MINISTRY OF EDUCATION AND TRAINING

Teaching manual

ON DISASTER RISK REDUCTION

LIVE & LEARN
For Environment and Community

Humanitarian Aid
and Civil Protection

This publication has been produced by the Ministry of Education and Training and Live & Learn for Environment and Community (Live&Learn).

In cooperation with Save the Children, Plan International in Vietnam, Care and other organizations in the Joint Advocacy Networking Initiative (JANI), sponsored by Humanitarian Aid and Civil Protection ofthe European Commission (ECHO).

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MINISTRY OF EDUCATION AND TRAINING

No. 1612/ QD-BGDDT

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

Hanoi, 27th April 2012

DECISION

On approval of the reference materials on Climate Change Adaptation and Disaster Risk Response

MINISTER OF MINISTRY OF EDUCATION AND TRAINING

Pursuant to Decree No. 178/2007/ND-CP dated December 03, 2007 of the Government defining the functions, tasks and organizational structures of Ministries and Ministerial-level agencies;

Pursuant to Decree No. 32/2008/ND-CP dated March 19, 2008 of the Government defining the functions, tasks, powers and organizational structure of the Ministry of Education and Training;

Pursuant to Decision No. 158/2008/QD-TTg dated December 02, 2008 of the Prime Minister approving the National target program on response to climate change;

As per the request of the Director of Department of Science, Technology and Environment;

DECIDES:

Article 1: Approve reference materials on climate change adaptation and disaster risk response which include 03 materials: ABC book on climate change, Teaching Manual on climate change Education, Teaching Manual on disaster risks reduction.

Article 2: This Decision takes effect on the date of signing.

Article 3: Head of the Office, Director general of Science, Technology and Environment Department – Ministry of education and Training, Leaders of related offices take responsibilities to conduct this Decision.

ON BEHALF OF
DEPUTY DIRECTOR

Receivers:
- As stated in Article 3
- Minister (for report)
- Filing: DSTE

BỘ GIÁO DỤC VÀ ĐÀO TẠO

Nguyen Vinh Hien

PREFACE

Located in South East Asia, a region familiar with extreme weather, Vietnam is regarded as one of the countries most heavily impacted by, and vulnerable to, natural disasters and climate change.

In recent years, the Vietnamese Government has developed guidelines and policies in order to enhance its capacity to respond to natural disasters and climate change. To achieve this, the Government has developed a National Strategy for Natural Disaster Prevention Response and Mitigation to 2020 and National Target Programme to respond to climate change.

The **"Teaching manual on Disaster Risk Reduction"** is one of the practical and specific reference teaching manuals that aims to help teachers and students raise their awareness and ability to prepare for, respond to disasters and adapt to climate change. The material is a timely contribution to implementing the Action Plan for the implementation of National Strategy on Disaster Mitigation and Prevention in Education and Training sector for the period of 2011-2020.

This manual, together with the "ABC Handbook on Climate Change" and the "Teaching Manual on Climate Change Education" form a comprehensive package of teaching materials on Disaster Risk Reduction and Climate Change Adaptation. The Ministry of Education and Training contributed to the development of these materials, and approved the final package. The content of the material was designed by Center of Live and Learn for Environment and Community as part of the Joint Advocacy Networking Initiative (JANI) project in Viet Nam, sponsored by Humanitarian Aid and Civil Protection of the European Commission (ECHO).

In the process of developing this manual, we have co-operated with Save the Children and Plan International in Viet Nam. We have also drawn from the experiences and lessons learned of implementing disaster risk reduction and climate change adaptation of many countries in the world and many provinces in Viet Nam.This resource has been piloted in some schools and is supplemented by valuable contributions from teachers, education leaders, and experts. We welcome any input from stakeholders to further develop this material.

The authors would like to thank the donor ECHO, Live&Learn, JANI partners, Save the Children, Plan International in Viet Nam, the Department of Science, Technology and the Environment, the Ministry of Education and Training the Disaster Management Center and teachers for valuable contributions to the process of writing this manual.

