areas exacerbate the effects of heatwaves?
 - ☐ a) By reducing the urban heat island effect
 - ☐ b) By increasing vegetation and green spaces
 - ☒ c) **By trapping heat and pollutants, leading to higher temperatures**
 - ☐ d) By promoting natural ventilation and cooling
- 5. Which demographic group is most vulnerable to heat-related illnesses during heatwaves?
 - ☐ a) Children
 - ☐ b) Young adults
 - ☒ c) **Elderly individuals**
 - ☐ d) Middle-aged adults
- 6. What role does climate change play in the frequency and intensity of heatwaves?
 - ☐ a) Climate change has no impact on heatwaves
 - ☒ b) **Climate change contributes to more frequent and intense heatwaves**
 - ☐ c) Climate change leads to fewer heatwaves
 - ☐ d) Climate change only affects heatwaves in specific regions
- 7. How can communities prepare for and respond to heatwaves?
 - ☒ a) **By implementing heatwave warning systems and providing cooling centers**
 - ☐ b) By ignoring heat advisories and continuing regular activities
 - ☐ c) By increasing greenhouse gas emissions to combat rising temperatures
 - ☐ d) By deforesting urban areas to reduce heat retention
- 8. Which of the following is a symptom of heat exhaustion?
 - ☐ a) Pale skin
 - ☐ b) Shivering
 - ☒ c) **Nausea**
 - ☐ d) Slow heartbeat
- 9. How do heatwaves impact ecosystems?
 - ☐ a) They have no effect on ecosystems
 - ☒ b) **They can lead to widespread die-offs of plant and animal species**



- ☐ c) They promote biodiversity and ecosystem health
 - ☐ d) They reduce the risk of wildfires
10. What are some measures individuals can take to stay safe during a heatwave?
- ☐ a) Staying indoors with the windows closed
 - ☐ b) Wearing dark, tight clothing
 - ☐ c) **Drinking plenty of water and staying in air-conditioned spaces**
 - ☐ d) Allowing students to play outdoor sport during peak heat hours
11. What are some strategies schools can implement to mitigate the impact of heatwaves on students and staff?
- ☐ a) **Providing access to shaded outdoor areas and water stations**
 - ☐ b) Conducting outdoor physical education classes to build resilience to heat
 - ☐ c) Encouraging students to wear heavy clothing to protect from sunburn
 - ☐ d) Keeping windows and doors closed to keep the heat out
12. Which of the following is a recommended action for schools during a heatwave to ensure student safety?
- ☐ a) Cancelling all outdoor activities and classes
 - ☐ b) **Implementing flexible dress codes to allow students to wear weather-appropriate clothing**
 - ☐ c) Encouraging students to engage in vigorous outdoor activities to build resilience to heat
 - ☐ d) Keeping classrooms well-insulated without proper ventilation
13. What role can teachers play in educating students about heatwaves and heat-related safety measures?
- ☐ a) Ignoring heat-related topics to avoid causing unnecessary worry among students
 - ☐ b) **Incorporating lessons about climate change and heatwave preparedness into the curriculum**
 - ☐ c) Discouraging students from asking questions about heatwaves to avoid distraction from academic subjects
 - ☐ d) Encouraging students to spend as much time outdoors as possible during hot weather to build tolerance to heat
14. How can schools ensure the safety of students and staff during outdoor activities in hot weather?
- ☐ a) Encouraging students and staff to wear sunscreen and protective clothing
 - ☐ b) Conducting outdoor activities during the hottest part of the day to maximize vitamin D intake
 - ☐ c) **Providing adequate shade and hydration stations for participants**
 - ☐ d) Prohibiting outdoor activities altogether during hot weather
15. What measures can schools take to ensure the comfort and well-being of students and staff in classrooms during a heatwave?
- ☐ a) Installing air conditioning in all classrooms
 - ☐ b) Keeping windows and doors closed to prevent heat from entering classrooms
 - ☐ c) **Using fans and opening windows to promote air circulation**



- ☀ d) Encouraging students to engage in physical activity to stay cool during class

2.4 ACTIVITY 4: Safety measures in schools

- 4.1. The trainer will present a list of possible actions that schools can take to reduce the impact of heat waves.
- 4.2. Participants will form small groups in which they will discuss these proposals or other new ideas, considering their cost, benefits and feasibility.
- 4.3. Each group will develop a detailed action plan to implement the priority measures in their school.

(MATERIALS TO BE ADAPTED)

- String cards: https://www.metlink.org/wp-content/uploads/2023/04/Heatwaves_Sorting_Cards.pdf
- Heatwaves solutions: https://www.metlink.org/wp-content/uploads/2023/04/Heatwaves_Sheet_Research_Solutions_-1.pdf
- Solutions (pros & cons): https://www.metlink.org/wp-content/uploads/2023/04/Heatwave_Solutions_Pros_and-Cons.pdf
- Adaptation: <https://www.canva.com/design/DAGFwjZwb4I/EaVk9s0dR8L2ehuCUNF6nw/edit>



3 Module 3. RESPONSE AND CLIMATE ACTION IN CASE OF STORMS

3.1 ACTIVITY 1. Tornadoes and severe storms. What are they? What is their impact? Where can they happen?

1.1 Webquest link: <https://eswd.eu/>

Lesser whirlwind

A vortex not associated with a convective storm, typically between a few metres to a few tens of metres in diameter, extending upward from the earth's surface but not reaching any cloud. It is rendered visible by material lifted off the earth's surface (land devils) or by water droplets (water devils). Lesser whirlwinds result from temperature differences between the surface and the air above. Whirls in the lee of objects (e.g. buildings) are not considered a 'lesser whirlwind' here.

Gustnado

A vortex occurring along a gust front of a convective storm that is visible by material that is lifted off the earth's surface. It is typically a few metres to a few tens of metres in diameter and extends upward from the earth's surface but is not connected with a cloud. In case of uncertainty whether a gustnado really occurred, do not select gustnado. If it is certain that either a tornado or gustnado occurred, select "tornado". If a "severe wind gust" may have occurred instead of a gustnado, please select that group.

Heavy rain

Heavy rain defined here as rain falling in such large amounts, that significant damage is caused, or no damage is known, but precipitation amounts have been observed that are exceptional for the region in question.

Large hail

The falling of hailstones having a diameter (in the longest direction) of 2.0 centimetres or more and/or smaller hailstones that form a layer of 2.0 cm thickness or more on flat parts of the earth's surface.

Tornado

A tornado or waterspout is a vortex typically between a few metres to a few kilometres in diameter, extending between a convective cloud and the earth's surface, that may be visible by condensation of water and/or by material (e.g. water, in case of a waterspout) that is lifted off the earth's surface.

Remark: select "tornado or waterspout" when a tornado or waterspouts is likely to have occurred or in case of doubt between a tornado or gustnado. If it is possible that a "severe wind gust" has occurred instead, select that category.



Severe wind

A severe wind gust is a gust measured to have a speed of at least 25 m/s or one doing such damage that a wind speed of 25 m/s or higher is likely to have occurred.

Damaging lightning

A lightning strike causing important damage to aircraft, vehicles, ships, or injuring/killing people or animals. Ball lightning or other exceptional lightning phenomena can be reported in this category also if no damage was reported.

Source: [European Severe Weather Database \(eswd.eu\)](https://eswd.eu)



Photo source: GoodFon

Did you know?

The largest observed thunderstorm: in history as measured by voltage occurred in India on December 1, 2014. Sunil Gupta, a scientist at the Tata Institute of Fundamental Research in Mumbai, and his colleagues used a muon telescope to measure the electric potential of this thunderstorm at 1.3 billion volts!

1.2 Video watching link:

https://store.steampowered.com/app/862800/Storm_Chasers/

3.2 Activity 2: How to stay safe?

2.1 Must & must not in storm situations

Model poster link:

<https://www.ready.gov/sites/default/files/2020-03/thunderstorm-information-sheet.pdf>



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Thunderstorms are dangerous storms that include lightning.



Include powerful winds



Create lightning and hail



Cause flash flooding and tornadoes

IF YOU ARE UNDER A THUNDERSTORM WARNING, FIND SAFE SHELTER RIGHT AWAY

When thunder roars,
go indoors.



Pay attention to alerts
and warnings.

Move from outdoors
into a building or car.



Unplug appliances.



Do not use landline phones.



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HOW TO STAY SAFE WHEN A THUNDERSTORM THREATENS



Know your area's risk of thunderstorms. They can occur year-round and at any hour.

Sign up for your community's warning system. The Emergency Alert System (EAS) and National Oceanic and Atmospheric Administration (NOAA) Weather Radio also provide emergency alerts.

Identify sturdy buildings close to where you live, work, study, and play.

