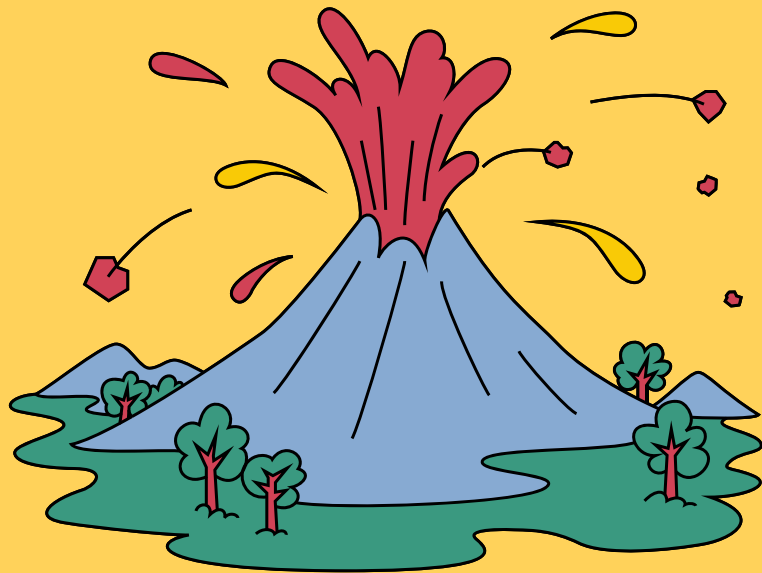


The illustration depicts three distinct natural hazard scenarios. On the left, a red volcano with blue lava flows erupts, sending a large plume of grey smoke into the sky. In the center, a city street is shown with a blue car on a road that has cracked and split into jagged pieces. On the right, two workers in red uniforms and yellow hard hats are seen amidst a field of brown rubble and debris, suggesting a major structural failure or landslide.

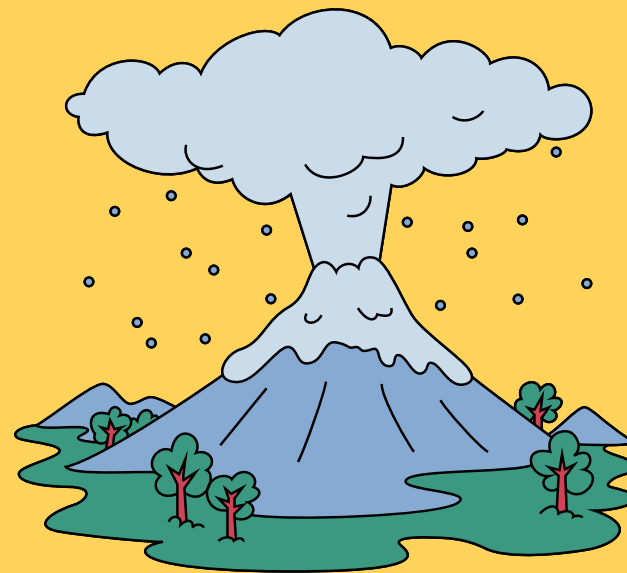
NATURAL HAZARDS OCCURRING LOCALLY

Adéla Velísková, Patrícia Malíková a Tobias Vajgel

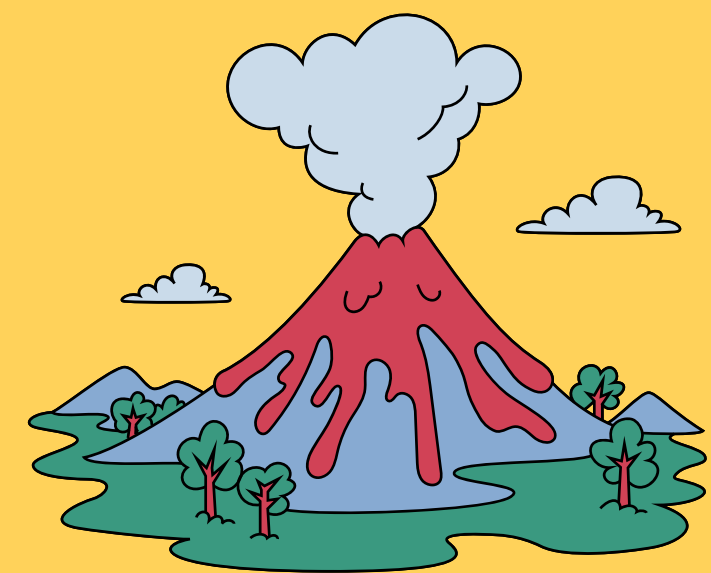
INTRODUCTION



Students should be able to identify the difference between natural events, natural hazards and natural disasters