TABLE OF CONTENTS

ABBREVIATIONS

CC	Climate Change
CCA	Climate Change Adaptation
DRR	Disaster Risk Reduction
ECHO	Humanitarian Aid and Civil Protection, European Commission
GHG	Greenhouse gas
Live&Learn	Center of Live and Learn for Environment and Community
MARD	Ministry of Agriculture and Rural Development
MOET	Ministry of Education and Training
PPM	Parts per million
THCS	Secondary School

INTRODUCTION

This teaching resource is expected to contribute to safer schools and communities by assisting children, teachers and communities to understand and be aware of ***disaster risks*** affecting their communities, to develop the ***skills and ability*** to protect themselves, their families and their communities from the negative impacts of ***natural hazards*** and to ***adapt to the impacts of climate change.***

By ensuring children achieve these learning outcomes and develop these skills, we can minimize risk and assist communities to avoid the worst impacts of ***disasters*** including loss to life and property.

OBJECTIVES OF THIS RESOURCE

The objectives of this Teaching Manual on Disaster Risk Reduction are:

- To raise awareness of DRR and the role of education in developing and maintaining safe and sustainable livelihoods and communities;
- To assist teachers in implementing a participatory, or student centered, teaching approach that uses content and methodologies to actively involve learners, and to integrate DRR content into subjects and extracurricular activities; and
- To promote the application and sharing of educational materials, ideas and activities on DRR

By doing this, teachers will help students to gain the knowledge, skills and attitudes that will allow them to prepare for and respond to natural hazards and implement DRR practices:

- ***Knowledge:*** Students will be able to explain hazards, disaster risks and the potential impacts of these risks on the community, particularly vulnerable groups, and they will understand the actions they can take for DRR;
- ***Skills:*** Students practice skills and become familiar with concepts including safe lifestyles, DRR and CCA. They will develop and enhance their ability to observe, analyze and evaluate the impacts of past and potential future disaster events and climate change, and will develop related soft skills including presentation skills, active listening, working in groups, etc;
- ***Attitude:*** Students will gain a sense of responsibility and develop a positive attitude in relation to DRR, they will be able to actively participate in the protection of the environment and in building green lifestyles for themselves, their schools and their communities- reducing the impacts of disaster events and adapting to climate change.

USERS

This manual was developed for use by

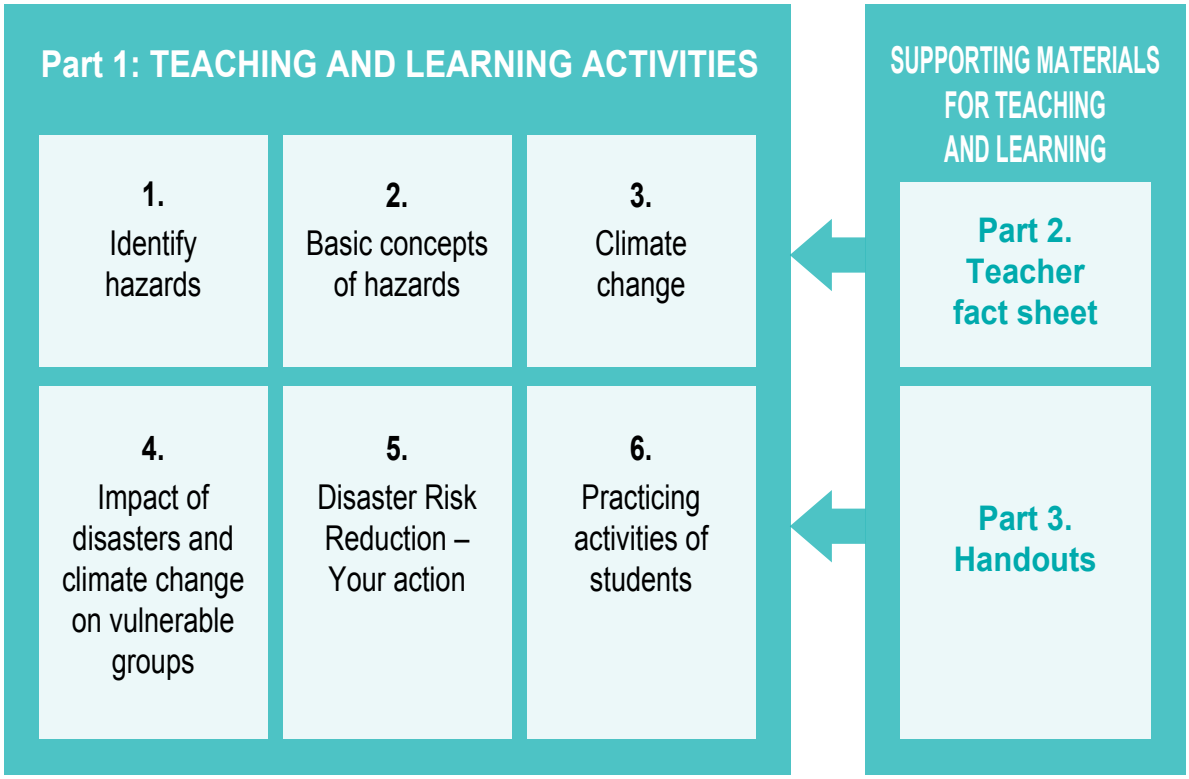
- Teachers at all educational levels;
- Experts involved in curriculum design and development;
- Managers in the education sector; and
- Student clubs, volunteer groups, and other individuals or organizations involved in DRR education