Cut down or trim trees that may be in danger of falling on your home.

Consider buying surge protectors, lightning rods, or a lightning protection system to protect your home, appliances, and electronic devices.

Secure outside furniture.



When thunder roars, go indoors. A sturdy building is the safest place to be during a thunderstorm.

Pay attention to weather reports and warnings of thunderstorms. Be ready to change plans, if necessary, to be near shelter.

When you receive a thunderstorm warning or hear thunder, go inside immediately.

If indoors, avoid running water or using landline phones. Electricity can travel through plumbing and phone lines.

Protect your property. Unplug appliances and other electric devices.

If boating or swimming, get to land and find a sturdy, grounded shelter or vehicle immediately.

If necessary, take shelter in a car with a metal top and sides. Do not touch anything metal.

Avoid flooded roadways. Turn Around Don't Drown®. Just six inches of fast-moving water can knock you down, and one foot of moving water can sweep your vehicle away.



Pay attention to authorities and weather forecasts to know whether it is safe to go outside and to get information regarding potential flash flooding.

Watch for fallen power lines and trees. Report them immediately.



Take an Active Role in Your Safety

Go to [Ready.gov/thunderstorms-lightning](https://www.ready.gov/thunderstorms-lightning). Download the **FEMA app** to get more information about preparing for **thunderstorm, lightning or hail**.

Worksheet Must & must not in storm situations

Preparation for staying safe and minimizing impact of severe storms. The main recommendations are:



Before the storm

- Check the forecast regularly to see if you are at risk of severe weather
- Listen to the local news/weather radio/ consult an e-weather smartphone app
- Have a communication plan with the family: WhatsApp group and an emergency meeting place
- Choose a safe room in your home, such as a basement, storm cellar, or an interior room on the lowest floor with no windows.
- Don't forget pets if time permits

During the storm

- Get out of the pool, lake, ocean, or any body of water
- Avoid using running water.
- If you're outside, seek shelter in the school/home, a house or building.
- If you're outside and can't get inside, don't stand under or near large objects, like tall trees.
- Do not touch concrete structures or metal bars.
- Avoid standing near windows.
- Don't open the windows.
- Don't keep your laptop charger and other electronics plugged in.
- It's better to not touch anything metal or electrical.
- Don't turn your radio or TV off. You need to make sure that you don't miss out on any information broadcasted by local authorities for your safety.
- Don't keep your laptop charger and other electronics plugged in.
- If caught outside, avoid hilltops and open areas.

After the storm

- Be careful not to touch any electrical/telephone cables that have been blown down or are still hanging
- Do not walk too close to walls, buildings and trees as they could have been weakened
- Make sure that any vulnerable classmates, neighbours or relatives are safe and help them make arrangements for any repairs



Must & must not in storm situations

Before the storm



- Check the forecast regularly to see if you are at risk of severe weather
- Listen to the local news/weather radio/ consult an e-weather smartphone app
- Have a communication plan with the family: WhatsApp group and an emergency meeting place
- Choose a safe room in your home, such as a basement, storm cellar, or an interior room on the lowest floor with no windows.
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After the storm



- Be careful not to touch any electrical/telephone cables that have been blown down or are still hanging
- Do not walk too close to walls, buildings and trees as they could have been weakened
- Make sure that any vulnerable classmates, neighbours or relatives are safe and help them make arrangements for any repairs

Source:

<https://padlet.com/silviapopovici2011/must-must-not-in-storm-situations-a8t9daxaz4k2ps53>

2.2 Communication plan in case of severe storm

Most important elements of a disaster situation communication plan:

- Who is the audience is?
- What is the person/team in charge for communication
- What are the key messages to deliver?
- When to make the communication?
- What is the most effective channel of communication: school radio, telephone, e-mail, sms, social media, etc.



2.3 Survival kit

Here is a poster with essential items for a basic storm survival kit



INFORMATION VIA – <http://www.alabamapublichealth.gov>

UAB MEDICINE

Source: www.alabamapublichealth.gov



Worksheet: Survival kit

Would you include the following items into your basic 10 items survival kit in case of storm?

umbrella	Your usual pills
PC	toilet paper
water	Towel
glasses	Make up
biscuits	TV
dog	favourite book
pen	Toothbrush
Batteries Radio	money
nuts	ball
Favourite plant	camera
can opener	favourite notebook
T-shirts and trousers	Running shoes
map	canned meat

Fill in with the 10 most important items:

No.	Yes	No
1		
2		
3		
4		
5		
6		
7		



8		
9		
10		

Have you forgotten anything that was not on the list?
Maybe your personal documents?



3.3 ACTIVITY 3 Risks

3.1 Link assess the risks of a severe thunderstorm:
<https://scijinks.gov/tornado-simulation/>

Major risks during severe storms are:

- flooding,
- lightning which may induced wildfires,
- tornadoes,
- wind
- hail

Here is a full list of an emergency items for 7 days in case of strong storm:

- ✓ 4 liters of water per person, per day (this is for sanitation as well as drinking)
- ✓ Several days' worth of non-perishable food, and a manual can opener
- ✓ Prescription medicines, if applicable
- ✓ Infant formula and baby bottles, if applicable
- ✓ Pet food, if applicable
- ✓ Diapers and baby wipes, if applicable
- ✓ Battery-powered or hand crank radio
- ✓ Flashlight
- ✓ Cash and/or traveler's checks
- ✓ Extra batteries
- ✓ First aid kit



- ✓ Whistle (as a help signal)
- ✓ Face masks
- ✓ Moist towelettes
- ✓ Trash bags
- ✓ Feminine hygiene products, if applicable
- ✓ Non-prescription medicines (pain relievers, antacids, etc.)
- ✓ Printed maps of local area
- ✓ Cell phone chargers or backup batteries
- ✓ Soap and hand sanitizer
- ✓ Prescription eyeglasses and contact lenses with solution
- ✓ Sleeping bag or blanket for each person
- ✓ Change of clothes and sturdy shoes
- ✓ Matches in waterproof container
- ✓ Paper cups, plates, and utensils
- ✓ Paper and pencil

Source: [Build A Kit | Ready.gov](#)

3.3 Evacuation plan check list:

- Where are you evacuating to?
- Do you have a backup evacuation location?
- Who is in charge of evacuation?
- What persons are in your responsibility to evacuate?
- How will you exactly do the evacuation?
- Do you already know how long it may take?
- Have you already done any simulations?



Photo source: Pick Pik



3.4 ACTIVITY 4 Appropriate emotional response during and after a severe storm

4.1 Info corner:

Astraphobia

Astraphobia is the fear of thunder and lightning. It typically affects children, but many adults still deal with a fear of thunderstorms. Astraphobia is one of the most common specific phobias. Treatment such as talk therapy or medication can help you manage anxiety symptoms and live a higher quality of life.

Source: <https://my.clevelandclinic.org/health/diseases/22101-astraphobia>

Post-traumatic stress disorder (PTSD)

Post-traumatic stress disorder (PTSD) is a common mental health condition that can develop after a traumatic event. It involves symptoms like flashbacks, anxiety, negative thoughts and beliefs, hypervigilance and more. The main treatment for PTSD is psychotherapy (talk therapy).

Sources: <https://my.clevelandclinic.org/health/diseases/9545-post-traumatic-stress-disorder-ptsd>

How to handle emotional stress during a storm

It's only natural to feel scared, anxious, and nervous. Recognize your emotions and try these tips to alleviate your anxiety. Preparation is important: create a plan, be informed, are your fears with family members, friends, a counselor, or others who can offer emotional support. Find out more on how to strengthen your emotional well-being before the storm. Accept what you can't control — Nobody can control the path of a storm or its damage. And excessive worrying that one may hit you will not change anything except your emotional well-being.

When talking to kid about weather-related anxiety:

- Be calm and supportive. Tell children that thunder won't hurt them. Explain that storms are a normal part of nature.
- Talk about storms matter-of-factly. Some kids may seem afraid of storms, but they're really interested in learning more about them.
- Allow children to face their fears by gradually helping them learn they can handle a fear and other uncertainties of life on their own.
- Help children face their fear of storms by reading about them or watching videos of tornadoes, hurricanes, and other big storms.
- If the anxiety doesn't diminish, or if it begins to create greater stress for the child or the parent, get the assistance of a mental health professional.

Source : <https://adaa.org/living-with-anxiety/managing-anxiety/hurricane-season-here-how-reduce-your-anxiety>



How to recover emotionally after a severe storm

- Continue practicing self-care and participating in activities you enjoy.
- Do something positive. ...
- Get back to your usual routine as soon as possible, but start with one thing at a time if needed.
- Support your friends and family.