Identify the different categories of natural hazards



Understand the impact of natural hazards on our lives and be more careful

MAN-MADE HAZARDS

We shouldn't confuse man-made hazards with natural hazards

Caused by people

Radiation leaks, oil and chemical spills, mining accidents, terrorist attacks

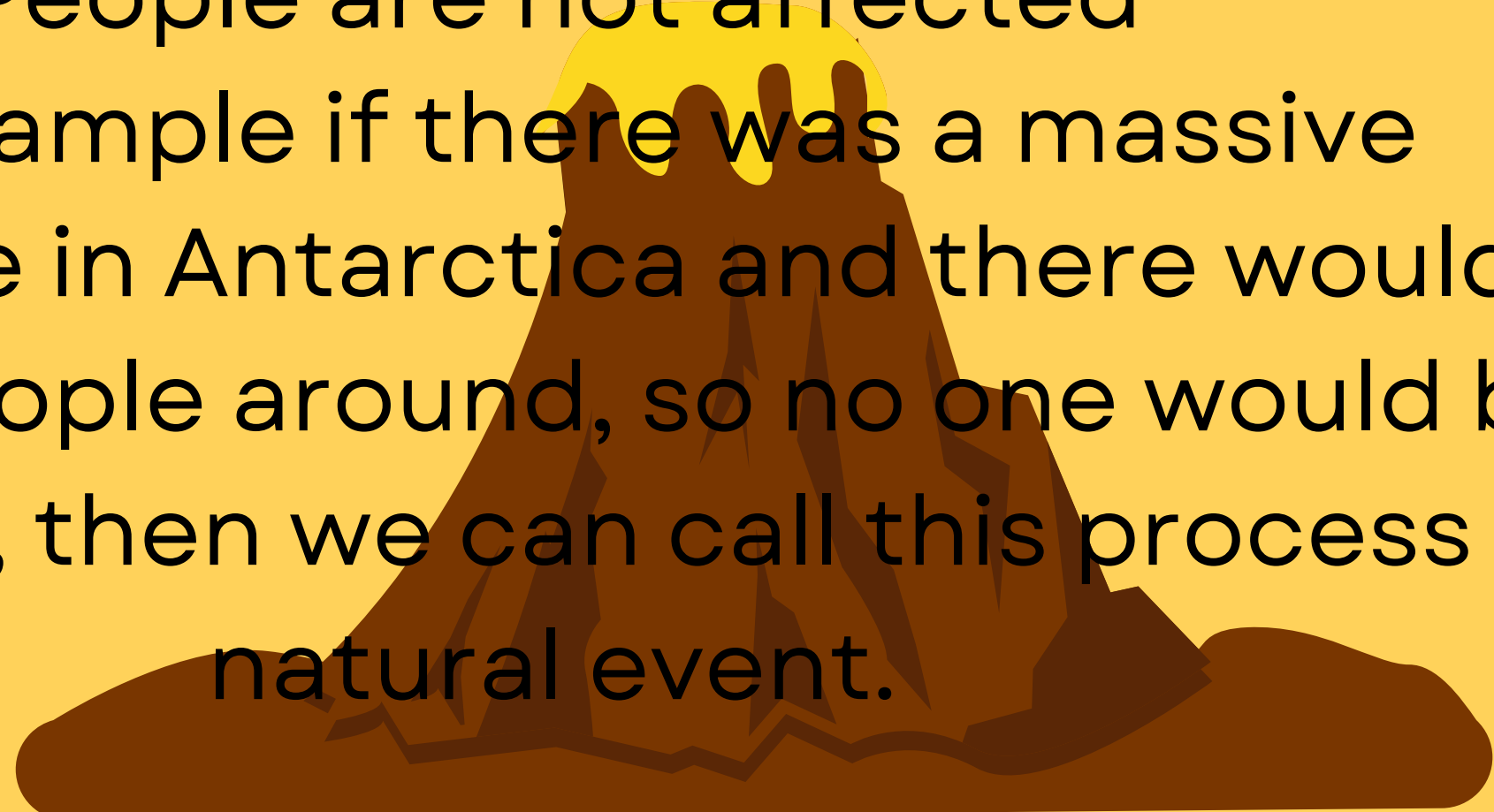


NATURAL EVENTS

Are all the ways our restless Earth is constantly reshaping and modifying itself

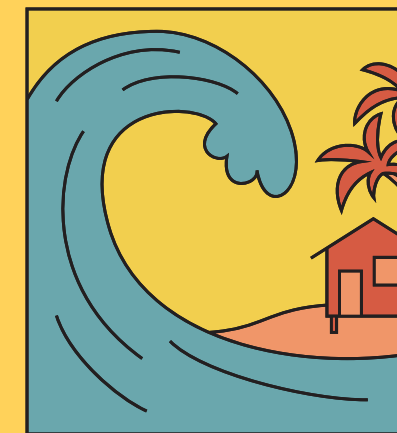
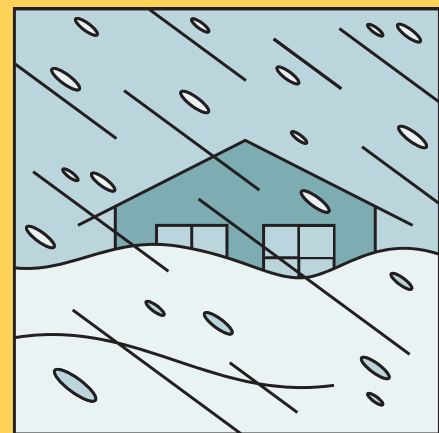
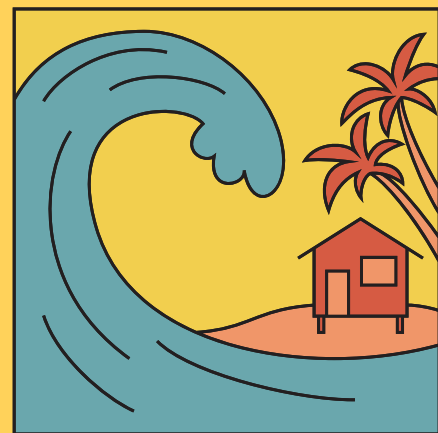
People are not affected

For example if there was a massive earthquake in Antarctica and there wouldn't be any people around, so no one would be affected, then we can call this process a natural event.



NATURAL HAZARDS

What turns natural event into a natural hazard?



NATURAL HAZARDS

Natural hazard is a natural event that poses a risk to people and property (there has to be an element of human involvement)

Every natural hazard has two components:

**THE ACTUAL
PHYSICAL EVENT
OR PROCESS**

**THE POTENTIAL
IMPACT ON
HUMANS**

CATEGORIES

Geophysical

- Earthquakes
- Volcanic Activity

Hydrological

- Flooding
- Landslides
- Tsunamis
- Avalanche

Meteorological

- Heat Waves
- Cold Waves
- Hurricanes
- Hails
- Winter Storms
- Lightning
- Drought
- Wildfire
- Tornados
- Winds

Geophysical



*This is also termed as geological hazard.
They are driven by geological (i.e., Earth)
processes, in particular, Shifts in tectonic
plates and seismic activity*



Hydrological

Are hazards driven by hydrological (i.e., water) processes.

The deadliest natural disaster in world history (not counting pandemics) was the 1931 Central China floods, killing three or four million people.