HOW TO USE THE MANUAL

This book consists of three parts:

- **Part 1 – Teaching and Learning Activities:** introduces lessons and educational activities related to natural disasters and climate change. ***Users can select information and activities appropriate to students' backgrounds or levels of understanding*** (See structure below).
- **Part 2- Information for Teachers:** provides reference materials on natural disasters and climate change corresponding to the topics in Part 1, and gives background information to assist with lesson delivery.
- **Part 3 – Handouts to Support Teaching and Learning Activities:** presents pictures, photos and correlative materials supporting each of the lessons in Part 1

Teaching Manual on Disaster Risk Reduction - Structure



When implementing the teaching and learning activities in Part 1, teachers or instructors may:

- Use the information in Part 2 to familiarize themselves with the content and reference materials on natural disasters and climate change; and
- Use the handouts (pictures and information) in Part 3 to teach and learn.

HOW TO USE PART 1 – TEACHING AND LEARNING ACTIVITIES

For each topic, teachers can choose the information and activities most appropriate to **the locality and students' backgrounds or levels of understanding**. This section comprises suggested educational activities, with each topic taking between 45 and 120 minutes for implementation.

The content provided for each topic consists of three parts:

- **Objectives:** describes the knowledge and skills that students will develop when studying the topic;
- **Information for students:** includes concise information for students. Teachers can select and revise contents to deliver concepts and knowledge that are appropriate to students at different levels and grades.

  Teachers also may need to get deep knowledge in Part 2 – Information for teachers.
- **Main activities:**
  - ***Warming-up:*** creates a positive teaching and learning atmosphere using educational games or interactive activities;
  - ***Problem studying:*** introduces the topics using interactive educational activities (e.g. group discussion, case studies, role-plays and presentations)
  - ***Lesson reinforcement:*** helps students to reinforce the key points of the lesson and to evaluate the knowledge gained through activities like quizzes or group questions. Teachers can use additional practical exercises for students to make their lessons more relevant, useful and interesting.
- **Other activity suggestions:** offers other educational activities for teachers to supplement/ replace the main activities where appropriate for students of different grades or regions. These activities also provide opportunities to practice the content and reinforce and evaluate students' knowledge, skills and attitudes.

ADVICE ON APPROACHES TO TEACHING AND LEARNING

- Use a variety of educational games and interactive activities to create a positive participatory learning atmosphere;
- Make sure the information delivered is concise and the skills are practical – avoid theory and rote learning (learning-by-heart);
- Enhance the role and participation of students using individual and group work, experiential learning and participatory planning, action and evaluation;
- Provide diversity with simple actions for learning activities – make full use of existing materials and combined activities using information technology with classroom and community activities; and
- Link economic, cultural and environmental themes to promote a vision of sustainable development.