Source: <https://www.bswhealth.com/blog/how-severe-storms-impact-your-mental-health>

4.2 The link to watch the Extreme Storm film trailer: <https://youtu.be/kgi2aNgPv6M>

4.3 Breathing exercise in order to calm down and teach others to calm down during a storm

-breathe in for three seconds,

-hold for four seconds and

-breathe out for five seconds.

-repeat for about 3 minutes.

It can be extremely effective for persons who are prone to anxiety or stress.

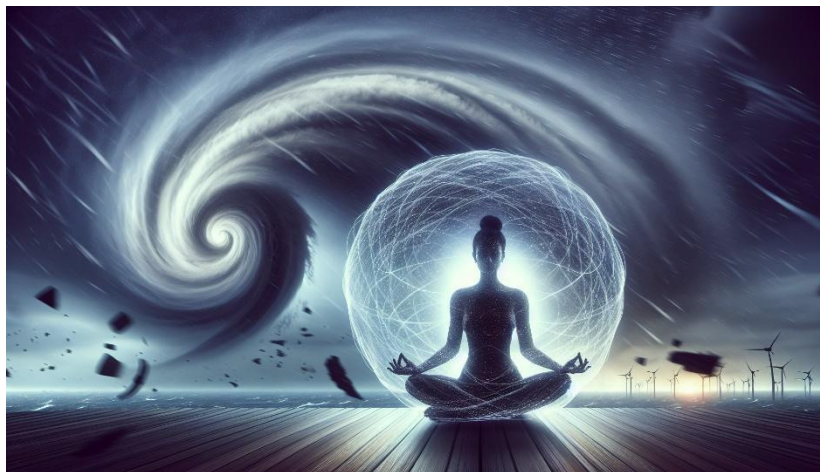


Photo source: Easy-Peasy.AI

Activity 5. What is the impact of climate change on the occurrence of severe storms and how can we mitigate it

5.1 Link for web quest:

<https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world/>



5.2 Mind mapping

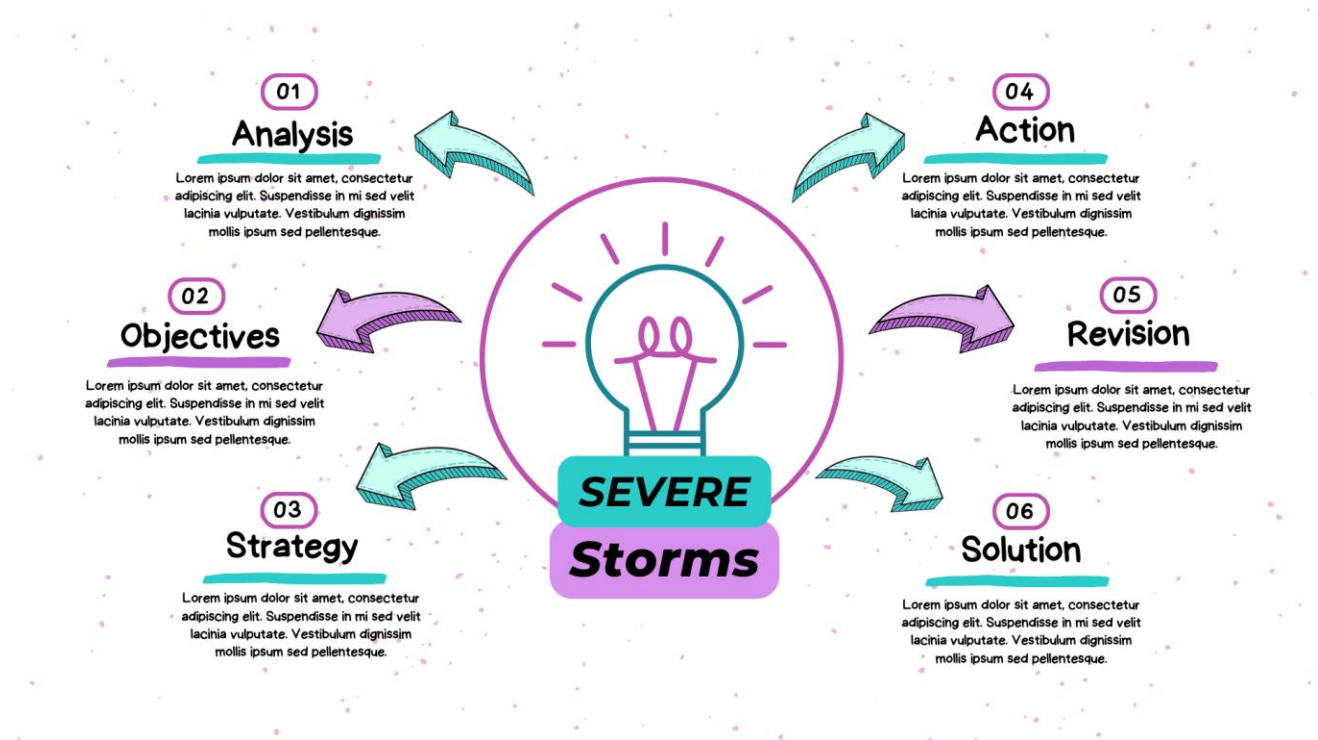


Photo source: canva.com

Source: <https://www.canva.com/templates/EAFioI8II4U-white-and-purple-doodle-mind-map-brainstorm/>

Correct answers : 1.c, 2 a, 3.b, 4.c, 5a.

Additional information:

<https://www.youtube.com/watch?v=qySBQjSXbfw>

<https://brightside.me/articles/12-things-we-shouldnt-do-during-a-storm-797666/>

<https://home.howstuffworks.com/home-improvement/household-safety/10-must-haves-storm-survival-kit.htm>

<https://www.ready.gov/make-a-plan>

<https://www.weather.gov/education/outreach>

<https://www.redcross.ca/how-we-help/emergencies-and-disasters-in-canada/be-ready-emergency-preparedness-and-recovery/make-an-emergency-plan>

<https://www.safetyactioncenter.pge.com/articles/26-quiz-do-know-pack-emergency-kit>

https://www.youtube.com/watch?v=_0TCrGtTEQM



4 MODULE. 4: Response and climate action in case of earthquakes

4.1 ACTIVITY 1- Earthquakes. What are they? What is their impact? Where can they happen?

Earthquakes are the result of sudden energy release within the Earth's crust, creating seismic waves that cause the ground to shake. This energy release typically occurs along faults, which are fractures between blocks of crust where energy has built up due to tectonic forces.

Tectonic Plates: Earth's lithosphere is divided into several large plates that float on the semi-fluid asthenosphere beneath them. Movements of these plates can cause stress along the edges, leading to earthquakes.

Focus and Epicenter: The focus is the point within the Earth where seismic waves originate during an earthquake, often located at depths ranging from shallow to several hundred kilometers. The epicenter is directly above the focus on the Earth's surface and is usually the location experiencing the strongest shaking.

What is Their Impact?

The impact of earthquakes can be devastating, varying greatly depending on the earthquake's magnitude, depth, distance from populated areas, and the local geology and building standards.

(Buildings, bridges, roads, and other infrastructure can suffer extensive damage or collapse, especially in areas without seismic-resistant construction.)

Human Casualties: Earthquakes can lead to significant loss of life and injuries due to falling debris and collapsing structures.

Economic Impacts: The costs associated with response, recovery, and rebuilding can run into billions, affecting economies at local, national, and even global levels.

Environmental Effects: Secondary effects such as landslides, tsunamis, and fires can further devastate the environment and human settlements.

Where Can They Happen?

While earthquakes can occur in many parts of the world, certain regions are more prone to seismic activity due to their geologic and tectonic characteristics.

Plate Boundaries: Most earthquakes occur at or near the boundaries of tectonic plates. The Ring of Fire around the Pacific Ocean is the most active, with frequent and large earthquakes.



Intraplate Earthquakes: These earthquakes occur within a tectonic plate and can be quite powerful, though less frequent than interplate earthquakes.

High-Risk Zones: Areas known for significant seismic activity include California, Japan, New Zealand, and Turkey, among others.

Activity 1.1

NFE Methods:

Participants will be engaged with dynamic presentations that combine verbal information with visual aids to explain the science of earthquakes, their effects, and geographical formations.

Group Discussions:

It will facilitate small group discussions that allow participants to share their personal experiences or knowledge about earthquakes, encouraging peer learning and better understanding the impact of earthquakes on different regions.

Question and Answer Sessions: Question and answer sessions will be added after the presentations to clarify concepts and encourage active participation.

Materials:

Infographics and Maps:

Detailed infographics will be used to visualize seismic activity and maps will be used to highlight tectonic plate boundaries where earthquakes are more likely to occur.