Meteorological

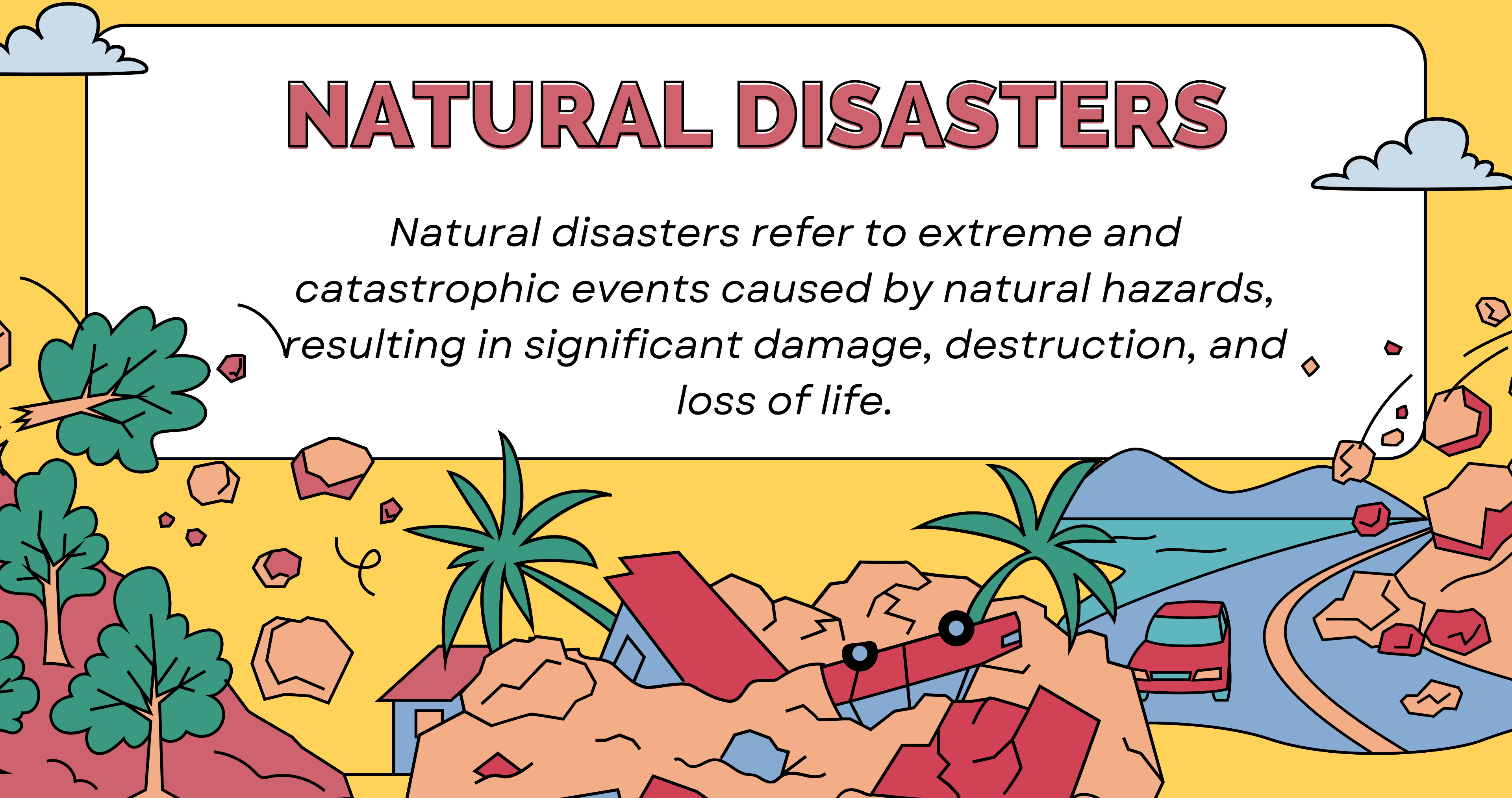


Are hazards driven by meteorological (i.e., weather) processes, in particular those related to temperature and wind. Such hazards are normally related to unexpected and adverse changes in the weather or weather-forming means.



NATURAL DISASTERS

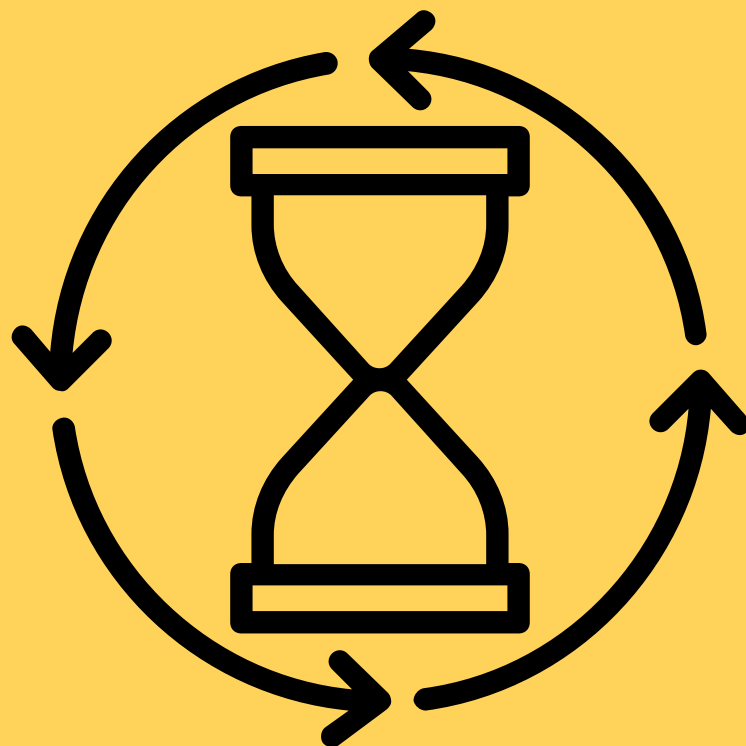
Natural disasters refer to extreme and catastrophic events caused by natural hazards, resulting in significant damage, destruction, and loss of life.



EVALUATING HAZARDS

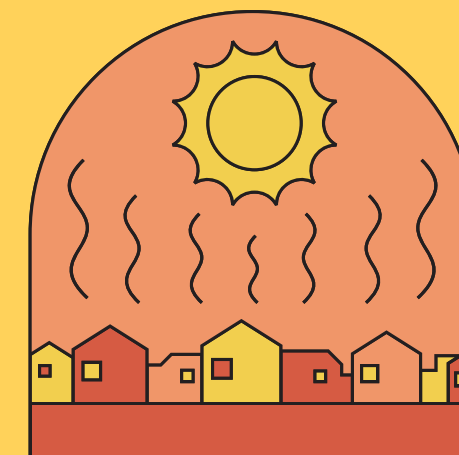
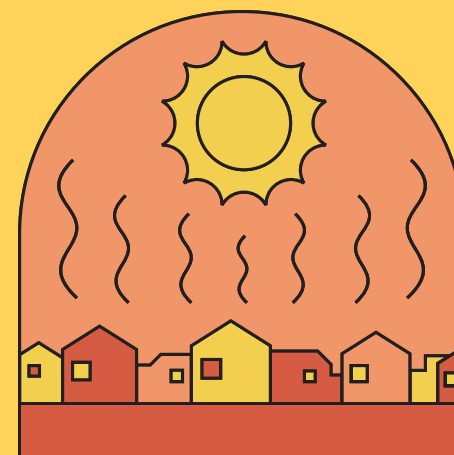
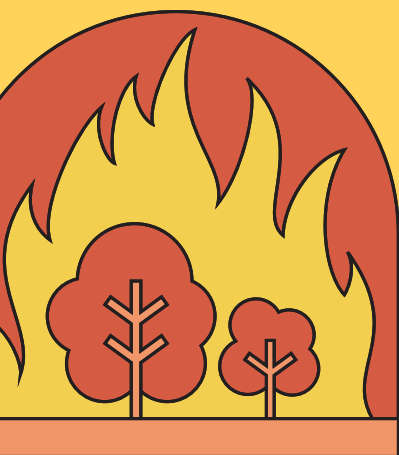
We can also evaluate hazards:

- **Magnitude** (*height, intensity*)
 - **Time** (*frequency of occurrence, speed of onset*)
 - **Space**
- Evaluating hazards can also show us how they changed over time*



RISK FACTORS

- Urbanisation (Tokyo, Haiti)
- Poverty/ economic development (Low income countries - Rio de Janeiro)
- Lack of public education and awareness