GLOSSARY OF TERMS

Definitions of terms are cited from the following sources: Terminology on disaster risk redution of United Nations International Strategy for Disaster Reduction (UNISDR, 2009), The United Nations Framework Convention on Climate Change (UNFCCC, 1992), Law on Natural Disaster Prevention (National Assembly, 2013), Training material on disaster risk reduction and climate change adaptation (Disaster management center, Directorate of Water Resources, Ministry of Agriculture and Rural Development, 2012), National Target Programme to Respond to Climate Change (Ministry of Natural Resources and Environment, 2008). For better teaching and learning, these definitions should be simplified in accordance with students' backgruond or level of knowledge.

Natural hazard

Hazard is a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Natural hazard is natural phenonmenon that may cause losses of life and damage to property, environment, living conditions and socio-economic activities.

Natural Disaster

Abnormal natural events that can cause loss of life and damage to property, environment, living conditions and socio-economic activities, which include typhoons, tropical depressions, whirlwinds, thunderstorms, torrential rain, floods, flash floods, inundation, landslides triggered by torrential rain or run-off, land subsidence triggered by flood or run-off, sea level rise, saltwater intrusion, heat waves, drought, cold waves, hail, frost, earthquakes, tsunami and other natural hazards.

Disaster

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses and impacts which exceed the ability of the affected community or society to cope using its own resources.

Disaster risk

Risk is the combination of the probability of an event and the scale of it's negative consequences.

Disaster risk is the potential disaster losses of life and damage to property, environment, living conditions and socio-economic activities

Vulnerability

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Capacity

The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.

Disaster risk management

The systematic process of using administrative directives, organizations, individuals and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards.

Weather	The atmospheric conditions at a particular place in terms of air temperature, pressure, humidity, wind speed and precipitation etc.
Climate	The weather averaged over a period of time (typically, 30 years as defined by the World Meteorological Organization).
Climate change	Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthrophogenic changes in the composition of the atmosphere or in land use.
Disaster risk reduction	The lessening or limitation of the adverse impacts of disasters.
Climage change mitigation	Actions resulting in a reduction of the degree or intensity of greenhouse gas emissions.
Climate change adaptation	Adjustment in natural or human systems to a new or changing environment. Adaptation refers to adjustments in natural or human systems, intended to reduce vulnerability to current or anticipated climate change and variability or exploit beneficial opportunities.

PART 1

TEACHING AND LEARNING

Activities

Topic 1: Identify the different types of natural hazards

Learning objectives:	***At the end of this module, students will be able to:*** List the different types of natural hazards that occur in Viet Nam and the provinces where they occur. This part presents storms, floods, inundation, drought, and landslides. Describe various characteristics of the hazards that occur in Viet Nam, including the conditions that lead to the hazard occurring and the potential impacts that the hazard may cause.
Time:	30-45 minutes
Supporting materials:	Information for Teachers, Part 2, Topic 1 Handouts 1.1 – 1.8 – Viet Nam map

INFORMATION FOR STUDENTS

Some types *of natural hazards related to climate change occur* regularly in Viet Nam, e.g. tropical depressions, typhoons, flood, inundation, drought, landslide, thunderstorms, whirlwinds, saltwater intrusion, etc. Other natural hazards, including earthquakes, tsunami, and volcanoes, are *unrelated to climate change and* less common.

Tropical depressions and typhoons

Characteristics:

- Cause strong winds and heavy rain as well as flooding;
- Strong winds –a tropical depression, whose wind speed is less than 63km/hour, becomes a typhoon when winds reach grade 8(63-119km/hour);
- Storms in Viet Nam are often formed over the sea.

Conditions required for typhoons to form:

- Warm sea surface temperatures;
- Atmospheric instability;
- High humidity (moist air);
- Moving winds and a low pressure system.

Potential Impacts

- Physical injury and loss of life, risk of disease that often follows disaster events as a result of a lack of water sanitation and hygiene;

- Loss of property: this can include damage to buildings, blocked roads and interruptions to communication, electricity and supply lines resulting from damage to roads, lines and connections;
- Loss of productivity: crop failure, disease/death affecting livestock, shortages of food and clean water;
- Damage to the environment: wind and heavy rain can result in pollution on land and in waterways, floods, flash floods and landslides.