Information Pages:

Fact sheets will be provided with earthquake statistics, preparedness tips, and important information about major earthquakes and their aftermath case studies.

Real Time Videos:

Videos will be shown that shows the occurrence of an earthquake and its immediate impact on various environments such as urban, rural and natural areas.

Activity 1.2

Digital Quiz:

Real-time digital quiz will be administered to reinforce learning and assess understanding of key concepts discussed during the session.



This multiple-choice quiz is designed to assess knowledge about the nature, impact, and geographic occurrences of earthquakes. This tool is perfect for evaluating understanding in an educational session on earthquakes.

Questions:

What is the primary cause of most earthquakes?

- A) Volcanic activity
- B) Meteor impacts
- C) Movement of tectonic plates
- D) Severe weather conditions

Answer: C

What is the point directly above the earthquake origin called?

- A) Apex
- B) Epicenter
- C) Hypocenter
- D) Mantle

Answer: B

Which device is commonly used to measure earthquakes?

- A) Barometer
- B) Seismograph
- C) Altimeter
- D) Anemometer

Answer: B

Which scale measures the magnitude of an earthquake?

- A) Kelvin Scale
- B) Richter Scale
- C) Mohs Scale
- D) Newton Scale

Answer: B

Earthquakes are less likely to occur in which of the following areas?

- A) Along coastlines
- B) Near mountain ranges
- C) Close to plate boundaries



D) In the interior of tectonic plates

Answer: D

What type of boundary involves two tectonic plates moving away from each other?

- A) Convergent
- B) Divergent
- C) Transform
- D) Isolated

Answer: B

What are aftershocks?

- A) The initial shocks of an earthquake
- B) Smaller earthquakes that occur after the main shock
- C) Earthquakes that occur independently of the main shock
- D) Predictable shocks before the main earthquake

Answer: B

What can earthquakes trigger?

- A) Tsunamis
- B) Tornadoes
- C) Hurricanes
- D) Blizzards

Answer: A

Which area is known as the "Ring of Fire" due to its frequent earthquakes?

- A) The Amazon Basin
- B) The Great Plains
- C) The Pacific Rim
- D) The Sahara Desert

Answer: C

What is the focus of an earthquake?

- A) The point on the Earth's surface directly above where it originates
- B) The underground point where the earthquake starts
- C) The center of the tectonic plate involved
- D) The endpoint of seismic activity

Answer: B

The process by which ground water-saturated soil temporarily loses strength and acts as a



fluid is called:

- A) Soil liquefaction
- B) Soil displacement
- C) Soil erosion
- D) Soil consolidation

Answer: A

Which feature can increase during an earthquake due to the rapid release of energy?

- A) Temperature
- B) Air pressure
- C) Magnetic field
- D) Stress along faults

Answer: D

4.2 ACTIVITY 2 -How to respond in case of a severe Eartquake:

2.1 : DOs and DON'Ts QUIZ

Earthquake Safety Quiz: Do's and Don'ts

1. What is the recommended action if you are inside during an earthquake?

- a) Stand near a window
- b) Take cover under a sturdy piece of furniture
- c) Run outside immediately

2. What is the recommended action if you are outside during an earthquake?

- a) Stand near tall buildings
- b) Stay where you are and move away from buildings, streetlights, and utility wires
- c) Hide under a car

3. If you are in a crowded public place during an earthquake, what is the best course of action?

- a) Stay where you are and wait for instructions from authorities
- b) Scream and panic
- c) Start running in any direction

4. What should you do if you are driving when an earthquake occurs?

- a) Stop the car and stay inside
- b) Speed up and try to outrun the earthquake
- c) Pull over to a clear location, stop, and stay inside the vehicle until the shaking stops



5. What should you avoid doing during an earthquake to prevent injuries?

- a) Taking cover under a sturdy table or desk
- b) Running through doorways
- c) Calling friends and family to inform them about the earthquake

6. If you are indoors during an earthquake, what is a common mistake to avoid?

- a) Standing in a doorway
- b) Turning on all the lights
- c) Ignoring the shaking and continuing with your activities

7. What should you do if you are trapped under debris after an earthquake?

- a) Shout for help continuously
- b) Conserve your energy and cover your mouth with a cloth to avoid inhaling dust
- c) Attempt to move large debris by yourself

8. What should you do after the shaking stops and it's safe to move around?

- a) Immediately turn on gas appliances to check for leaks
- b) Check yourself and others for injuries and administer first aid if necessary
- c) Go back inside damaged buildings to retrieve personal belongings

9. During an earthquake, what is the recommended action if you are in bed?

- a) Stay in bed and cover your head with a pillow
- b) Get out of bed and lie face down next to it, covering your head and neck with your arms
- c) Jump out of bed and run outside

10. What should you avoid doing immediately after an earthquake to prevent further danger?

- a) Checking the internet for updates
- b) Using elevators
- c) Lighting candles for illumination

Answers:

- 1. b) Take cover under a sturdy piece of furniture
- 2. b) Stay where you are and move away from buildings, streetlights, and utility wires
- 3. a) Stay where you are and wait for instructions from authorities
- 4. c) Pull over to a clear location, stop, and stay inside the vehicle until the shaking stops
- 5. b) Running through doorways



6. a) Standing in a doorway
7. b) Conserve your energy and cover your mouth with a cloth to avoid inhaling dust
8. b) Check yourself and others for injuries and administer first aid if necessary
9. b) Get out of bed and lie face down next to it, covering your head and neck with your arms
10. b) Using elevators

2.2 ROLE PLAYING

2.3 Communication plan in case of severe earthquake

CHECKLIST :

1. Emergency Contact Lists:

Prepare a comprehensive list of personal and emergency contacts, including family members, friends, neighbors, local emergency services and charities.

Make sure every member of your household or team has access to this list.

Control List:

X All contacts' phone numbers, email addresses and physical addresses are up to date.

X Copies of the contact list are easily accessible in multiple formats (physical, digital).

2. Communication Chain:

Determine who will be responsible for initiating communication in the event of an earthquake. Establish a clear order of who should be contacted and who will take over if the primary person is unavailable.

Control List:

X Designated primary and secondary communicators.

X Clearly defined roles and responsibilities in the communication plan.

3. Prioritization of Information:

Determine what information is most critical during an earthquake, such as security status, location details and next steps.

Develop protocols for effectively disseminating this information to prevent misinformation.



Control List:

X Pre-prepared important messages (e.g. evacuation notices, status updates).

X Identified methods for sharing information (text messages, social media, emergency broadcast systems).

4. Redundancy and Backup Communication Methods:

Ensure alternative communication methods are available in the event of primary systems failure (e.g. battery-powered radios, satellite phones).

Control List:

X Secondary communication tools are ready and functional.

X Regular checks and maintenance of equipment.

5. Training and Exercises:

Regularly train all involved parties on the communication plan to ensure everyone knows what to do in the event of an earthquake.

Control List:

X Scheduled training sessions.

X Annual reviews and updates of the communications plan.

2.4 SCENARIO CARDS

2.5 Survival kit WORKSHEET

Earthquake Survival Kit Worksheet

1. Water: Calculate how much water you'll need for each person for at least three days. (1 gallon per person per day)

2. Food: Make a list of non-perishable food items that can sustain you and your family for several days. Include items like canned goods, protein bars, and dried fruits.

3. First Aid Kit: Check if your first aid kit is up to date. Ensure it includes bandages, antiseptic wipes, **pain relievers, and any necessary medications.**



- 4. Flashlight:** List the number of flashlights you have and ensure each one has working batteries. Consider including extra batteries.
- 5. Emergency Radio:** Include a battery-powered or hand-crank radio to stay updated on news and alerts.
- 6. Blankets:** Add warm blankets or sleeping bags to your kit to stay comfortable in case of extended power outages.
- 7. Clothing:** Include sturdy shoes, gloves, and extra clothing in case of injury or exposure to the elements.
- 8. Personal Hygiene Items:** Pack toiletries like toothbrushes, toothpaste, soap, and hand sanitizer.
- 9. Important Documents:** Compile copies of essential documents such as identification, insurance policies, and emergency contacts.
- 10. Tools:** Include basic tools like a wrench to turn off utilities if necessary.
- 11. Whistle:** Add a whistle to your kit to signal for help if trapped.
- 12. Cash:** Keep some cash on hand in case ATMs and banks are inaccessible during the emergency.
- 13. Special Needs:** Consider any special needs for infants, elderly family members, or pets in your survival plan.
- 14. Storage:** Choose a sturdy, waterproof container to store your survival kit in a readily accessible location.
- 15. Review and Refresh:** Regularly review and update your survival kit to ensure everything is in working order and replace any expired items.