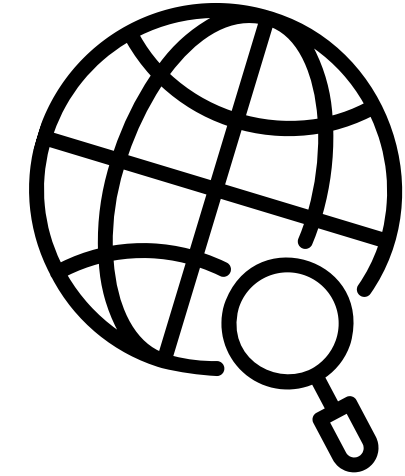


**BEING READY IS OUR
SECRET POWER, GUIDING
US THROUGH TOUGH TIMES
WITH COURAGE.**





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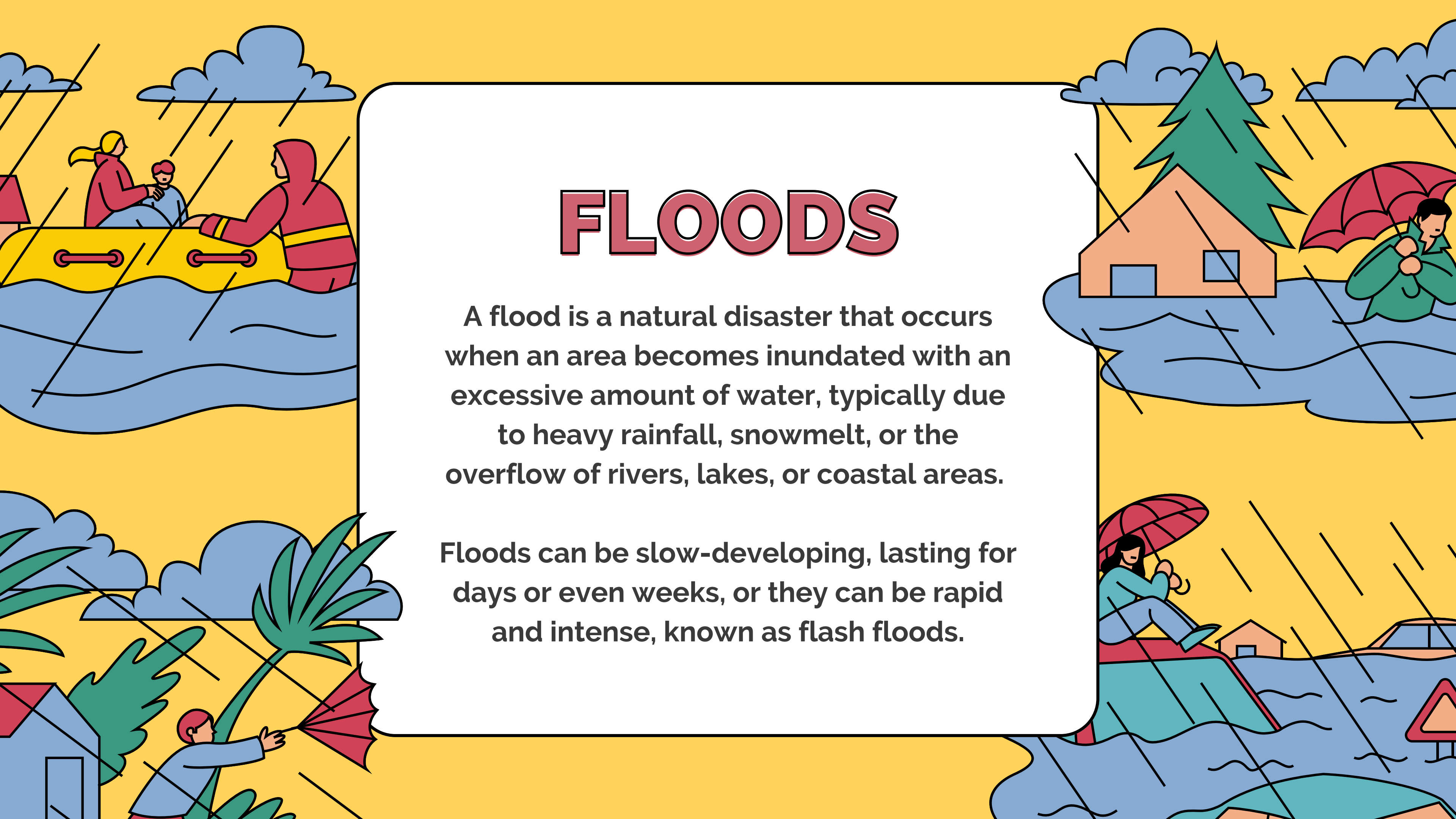
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https://www.youtube.com/watch?v=LQp_82E2fTs&list=PLtM8hg4aOfuNkHOcLVzGMqpkbauE4W3mM&index=3&ab_channel=tutor2u

<https://hazards.fema.gov/nri/natural-hazards>

<https://testbook.com/ugc-net-paper-1/hazards-and-disasters>

The background of the page is a colorful illustration of a flood. In the top left, a yellow inflatable boat with two people is on blue water under a blue sky with rain falling. In the top right, a house is partially submerged in water, with a person holding a red umbrella nearby. In the bottom left, a person is holding a red umbrella in the rain, with a house and palm trees visible. In the bottom right, a person is sitting on a red roof or ledge, holding a red umbrella, with a house and a car partially submerged in water below. The central text is contained within a white rounded rectangle.

FLOODS

A flood is a natural disaster that occurs when an area becomes inundated with an excessive amount of water, typically due to heavy rainfall, snowmelt, or the overflow of rivers, lakes, or coastal areas.

Floods can be slow-developing, lasting for days or even weeks, or they can be rapid and intense, known as flash floods.

TYPES OF FLOODS

Natural floods: Caused by heavy rain, snowmelt, or ice blockages in the river. Typically cause less damage.

Flash floods: Triggered by dam failures or breaches of protective barriers. Rare but highly destructive, causing significant damage.



Case study 1

The 1342 Flood



Causes:

Prolonged rains combined with spring

Impacts:

Judith Bridge, a vital trade route, was completely destroyed
Severe disruption of trade and communication, affecting Prague's
economy for decades

Societal Response:

Interpreted as divine punishment; led to religious processions and
calls for repentance.

Inspired the construction of the Charles Bridge (begun 1357),
designed with better engineering to withstand future floods.



Case study 2

The 1592 Flood

Causes:

A combination of spring snowmelt and intense summer storms.

Impacts:

In Prague, water levels rose 120 cm above the “Bradáč” gauge, flooding the Old Town up to Husova Street.

In Polabí, large-scale agricultural damage led to famine and long-term economic strain.

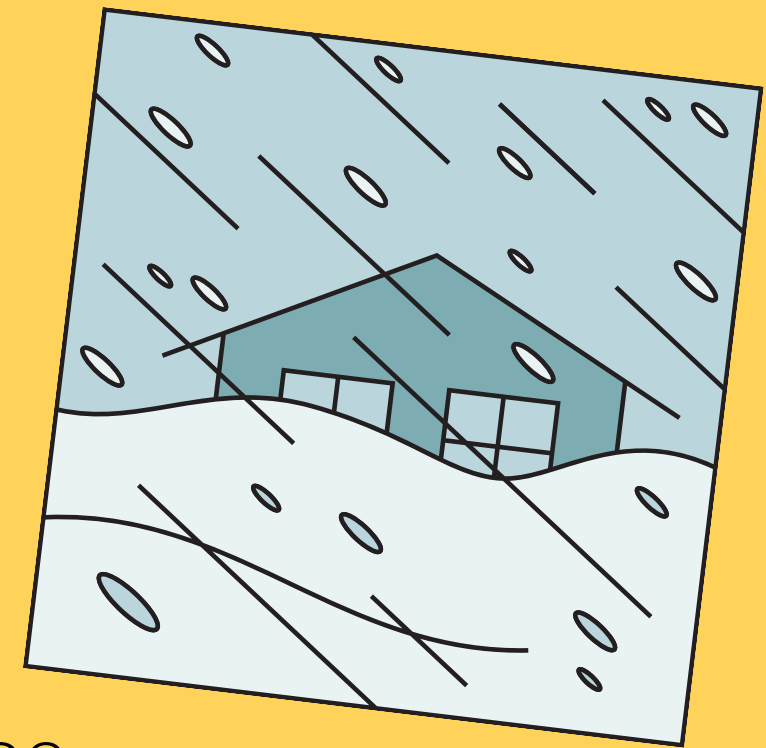
Societal Response:

Continued reliance on religious explanations, but some communities started building basic flood defenses (e.g., embankments).

Increased awareness of the need to avoid low-lying areas.

Case study 3

The 1784 Flood



Causes:

Harsh winter followed by rapid snowmelt and heavy rains.
Ice jams exacerbated flooding along the Vltava River.