Flood

Characteristics:

- Floods happen when water rises to higher levels than average and moves faster than usual;
  - Flash floods happen over a short period of time, and water can flow fast and with a strong current;
  - River floods occur when the water level in a river or stream rises slowly in response to seasonal variation or individual heavy rainfall events;
  - Ocean or coastal flooding occurs when the sea level rises suddenly, either from high tides or storm surges, which can create bigger and stronger wave action. Water can breach dyke thresholds and destroy coastal infrastructure;
- Inundation happens during or after a flood, and refers to the phenomenon where floodwater rises to submerge (inundate) houses, agricultural land and even towns or villages. This severely impacts livelihoods, as crops, livestock and other property can be lost or damaged. The environment is often adversely affected.

Conditions required for floods to occur:

- Prolonged periods of sustained, heavy rainfall, sometimes after long periods with low rainfall;
- Poorly planned construction, for example construction restricting lakes, rivers or other large natural bodies of water;
- Damaged dykes or reservoir infrastructure;
- Coastal storm conditions creating ocean surges;
- Deforestation, erosion or other land management impacts that result in a reduction in soil structure, soil quality and the capacity of the soil to hold water.

Potential impacts:

- Serious injury or loss of life from either drowning or falling into rivers or fast-moving water;
- Damage to buildings, homes and property;
- Death or injury for livestock;
- Disease affecting humans and livestock from stagnant water;
- Roads blocked or damaged and other infrastructure damaged or destroyed;
- Pollution of groundwater/land, intrusion of saline water into the aquifer.

Where flood events are a part of the natural cycle, they can have positive impacts as well as negative impacts. For example, in some regions like the Mekong Delta, floods can sustain

important marine/estuarine production systems, enrich the soil with alluvium-rich wate and provide valuable water flows which can flush out agricultural fields and provide water for the ecosystems that depend on it.

Landslides

Characteristics:

- Landslides or landslips are events where soil and land sinks or slips down the side of a hill slope or mountain;
- Near riverside, land fall or sink.

Conditions required for landslides to occur:

- Natural destablising movement in the earth (earthquakes);
- Saturation of the soil – this can come from heavy rain, flooding or melting snow, which loosens soil structure and rocks;
- Deforestation and damage to the soil structure from other human interference (e.g. agriculture);
- Erosion at the bottom of a hillslope or at the bank of a river.

Potential impacts:

- Death or injury to humans and animals as they can be buried under debris;
- Damage to buildings, homes and property;
- Damage to infrastructure, e.g. block roads
- Damage to agricultural systems, e.g. through loss of top soil and rocks covering crops and soil.

Drought

Characteristics:

- Reduction in rainfall over a prolonged period of time, typically a season or longer. This leads to deficiencies in supply of surface and/or ground water, and water shortages for communities and agricultural systems;
- Drought events are often (but not always) accompanied by periods of unusually hot weather. This can exacerbate water shortages by adding extra evaporative potential to the environment.

Conditions required for droughts to occur:

- Reduced rainfall over a prolonged period of time;
- Deforestation can worsen drought impacts – compromised soil structure can lead to erosion because there is no vegetation to hold the soil together. Soil is less able to absorb water without vegetation and the water leaves the system as runoff;

Potential impacts:

- Reduced access to water - no clean water for daily activities (such as drinking, cooking and washing);

- Diarrhea and contagious diseases can become a risk with reduced access to water for washing and clean drinking water;
- Lack of water for agricultural crops and/or livestock can lead to food shortages. In the worst cases this can lead to famine;
- At coastal areas, as rivers stop flowing, freshwater can be affected by saltwater intrusion.

MAIN ACTIVITIES

1. Warm-up

Time: 10 minutes

Materials required:
Handouts 1.1 – 1.8

The teacher can collect more pictures of natural hazards in Viet Nam

Hazard types

- The teacher asks the students questions or the students compete to list the types of hazards they know;
- The students name the types of hazards they know, and the teacher lists them on the board. The list should include: *typhoons and tropical depression, floods, inundation, drought, landslides, thunderstorms, whirlwinds, tsunami, earthquakes, wildfires and saltwater intrusion.*