Title: Earthquake Survival Kit Quiz

1. Which of the following is an essential item for an earthquake survival kit?

- a) A flashlight
- b) A hairdryer
- c) A pair of sunglasses

2. What type of food is best suited for an earthquake survival kit?



- a) Fresh fruits and vegetables
- b) Canned goods with a long shelf life
- c) Ice cream

3. Which of the following should be included in your earthquake survival kit for communication?

- a) A smartphone charger
- b) A DVD player
- c) A boombox

4. What is the recommended amount of water per person per day for an earthquake survival kit?

- a) 1 gallon
- b) 2 liters
- c) 3 cups

5. Which of these items is essential for first aid in an earthquake survival kit?

- a) Band-aids
- b) A sewing kit
- c) A compass

6. Which of the following is not recommended for an earthquake survival kit?

- a) A multi-tool or Swiss Army knife
- b) Matches or a lighter
- c) A collection of novels for entertainment



7. What type of shelter is recommended for an earthquake survival kit?

- a) A tent
- b) A hammock
- c) A beach umbrella

8. Which of the following should be included in your earthquake survival kit for warmth?

- a) A wool blanket
- b) A beach towel
- c) A silk scarf

9. What should you include for your pet in an earthquake survival kit?

- a) Extra toys
- b) A leash and collar
- c) Perfume

10. What is a crucial item for sanitation in an earthquake survival kit?

- a) Toilet paper
- b) Bubble bath
- c) Scented candles

Answers:

- 1. a) A flashlight
- 2. b) Canned goods with a long shelf life
- 3. a) A smartphone charger



- 4. a) 1 gallon
- 5. a) Band-aids
- 6. c) A collection of novels for entertainment
- 7. a) A tent
- 8. a) A wool blanket
- 9. b) A leash and collar
- 10. a) Toilet paper

Activity 3. Evacuation plan in case of Earthquake

Activity 4. ECO-RESILIENCE

QUIZ Questions:

What is the primary purpose of seismic retrofitting in buildings?

- A) To beautify the building exterior
- B) To make buildings more energy-efficient
- C) To strengthen buildings to withstand seismic activities
- D) To reduce construction costs

Which feature is essential in the design of a new building to enhance its earthquake resilience?

- A) High ceilings
- B) Large windows
- C) Deep foundations
- D) Base isolators

What is a crucial practice for household earthquake preparedness?

- A) Keeping heavy objects on high shelves



- B) Securing heavy furniture and appliances to the walls
- C) Using glass containers for storing all liquids
- D) Installing delicate light fixtures in every room

Which policy is most effective in mitigating earthquake risks at the community level?

- A) Regularly updating fashion outlets
- B) Enforcing strict building codes that require earthquake-resistant designs
- C) Increasing the number of parks
- D) Reducing the number of public awareness campaigns

How does land-use planning contribute to earthquake mitigation?

- A) By promoting residential developments in high-risk zones
- B) By restricting developments in earthquake-prone areas
- C) By encouraging the construction of taller buildings
- D) By decreasing public spaces in urban layouts

Answer Key:

- C) To strengthen buildings to withstand seismic activities
- D) Base isolators
- B) Securing heavy furniture and appliances to the walls
- B) Enforcing strict building codes that require earthquake-resistant designs
- B) Restricting developments in earthquake-prone areas

4/1 Role-play exercise:



Feedback Quiz: Earthquake Mitigation and Adaptation

Multiple-Choice Questions:

Which is the primary benefit of seismic retrofitting?

- A) Enhance aesthetic value
- B) Increase property value
- C) Improve structural resilience
- D) Reduce insurance costs

What does an earthquake early warning system primarily provide?

- A) Damage assessment
- B) Immediate evacuation
- C) Advance notice to take cover
- D) Information on earthquake magnitude

Which is a critical component of community-based adaptation strategies?

- A) Regular social events
- B) Earthquake simulation drills
- C) Investment in local businesses
- D) Development of recreational areas

Open-Ended Questions:

What do you think are the key challenges in implementing earthquake mitigation techniques in urban settings?

.....

Describe an effective earthquake adaptation measure that could be implemented in coastal



areas.

.....

What improvements would you suggest for local earthquake early warning systems?

.....

Yes/No Questions:

Is it essential to include earthquake insurance in mitigation strategies?

Yes

No

Should earthquake drills be mandatory in schools and workplaces?

Yes

No

Retrofitting is only necessary for older buildings.

True or False:

Only certain geographic areas need to prepare for earthquakes.

True or False:

Scenario-Based Questions:

If an earthquake occurs and you are indoors, what is the safest action to take?

- A) Stand in a doorway
- B) Hide under a sturdy table
- C) Exit the building immediately
- D) Use the elevator to get to ground level

What should be included in a personal emergency kit for earthquakes?

- A) Candles and matches



- B) Non-perishable food and water
- C) A selection of books
- D) All of the above

Activity-5 : Policy, Governance, and local Community Engagement during Eartquakes

Activity-5.1 : **Community Engagement Plan**



MODULE 5: Response and climate action in case of floods

1.1 ACTIVITY 1: What is a flood? How many types of floods are there? What are their risks? (30 minutes)

Floods occur when an expanse of water submerges land that is usually dry. This natural phenomenon is among the most common and widespread of Earth's weather-related disasters. Floods can develop over several weeks or happen suddenly, depending on the cause, and are classified into several types based on their source and development speed. The term 'flood' means 'the temporary covering by water of land not normally covered by water'. The notion includes floods from rivers and mountain torrents, as well as floods from sea surges in coastal areas. In some interpretations, it also includes floods from sewage systems.

Flood type	Examples
Heavy or intense rainfall	Slow-onset riverine flood (fluvial) Flash flood (rapid onset) Intense, sudden rush of water caused by heavy rainfall or dam failure. These can develop in just minutes, posing significant risk to life and property Pluvial or surface water flood affecting sewers and urban drainage Groundwater flood
Thawing of ice	Glacial meltwater Snowmelt
Dam failure	Dam break Dam overtopping
Tidal wave or wave extremes	Storm surge Tsunami

(source: Floods in the WHO European Region: health effects and their prevention - 2013)



Risks and real case examples

According to the WMO report for 2023 :

- During 2023, Europe as a whole saw around 7% more precipitation than average.
- Averaged across the European river network, river flows were the highest on record for December, with 'exceptionally high' flow in almost a quarter of the river network.
- During 2023, one third of the European river network saw river flows exceeding the 'high' flood threshold, and 16% exceeding the 'severe' flood threshold.



(source: <https://wmo.int/news/media-centre/europe-experiences-widespread-flooding-and-severe-heatwaves-2023>)

A new Copernicus and WMO (World Meteorological Organisation) report in 2023 highlights the need for flood defences, the potential for hydropower and the urgency of climate action. One third of rivers across Europe breached the ‘high’ flood threshold last year, climate scientists have calculated, while 16 per cent swept past the ‘severe’ mark.

Discuss in class what are the effects of floods in urban and rural environment. You can use these questions to start a discussion and check the students’ knowledge.

What is a flood?

- A. A big wave in the ocean
- B. A sudden overflow of water onto normally dry land**
- C. A type of earthquake
- D. A large snowstorm

Which type of flood happens quickly and can be very dangerous?

- A. Flash flood**
- B. River flood
- C. Coastal flood
- D. Urban flood

How can floods affect a rural environment?

- A. Damaging crops and farmland**
- B. Causing traffic jams
- C. Making tall buildings collapse
- D. Closing schools and shops

Which type of flood is common in cities with a lot of pavement and buildings?

- A. River flood
- B. Flash flood
- C. Urban flood**
- D. Coastal flood

What can happen in an urban area during a flood?

- A. Crops grow faster
- B. Roads can become rivers**
- C. Animals find more food
- D. It starts to snow

Did you know?

In countries that are noticeably impacted by climate change and severe rainfall floods have destructed whole towns and communities causing immeasurable damage in buildings and causing the death of dozens of people and the displacement of whole communities that seek refuge in safer



regions.

The impacts of floods are multifaceted, affecting every level of society and the natural environment in profound ways. Understanding these impacts is essential for building resilience and improving preparedness in vulnerable regions. It also highlights the importance of sustainable environmental management and urban planning in mitigating the effects of floods. Through comprehensive planning, community education, and investment in infrastructure, the risks posed by future flooding events can be significantly reduced, protecting both human communities and the natural environment



Video watching link: <https://www.youtube.com/watch?v=4PXj7bOD7IY>

1.2 Activity 2: How to stay safe? Understanding the importance of prevention (40 minutes)

Flood warning systems are essential tools in mitigating the impacts of flooding by providing timely information that can save lives and property. This guide is designed to help teachers and secondary education students understand how these systems function, their importance, and how communities can respond effectively.