Impacts:

Hundreds of deaths, destruction of infrastructure, and significant damage to Charles Bridge (statues washed away).
Long-term agricultural losses led to food shortages.

Societal Response:

Marked a shift toward scientific understanding and planning.
Initiation of systematic flood recording (e.g., water levels measured at Děčín Castle).

Historical Flood Preparation



Floods of 1342

- At that time, there were no modern warning systems or river regulations.
- Measures included repairs of dikes and protective barriers, often made of wood.
- Improvised protective elements such as walls and barriers were also used, but there was no nationwide coordination.



Floods of 1592

- The first attempts at building protective embankments, often made of wood.
- Community efforts to control river flows through embankments and water diversion.
- Limited effectiveness due to a lack of technology and coordination.

Floods of 1784

- More advanced embankments and river flow regulations.
- The event's documentation helped improve future prevention efforts.
- Increased focus on the management of watercourses.

Flood Prevention and Protection



Technical Measures

- Construction of Dams and Protective Dikes: regulates water flow and protects low-lying areas.
- Flood Barriers: temporary or permanent structures preventing water overflow.
- Retention Reservoirs : collect excess water during heavy rainfall periods.

Natural Measures

- Restoration of Wetlands and Floodplain Forests: wetlands absorb excess water and mitigate floods.
- Enhancing the Retention Capacity of the Landscape: afforestation and soil care help retain water in the landscape.

Organizational Measures

- Early Warning Systems: weather and river monitoring, providing alerts about risks.
- Flood Risk-Free Zone Planning: designating safe areas for construction and development.
- Crisis Plans and Evacuations :pre-prepared procedures for protecting people and property.

What to do in case of a Natural Disaster?

1

Keep an eye on the news



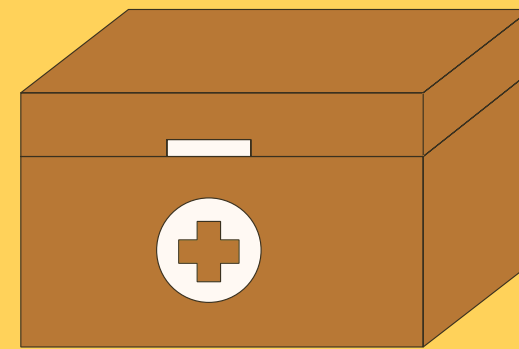
2

Have a family plan



3

Prepare an emergency kit



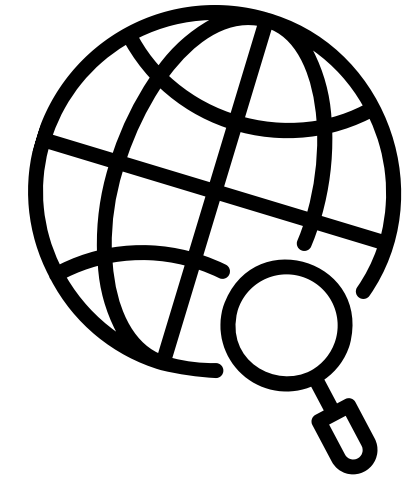
4

take shelter in a safe place





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https://www.researchgate.net/publication/294756599_Floods_in_the_Czech_Republic_during_the_past_millennium

The background features a yellow sky with a large yellow sun. On the left, a blue skull with horns sits on a cracked, orange-brown path. On the right, a man in a red shirt and blue pants carries a blue bucket, walking on a similar cracked path. The bottom left shows a stylized city skyline with pink and yellow buildings. The central text is enclosed in a white rounded rectangle.

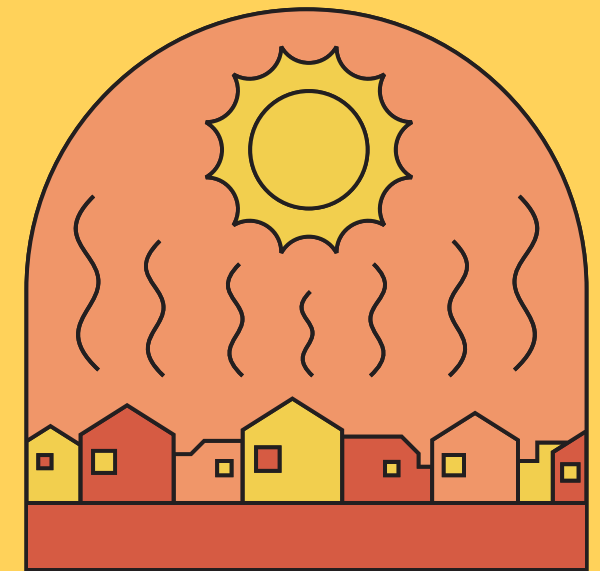
DROUGHTS

Drought is a prolonged period of abnormally low precipitation, resulting in a shortage of water supply that significantly impacts ecosystems, agriculture, and human activities.

It is a natural disaster that can occur in various regions around the world, leading to significant socioeconomic and environmental consequences.

Types of droughts

- **Meteorological**
 - precipitation deficiency
- **Hydrological**
 - lowered water level and streamflow
- **Agricultural**
 - low soil water availability
- **Socioeconomic**
 - results of the others, lack of water for people



Impact of droughts

- **Recent droughts in Central Europe - 2003, 2015, 2018 and 2019**
- **1950 and 2014 - 2.2 billion people globally affected**
- **Drought accounts for 34% of disaster-related deaths between 1970 and 2019**
- **estimated damages of EUR 621 Mio on average per event**
- **11% of the European population and 17% of the area of the EU have been affected by water scarcity**



Case study

Drought of 1842

Hydrological and meteorological

Exceptionally dry and hot year for Central Europe, especially in July
Streams dried out, water levels in rivers sank historically low - hunger stones



Agricultural

Crop failures recorded everywhere, only wine grapes seemed to flourish

Socio-economic

Towns and cities affected the most

Fires - Hamburg fire (3 days long)

Many mills on smaller rivers out of commission or limited

Raised prices of food

Impact on livestock - dropped to a half or third

Drought mitigation and Adaptation

Assesment

Monitoring

Vulnerability assesment

Water management

Restoring and protecting
freshwater habitats

Lowering water use

rainwater harvesting

Reservoirs

desalination

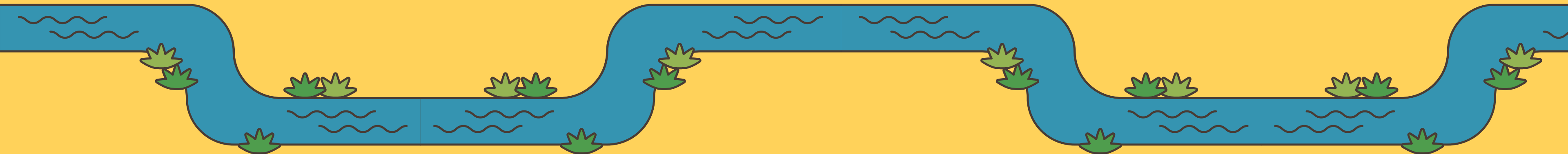
Agriculture


conservation tillage

maintaining vegetation
cover

improved pasture
management

Sustainable agriculture
practices





WHAT TO DO?

Use water sparingly and avoid wastage. Turn off faucets tightly to prevent dripping, fix any leaks promptly, and only use the water you need.

Consider collecting and reusing water for non-potable purposes, such as watering plants or cleaning.

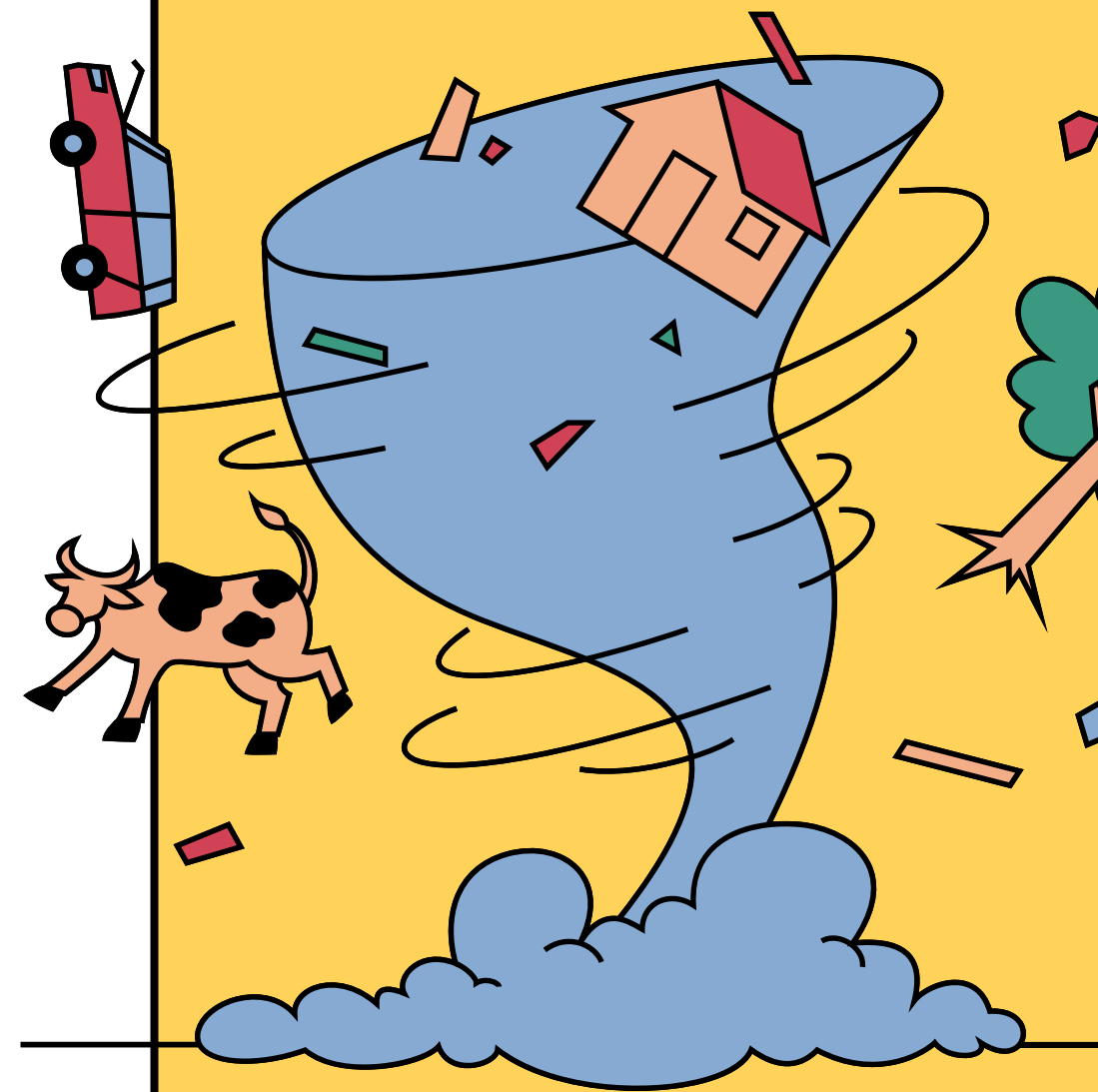
Water plants and gardens during cooler hours to minimize evaporation, and use mulch to retain moisture in the soil.

Educate yourself and others about the importance of water conservation during a drought.

TORNADO

A tornado is a violent and rapidly rotating column of air that is in contact with both the surface of the Earth and a cumulonimbus cloud (thunderstorm cloud).

Tornadoes are characterized by a funnel-shaped cloud extending downward from the thunderstorm, often accompanied by a visible condensation funnel or debris cloud.



Types of tornadoes



Supercell tornadoes

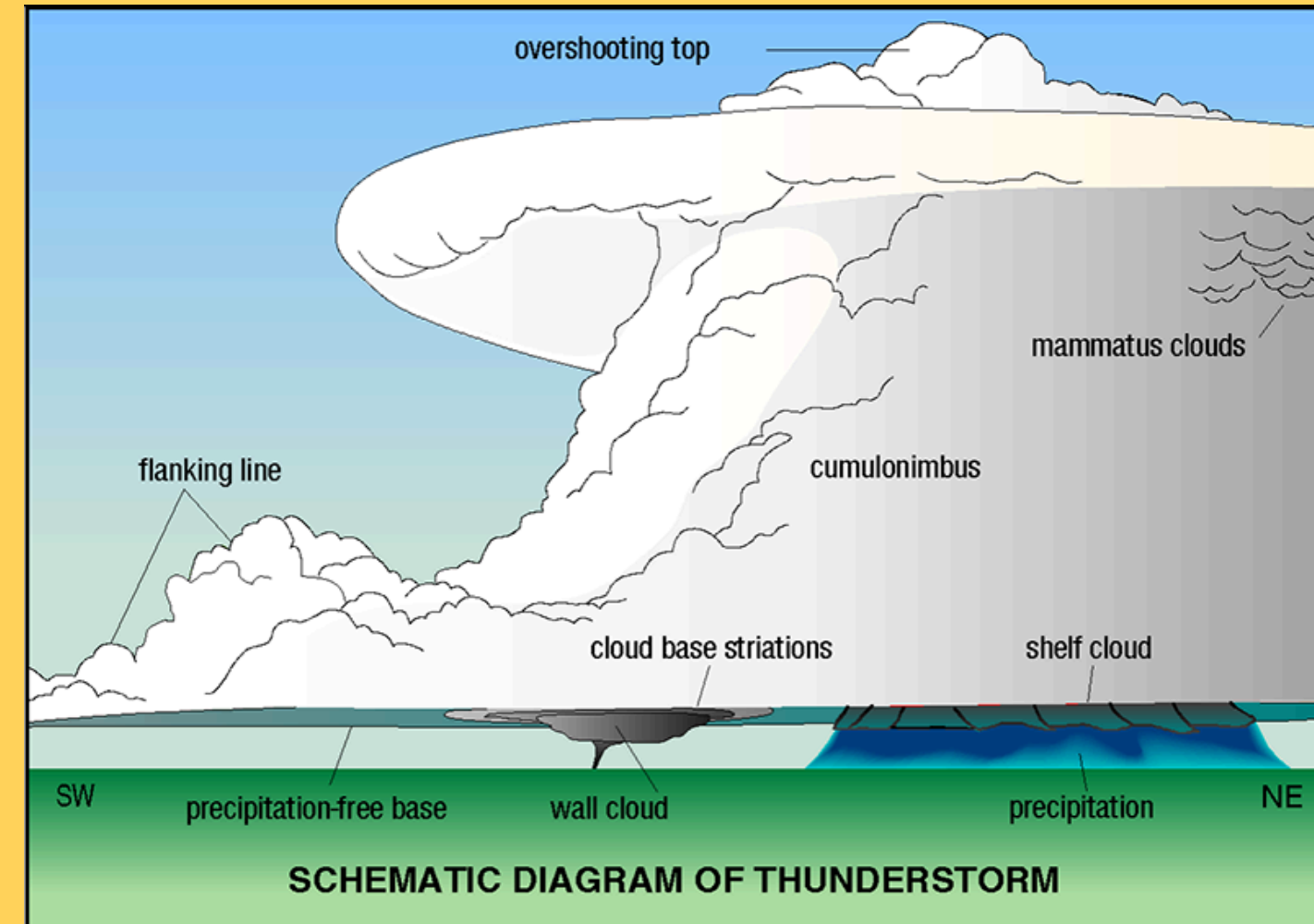
Tornadoes attached to a large storm formation, the most dangerous, most common