One of the measures on the part of the European Union is the European Flood Awareness system: <https://european-flood.emergency.copernicus.eu/en> , where there are many resources available regarding flood preparedness such as maps, news and webinars.



Components of Flood Warning Systems

Data Collection: Sensors and Gauges measure water levels, flow rates, rainfall, and soil moisture in rivers, lakes, and streams; weather Satellites and Radar provide data on storm patterns, rainfall intensity, and weather system movements.

Data Analysis: Hydrological and Meteorological Models use sensor data and forecasts to predict water rise and flood severity, helping to understand water cycle dynamics and potential runoff.

Communication and Dissemination: Warning Services formulate and send flood warnings to the public, government agencies, and emergency services, categorized as advisories, watches, and warnings.

One example regarding Flood warning systems is the **UrbanFlood early warning system (EWS)**. This is an Internet-based system designed to monitor data from extremely large sensor networks in flood defences such as embankments, dikes, levees, and dams. The EWS uses real-time sensor information and Artificial Intelligence (AI) to quickly calculate the probability of dike failure and possible scenarios of dike breaching and predicted flood spreading. It presents results on interactive decision support systems that assist dike managers and public authorities during flood events.

How to stay safe?

First and foremost, students must comprehend the risks associated with flooding, especially when indoors. Flooding can occur swiftly and can vary greatly in severity, from minor floor-level flooding to conditions that can engulf an entire ground floor. Key risks include electrical hazards, where water contact with power sources can lead to electrocution; structural damage, which may compromise the integrity of buildings; and health risks from contaminated waters, which can carry pathogens, chemicals, and debris. Educate students about the importance of flood safety and empower them with knowledge so they can react confidently under direction during an emergency.

Preparation is Key

- * Have a list with emergency contacts and one contact that is out of your town.
- * Learn about your school's emergency plan in case of flood
- * Make sure you know the escape routes around your school: Identifying safe paths to higher ground or out of the school/ neighborhood.
- * In case you don't know how to swim, consider taking up swimming lessons, as part of your preparation against potential floods in your area.

Communication strategy

How family members will stay in contact if separated? Make sure you have a plan with your family and classmates on how to contact one another in case of emergency. This could also involve designating a relative or friend outside the flood zone as a central contact point.



Emergency kit preparation

This kit should include water, non-perishable food, a first-aid kit, medications, flashlights, batteries, cell phone and crucial documents in waterproof containers.

During the Flood

Avoid electrical equipment: Do not touch any electrical equipment including plugs and appliances

Stay out of floodwater: If evacuation is not possible, move to higher floors or the roof. Floodwater can be deceptively powerful and contaminated.

Post-Flood Safety

After a flood, the dangers do not recede with the water. Structural damage, electrical system compromises, and water contamination are serious concerns.

Wait for official clearance: Before re-entering flood-affected areas or buildings, ensure it is officially declared safe by authorities.

Beware of contamination: Wear protective clothing during cleanup and be cautious of water that may be contaminated with sewage or chemicals.



Suggested activities: (30 minutes each)

Educators can organize interactive activities that allow students to engage with the material actively. For example, mapping exercises where students identify potential flood zones within their



community based on topography and historical data can be very enlightening. Additionally, role-playing exercises where students must make quick decisions based on evolving flood scenario details can help cement their understanding of emergency preparedness. All the above can be taught and communicated through activities and games in the school curriculum.

1. Drill of Flood Evacuation Plan:

- Divide students into groups and provide them with a floor plan of a building or a classroom.
- Instruct each group to create a flood evacuation plan for their assigned space, considering different scenarios.
- Students should identify primary and secondary evacuation routes, safe assembly points, and designated leaders responsible for guiding others during an evacuation.

2. Safety Posters and Infographics:

- Assign students to create eye-catching posters or infographics that highlight flood safety tips and actions.
- Encourage the use of visuals, colors, and clear messaging.
- Display the posters in the classroom or school hallways to remind students about flood safety measures.

3. Emergency Kit Creation:

- Guide students in creating their own emergency kits for flood situations.
- Discuss the essential items to include, such as non-perishable food, water, flashlights, batteries, first aid supplies, and important documents.
- Encourage students to bring their emergency kits to class for discussion and review.

For the creation of the kit, we suggest including:

- Water (one gallon per person per day for several days, for drinking and sanitation)
- Food (at least a several-day supply of non-perishable food)
- Battery-powered or hand crank radio and a NOAA Weather Radio with tone alert
- Flashlight
- First aid kit
- Extra batteries
- Whistle (to signal for help)
- Dust mask (to help filter contaminated air)
- Plastic sheeting and duct tape (to shelter in place)
- Moist towelettes, garbage bags and plastic ties (for personal sanitation)
- Wrench or pliers (to turn off utilities)
- Manual can opener (for food)
- Local maps
- Cell phone with chargers and a backup battery

(source: <https://www.ready.gov/kit>)

4. Discussion on the do's and don'ts during a flood in an indoor and outdoor scenario.

For the former, consider these elements:

- Stay Informed: Listen to radio and television, check the Internet and social media for



information and updates.

- Seek Higher Ground: If you live in a flood prone area or are camping in a low lying area, get to higher ground immediately.
 - Obey Evacuation Orders: Evacuate school premises as soon as possible if instructed so by local authorities. If you have time, disconnect utilities and appliances.
 - Practice Electrical Safety: Don't go into a basement, or any room, if water covers the electrical outlets or if cords are submerged. If you see sparks or hear buzzing, crackling, snapping or popping noises--get out! Stay out of water that may have electricity in it!
 - Keep children away from dirty water. Keep children and pets away from hazardous sites and floodwater as it's likely to be dirty, carry bacteria, and vulnerable to electric shock.
 - Keep children clean. Wash children's hands frequently (always before meals) and ensure they bathe after being exposed to flood waters or flood-damaged areas.
- (Source: <https://pinellas.gov/safety-tips-before-during-and-after-a-flood/>)
- Electricity should be turned off. Some appliances, such as television sets, keep electrical charges even after they have been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned and dried.
 - Be alert for gas leaks. Use a flashlight to inspect for damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been turned off and the area ventilated.

For outdoor safety, consider these ones:

- Avoid Walking Through Flood Waters
 - Six inches (15 cm) of moving water can knock you off your feet.
 - Stay away from riverbanks and urban streams.
- Do Not Drive Through Flooded Areas
 - Most flood-related drownings occur in vehicles.
 - Follow travel routes recommended by local authorities.
- Stay Away from Power Lines and Electrical Wires
 - Electrocution is the second leading cause of flood deaths.
- Look Before You Step
 - Floors and stairs may be covered with debris like mud and broken glass.
- Move to Higher Ground
 - If trapped by moving water, seek the highest possible point.
 - Avoid camping or parking along streams, rivers, and creeks during heavy rain.
- Do Not Drive Around Road Barriers
 - Water may be deeper than it appears and hide hazards.
 - 30 cm of water can float a car; 45 cm can carry away larger vehicles.
- Avoid Bridges Over Fast-Moving Water



- Floodwaters can undermine bridge foundations, making them unstable.
- 30 cm of moving water can sweep your vehicle away.
- Abandon Car If Water Rises
 - If floodwaters rise around your car but are not moving, leave the car and move to higher ground.
 - Do not exit the car into moving water.

Additional information:

<https://www.beprepared.com/blogs/articles/stuck-in-a-flooded-car-heres-how-to-save-your-own-life>

<https://blog.americansafetycouncil.com/how-to-survive-a-flash-flood-in-your-car-2/>

<https://www.rospa.com/leisure-water-safety/leisure-safety/flood>

<https://www.rospa.com/policy/road-safety/advice#e>

https://www.ready.gov/sites/default/files/2019-06/family_communications_plan_kids.pdf

https://europa.eu/youreurope/citizens/travel/security-and-emergencies/emergency/index_en.htm



MODULE 6: Response and climate action in case of droughts

ACTIVITY 1: Understanding Droughts and Their Impacts in the Context of Climate Change (30 minutes)

Learning Outcome: Define droughts and their effects specifically in the context of climate change.

COURSE INTRODUCTION (5 min)

1. Open Question: "What is a Drought?"
2. Before telling you the answer, let's watch an introductory video about droughts.