Non-supercell tornadoes

Tornadoes formed without the supercell, less dangerous

Whirlwinds

A wind vortex, small and easily disrupted



Tornado scale

EF SCALE	
EF Rating	3 Second Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

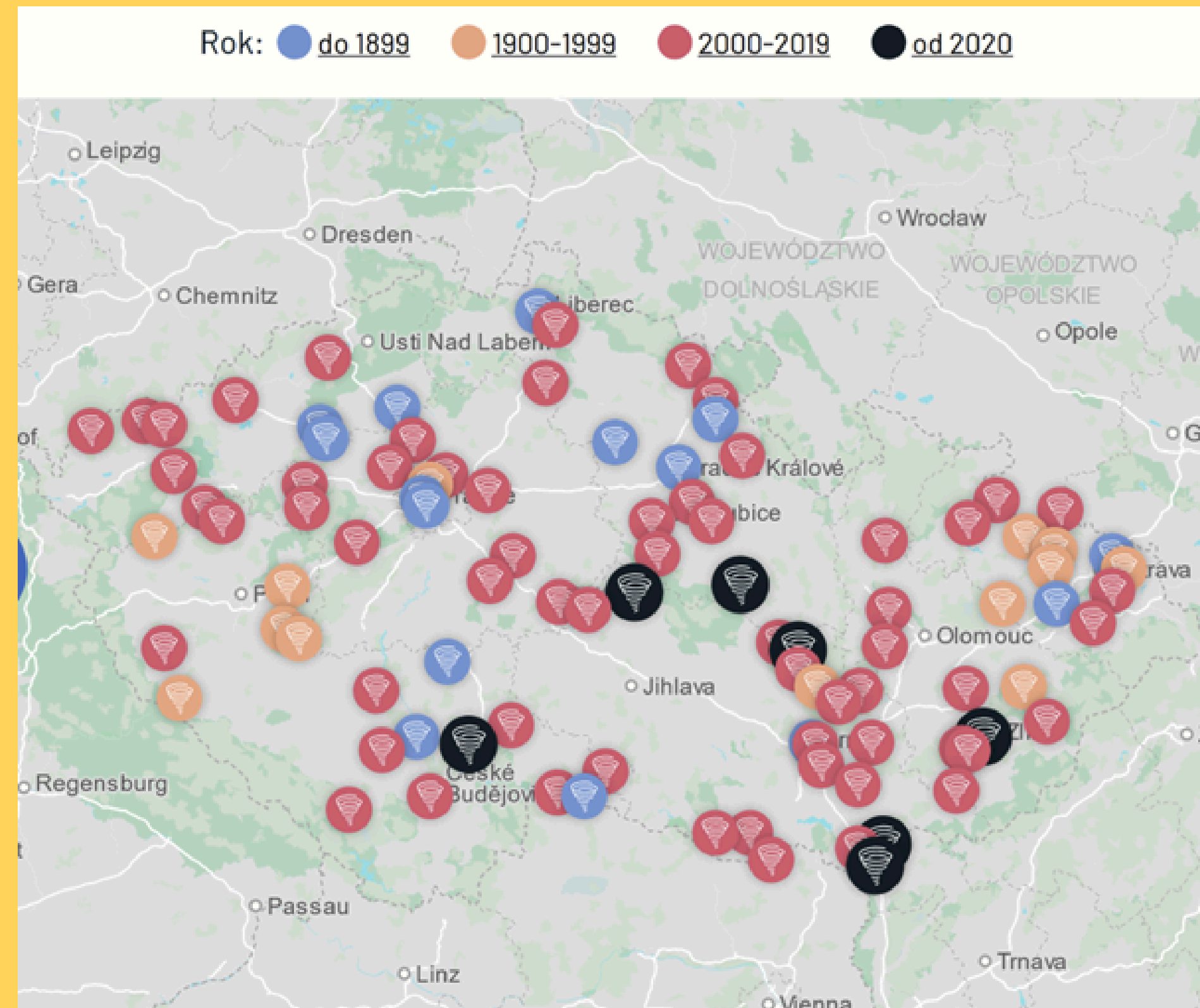


The Enhanced Fujita Scale

speed assessed by damage on buildings and trees
28 damage indicators

Tornadoes in Europe

- Handful a year in Czechia
- Rarely damaging
- Quieter periods and more active periods
- Unpredictable, lack of data



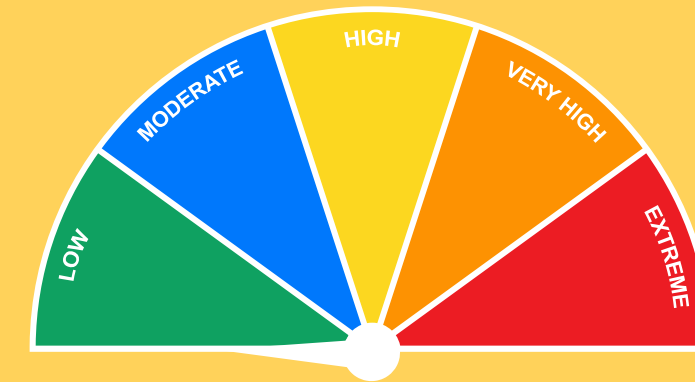
Case study

Tornado in Moravia - 2021



LOCATION

Hrušky, Moravská Nová Ves,
Mikulčice, Lužice, Hodinín



RATING

EF 4: 332 -418 km/h
levels well constructed building, can
take lighter buildings with it



AFTERMATH

- 6 dead, tens of injured people, 100+ destroyed houses

Case study

Tornado in Moravia - 2021

RECOVERY



- Financial aid
- government
- donations



- Lack of organisation
- Underprepared volunteers
- Donated resources mismanaged



WHAT TO DO?

Move to a small, windowless, and sturdy interior room on the lowest level of your home, such as a basement or storm cellar.

Regularly practice tornado drills with your family or classmates to ensure everyone knows what to do during a tornado.

Listen to local weather updates and warnings through a battery-powered weather radio or smartphone app.

Cover your head and neck with your arms or a sturdy object to protect against flying debris.