PART 1 - WHAT ARE DROUGHTS ? - (5min)

<https://www.youtube.com/watch?v=ZoRxIIvSbtQ>

Interactive discussion about video (10 min)

Questions : The professor asks questions to the students about their understanding of the video

- According to your understanding, what is a drought ?
 - A drought is a long period of time when there isn't enough rain or water available.
- What are the three types of droughts?
 - Meteorological Drought: When it doesn't rain enough for a long time.
 - Agricultural Drought: When there's not enough water in the soil for plants to grow well.
 - Hydrological Drought: When rivers and lakes don't have enough water.
- According to your understanding, why do droughts happen ?
 - Answer: Droughts can be caused by various factors including climate change, human activities such as deforestation and excessive water consumption, agricultural practices, water mismanagement, and natural climate variability.
- What are the effects of droughts ?
 - Answer: Droughts can lead to crop failures, water shortages for human consumption and sanitation, habitat loss for wildlife, food insecurity, water-related diseases, and biodiversity decline.
- In your own words, how would you say droughts are linked to climate change ?
 - Droughts are linked to climate change because the Earth's climate is getting warmer. As temperatures rise, it can change weather patterns, making some places hotter and drier. This means there's less rainfall, which can lead to droughts. So, while droughts



have always happened naturally, climate change is making them more frequent and severe in some places.

PART 2 - WHAT HAPPENS AROUND THE GLOBE (10 minutes)

China : <https://www.youtube.com/watch?v=12CrnET3wTo>

What is happening in the video ?

Mauritania : <https://www.youtube.com/watch?v=sDTKeo5pKdo>

What is happening in the video ?

CONCLUSION (key points)

4.3 ACTIVITY 2. Water saving challenge (45 min)

Learning outcome: Demonstrate water conservation practices and their role in preventing and mitigating the impacts of droughts.

INTRODUCTION (10min)

Professor explains the importance of water conservation and its role in preventing and mitigating drought impacts.

CHALLENGE (30 min)

Objective: To educate students about the importance of water conservation and to encourage them to brainstorm and present strategies for conserving water in various scenarios.

Rules:

1. The professor divides the class into teams.
2. Each team will receive a situation card and a set of strategy cards.
3. Teams will have a designated amount of time to discuss and plan their water conservation strategies based on the situation given.
4. After the planning phase, each team will present their strategies to the class. Presentations should include explanations of the chosen strategies and why they are effective for conserving water in the given scenario.
5. The class can ask questions or provide feedback after each presentation.
6. After all teams have presented, the class can vote on the most creative or effective strategy.

CONCLUSION (5min)



4.4 ACTIVITY 3: Finding Solutions to Droughts (60 minutes)

Learning Outcome: Find creative and implementable solutions about droughts

INTRODUCTION + EXPERT INTERVENTION (40 minutes)

1. Review the key concepts learned about droughts.
2. Explain the purpose of the activity: to creatively express understanding of droughts and brainstorm ideas for addressing this environmental challenge.
3. Expert intervention regarding potential solutions to droughts (expert comes from an NGO, a cie, a governmental institution) - expert's role is to empower students.

CREATIVITY (20 minutes)

1. Provide students with poster boards or large sheets of paper along with art supplies.
2. Guide students to utilize their creativity to design posters that visually depict their comprehension of droughts, their ramifications, and potential solutions.
3. Students can choose between 3 levels of action : solutions me and my family can implement, solutions we can implement with my community, solutions we can implement worldwide
4. Encourage students to incorporate drawings, symbols, colors, and text to effectively convey their messages.

POSTER PRESENTATION OR GALLERY WALK (10 minutes per person)

1. Once the posters are completed, arrange them around the classroom or in a designated area for a gallery walk.
2. Each student or group of students present their poster briefly, highlighting key points and insights depicted on their artwork.

The posters can also be displayed in a gallery walk - family could be invited to see the students work

Conclusion and Reflection (10 minutes)

1. Summarize the main themes and innovative solutions proposed during the activity.
2. Encourage students to reflect on what they've learned and how they can apply this knowledge to contribute to drought mitigation efforts in their communities.
3. Emphasize the importance of creative thinking and collaboration in addressing complex environmental challenges like droughts.



4.5 ACTIVITY 4: Exploring the Emotional Impacts of Droughts (20 minutes)

Introduction (5 minutes)

1. Provide a brief introduction to the emotional impacts of droughts and underscore the significance of discussing this aspect.
2. Explain that droughts can evoke emotions such as anxiety, sadness, and fear due to their profound effects on water scarcity, food insecurity, and environmental changes.

Mindfulness Exercise (5 minutes)

- Lead students in a brief mindfulness exercise to help them connect with their emotions and cultivate self-awareness.
- Guide them through deep breathing and a body scan, encouraging them to observe any sensations or emotions that arise without judgment.

Discussion (10 minutes)

1. Facilitate a group discussion on the emotional responses elicited by droughts, posing open-ended questions such as
2. Encourage students to share their thoughts, experiences, and insights while fostering a supportive and empathetic atmosphere.
3. Summarize key points discussed and transition to conclusion.

COURSE CONCLUSION (15 min)

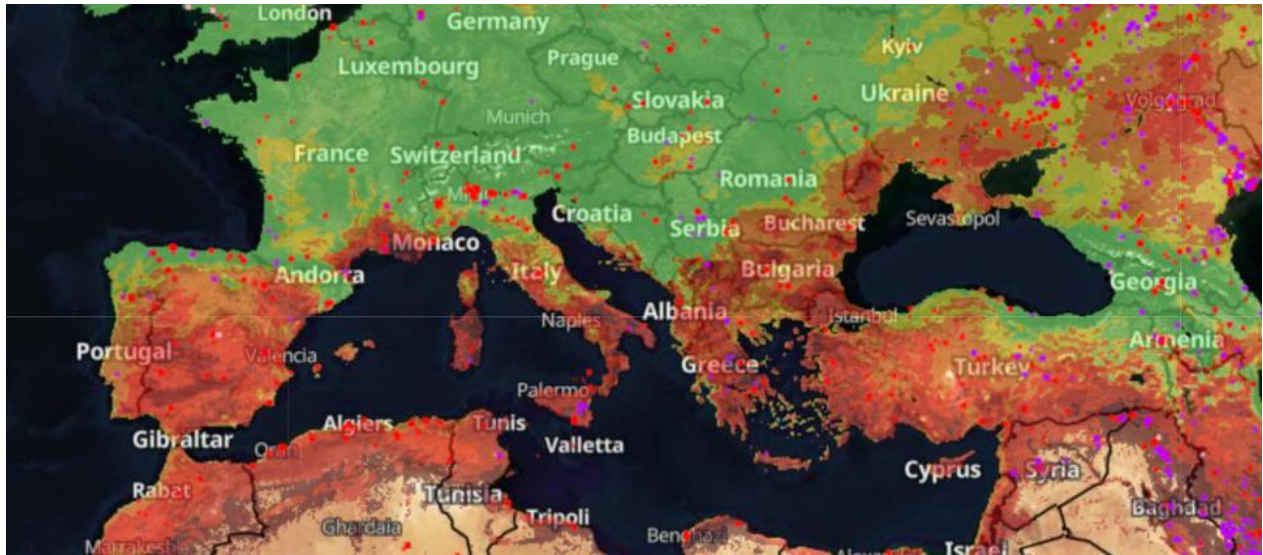
1. Conclude the course by thanking the students for their participation and creative contributions.
2. Emphasize the importance of raising awareness about droughts and taking proactive steps to mitigate their impacts.
3. Encourage students to continue exploring ways to address environmental challenges and make a positive difference in their communities.



5 MODULE 7. Response and climate action in case of vegetation fires

5.1 ACTIVITY 1: What are forest fires?

1.1 Map of major European areas where the largest fires have occurred in the past year.



https://effis.jrc.ec.europa.eu/apps/effis_current_situation/

Consideration is given to data provided by EFFIS - European Forest Fire Information System, a modular web-based geographic information system, managed by the European Commission's Joint Research Centre, which provides both near-real-time information (through satellite analysis from the Copernicus system) and official time series reported by individual countries, relating to fires in the European, Middle Eastern and North African regions. EFFIS was established by the European Commission in collaboration with national fire administrations to assist the services in charge of forest fire protection in the EU and neighboring countries, as well as to provide the Commission services and the European Parliament with harmonized information on forest fires in Europe.

Specific reports on phenomena affecting southern Italy, issued by ISPRA - Istituto Superiore per la Protezione e la Ricerca Ambientale, were also considered.

According to EFFIS data in the year 2023, In Italy, 97,382 hectares of vegetation went up in smoke. In particular, considering the average of the week historically most affected by fires, i.e., the last week of July, it can be seen that in Italy, in the years 2006-2022, about 9,000 hectares of vegetation went up in smoke. Examination of the data reveals glaringly how, in the year 2023, the month of July alone was way off the scale: in fact, in the week of reference alone, it came close to 34,000 hectares.