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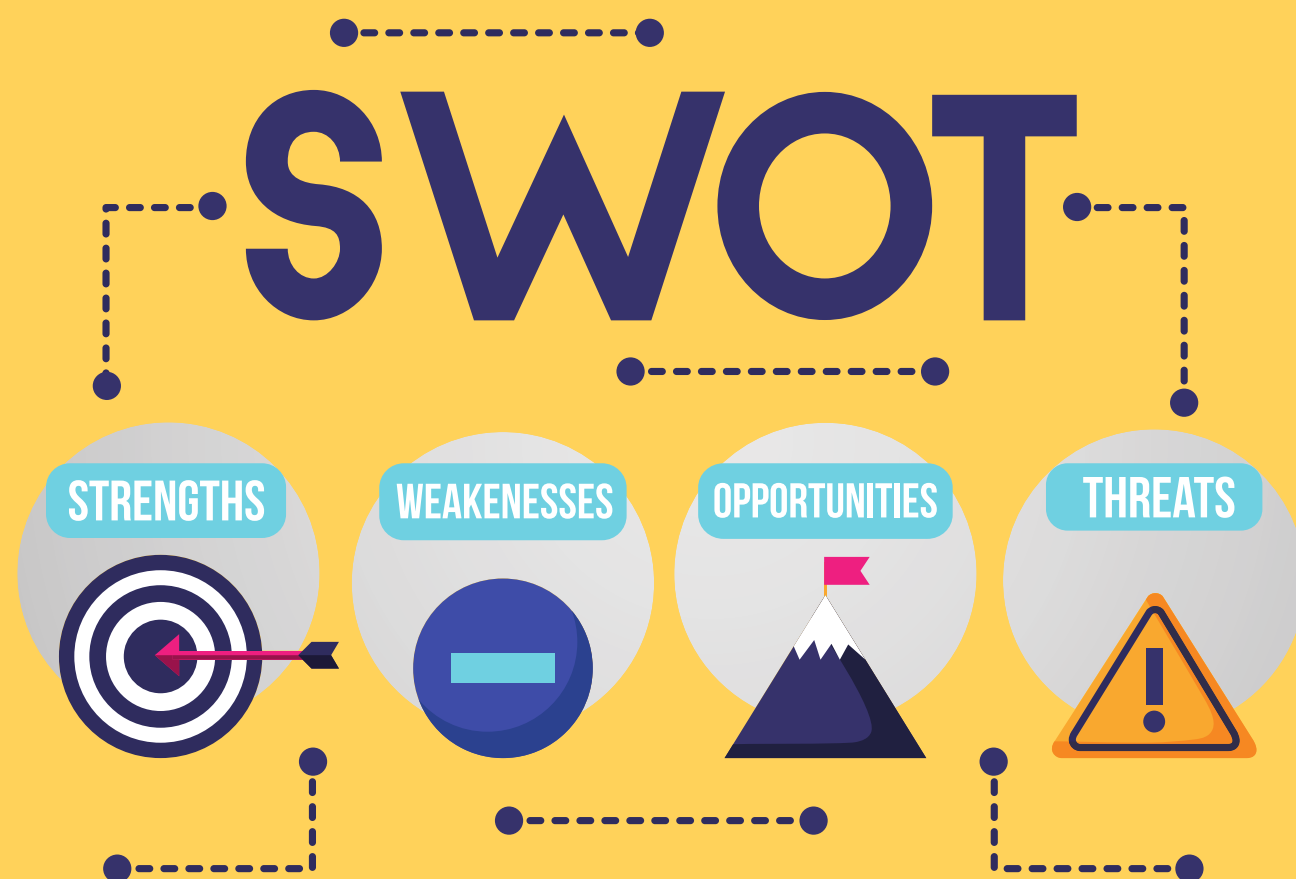
ACTIVITY

Students will be divided into three groups (tornadoes, floods and droughts). Each group will have a specific natural hazard that already happened. Each group will get a printed assignment. You will get 5 minutes to read what happened. Then your group supervisor will give you another paper with a SWOT Analysis. You should try to analyse the situation and if we will have the time, each group will share their analysis.



SWOT ANALYSIS

What exactly is swot analysis?

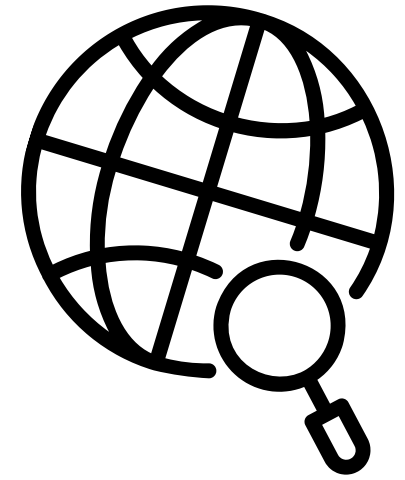


SWOT - ANALYSIS

Strengths	Weaknesses
Opportunities	Threats



SOURCES

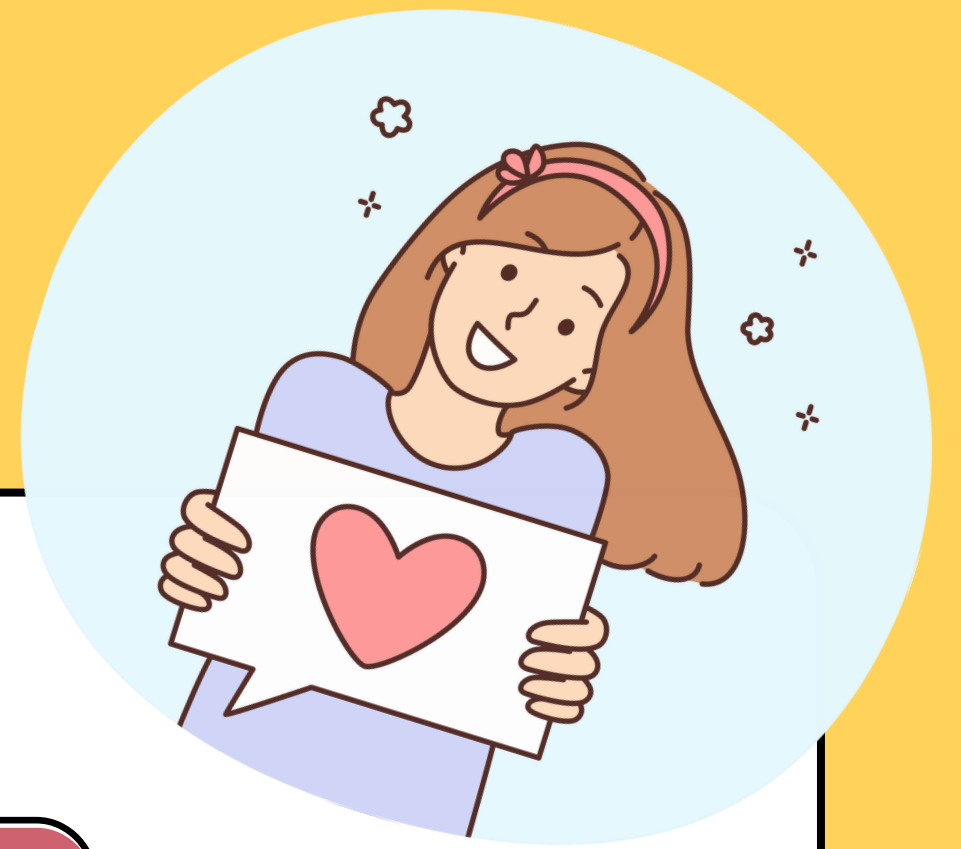


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**THANK YOU FOR
YOUR ATTENTION :)**