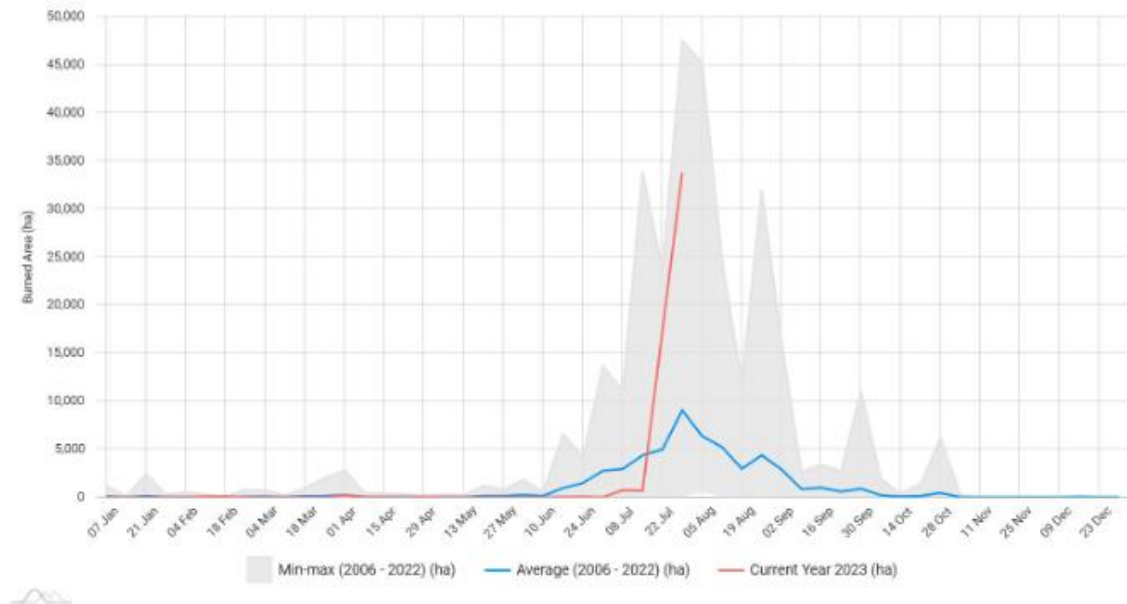
ECOSTAND

Simulation Training and Gaming to Raise Awareness about Climate Change and to behave appropriately in case of Natural Disasters for Secondary Schools



Co-funded by
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Area burned weekly during 2023 compared with the average (2006-2022). Source: EFFIS

Specifically, Sicily, with 41,365 hectares in ashes from the beginning of the year to the end of July 2023, is the region most affected by the flames (accounting for 80 percent of the national total), which have threatened population centers, people's lives and biodiversity. Specifically, in three days from July 25-27, 2023, as much as 31,078 hectares of vegetation burned, including nearly 15,000 hectares in the province of Palermo alone.



1.2 Presentation through the aid of Canva of causes, effects and classifications of forest fires.



Natural hazards include all those processes that threaten man's existence as well as his activities, limiting the enjoyment of environmental resources due to negative actions on ecological systems. To this category

belong risks related to geological factors, water resources, climate and fire: the latter, specifically, is one of the main sources of land disturbance, capable of causing damage to the environment, economy and health.

A forest fire is a fire that tends to spread over wooded, shrub or arboreal areas, including any man-made structures and infrastructure located within the same areas, or over cultivated or uncultivated land and pastures adjacent to the areas (Article 2 of Law No. 353 of 2000). In the specific case where the fire spreads close to houses, buildings or places frequented by people, this is called an interface fire.

Fire is a combustion phenomenon that needs three basic elements to ignite and feed itself over time: fuel, oxidizer and ignition energy. In the case of forest fire, the fuel is all the woody materials that make up the plants and other vegetation in the area of interest; the oxidizer is atmospheric oxygen while the ignition energy is external, usually a flame.

The fire begins with the combustion of the lightest and smallest substances that it increases.



The causes of fires can be natural or human. Fire predisposing factors are the set of aspects that promote fire ignition and fire spread. They include: vegetation characteristics, climatic conditions, soil morphologies. On the basis of the vegetation layer involved in the burning process, it is possible to distinguish different types of fires: subterranean, grazing, crown or barrier fire.

The damages caused by fires affect vegetation, fauna, soil, atmosphere, and landscape.

From a time perspective, damage can be classified into first-order and second-order damage.

The main regulatory reference for forecasting, prevention and active fight against forest fires in the national territory is Law No. 353, Nov. 21, 2000, “*Framework Law on Forest Fires*”.



5.2 ACTIVITY 2: Kahoot

2.1 Based on the information from Activity 1, participants, divided into groups, answer a self-assessment questionnaire through Kahoot!



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2.2 Debate on the test results

5.3 ACTIVITY 3: Case study

3.1 Brainstorming on the causes and concauses that contributed to the tragic event that is the subject of the case study.



3.2 Presentation of the case study: from the night of July 24 to the aftermath of Tuesday, July 25, 2023, for more than 48 hours, Palermo and its province were in the grip of wildfires. The situation was truly dramatic, not only for the affected forest environments, but especially for the consequences of the vast fires that licked many densely populated urban areas. Dozens of fires, fueled by the heat and strong winds, have in fact developed all around the city and province, causing more than a thousand people to leave their homes, five fatalities and the emission of highly polluting substances due to the fire that developed in the landfill. There were also blackouts and major problems related to air traffic, as well as damage to numerous infrastructures.



Teams of firefighters, civil defense, forestry, carabinieri, police, municipal and volunteers manned all the areas affected by the flames: Capo Gallo, Mondello, Sferracavallo, Barcarello, Boccadifalco, Baida, Poggio Ridente, San Martino, Monreale, Inserra, Cruillas, Tommaso Natale, Villagrazia, Bellolampo, Borgo Nuovo, Altofonte. In the province, fires from Bagheria to Terrasini led to the closure of the A29 Palermo-Mazara del Vallo and the A19 Palermo-Catania highways. The fire also reached Falcone Borsellino airport, which was closed for several hours. The City of Palermo has set up the Emergency Operations Center and urged citizens not to go outside because of the dioxin risk. Hospitals are also in trouble: between Altofonte and Palermo alone, about 1,500 people have been evacuated and nearly 190 hospital operations have been carried out, mostly for breathing smoke. The flames are not sparing even monuments. The flames also affected the Bellolampo landfill, causing dioxin contamination of the air.

The canadair were only able to operate by daylight: as the Civil Defense explained, the strong



sirocco wind prevented night flights.

<https://www.rainews.it/tgr/sicilia/video/2023/07/incendi-palermo-borgo-nuovo-danni-b970730d-75e2-4524-8417-df60da4cf9ef.html>

https://player.vimeo.com/progressive_redirect/playback/740784078/rendition/720p/file.mp4?loc=external&oauth2_token_id=1467441249&signature=4f3760673f3ffa97e21f317720fa50ecf13dec5ac6bae910f3e630bb00dd7b86

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https://www.facebook.com/story.php?story_fbid=pfbid06CwQJNVhJxVb9HQtvZQFtBTGE4yP3G6kLEm9ZnCSkk4ma1ukWqN5ttgJDoNQEZcnl&id=100000802498406&sfnsn=scwspwa&_rdr

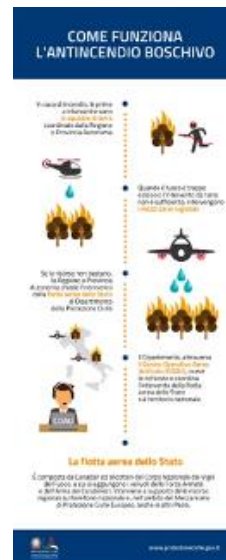




3.3 Group activity: each group is assigned a specific symbolic place affected by the summer 2023 fires on which to do an online search for images, videos and news. Sharing of results through multimedia presentation.

5.4 ACTIVITY 4: Good practices and brochure

4.1 Sharing specialized websites (e.g., Civil Defense, Legambiente...) to learn about good practices to put in place to prevent and deal with a forest fire.



<https://rischi.protezionecivile.it/it/incendi-boschivi-0/>

Sharing specialized websites investigating the causes and effects of climate change as it



relates to wildfires.



<https://www.greenpeace.org/italy/storia/5964/ecco-come-i-cambiamenti-climatici-incidono-sugli-incendi/>

<https://www.nationalgeographic.it/perche-il-cambiamento-climatico-e-ancora-la-principale-minaccia-per-la-salute-umana>

4.2 Activities in groups to produce a brochure with good practices in order to prevent and cope with fires, also in relation to climate change.

4.3 Realization of a single product and work sharing.



5.5 ACTIVITY 5: Practical activity

5.1 Sharing the school safety plan.



5.2 Participants are divided into groups and each group is assigned a classroom and/or room in the school to go to and evacuate from.

5.3 The evacuation plan is implemented.