2. Problem studying

Time: 30 minutes

Materials required:
Handouts 1.1-1.4

Map of Viet Nam

2.1 Characteristics of some common hazards in Viet Nam

- The teacher divides the class into small groups (each group has 4-8 students). Each group receives a picture of a hazard that is common in that local province. The groups have 15 minutes to discuss the following questions:
  - *What hazard is this?*
  - *What impacts may this hazard cause?*
  - *For secondary school classes, the teacher can add the questions: Where else in Viet Nam does this hazard occur? What conditions lead to this hazard occurring?*
- One representative from each group presents the results. Each group has 3 minutes to present. Other groups listen and add more information if necessary. After each presentation, the teacher explains the hazard in depth, including information on hazard characteristics, conditions leading to the hazard event and potential impacts of each hazard type *(See Information for Students, Part 1)*
- The teacher can use the map of Viet Nam to demonstrate the regions affected by the different hazards *(See Information for Teachers, Part 2, Topic 1)*. Based on the students' capacities, the teacher can introduce the

topic of hazard causality. This topic will explore the different hazard classifications - for example, natural hazards such as earthquakes, tsunami, fires, etc., and hazards that are the result of human intervention.

Time: 10 minutes

2.2 Local hazards

- After discussing hazard types in general, the teacher can link this content to hazards that are common in the local area. The teacher can ask students the following questions:

- *What hazards often occur in the region?*
- *When do they occur?*
- *What impacts result from these hazards, and how might they affect your family and community?*

- The teacher can ask the students to answer the questions, and then summarize the most common hazards and their impacts for the class.

3. Lesson reinforcement

Time: 10 minutes

Suggested questions

Question 1: Choose the most appropriate answer to the following questions

1. **At above which wind speed can a weather event be classified as a typhoon?**
   a. 6.
   b. 7.
   c. 8.
   d. 9.

2. **Which conditions commonly cause flooding in Viet Nam?**[1]
   a. Heavy rain in river catchments
   b. Damaged infrastructure in reservoirs and lakes
   c. Rising sea levels
   d. All of the above

3. **Which hazards can be caused by deforestation?**
   a. Landslides
   b. Drought
   c. Flooding
   d. All of the above

4. **Which type of hazard is caused by a movement of**

[1] VNRC, 2005. An introduction to disaster preparedness for primary school children. Thanh nien Publication House.

the Earth's surface?

a. Earthquake

b. Typhoon

c. Flood

d. Whirlwind

Earthquake or seismic is a movement or shaking of the Earth's surface. Earthquake is often the result of movement of geological layers or a crack in the Earth's crust (Wikipedia)

Typhoon, flood and whirlwind are weather phenomenon.

Question 2: Fill in the blank space in the following sentence:

When strong winds are blowing and dark clouds are in the sky, like the Vietnamese proverb says, "If the dragonflies swarm in July, there would be …."

a. A storm

b. Rain

c. Wind

d. Drought

OTHER SUGGESTED ACTIVITIES

1. Activity: Who am I?

Target participants:
Secondary students

Time: 10-15 minutes

Materials required:
Pictures of hazards that result from natural causes and human interventions (Handout 1.1 - 1.8);

Cards with information of each type of hazard

- The teacher invites 1 or 2 pairs of students to play the Who Am I game, where the students guess the type of hazard *(typhoon, flood, landslide, drought, thunderstorm, earthquake, volcano, fire).*
- Students play the game in pairs: the students face each other. One student looks at the card/picture pasted on the back of the other student. The one who does not see the picture asks "Who am I?". Student knows the picture describes what she/he sees for the other student without revealing the exact answer/word. The other student tries to guess which type of disaster her/his partner is describing. The pair has 3 minutes to play. The teacher can recommend that students describe the characteristics and impacts of the hazards.
- The whole class can work like this in pairs.

2. Screening a film "Xa Thuan"

Time: 15 minutes

Materials required: a projector, the film, "Xa Thuan" (the first part of the film is the most relevant to the students' learning outcomes)

- The film "Xa Thuan": This film was made by Plan International in Viet Nam using a child-centered participatory method. Children led the creation of this film at every step in the film-making process: assessing the consequences and risks of disasters and climate change, designing the film outline and script, shooting the film and sharing it with community and other students. The children also played a lead role in advocating the concepts addressed in the film.
- Before the screening, the teacher asks the class to observe and note down the following details:
  + *Which types of hazard do the students mention in the film?*
  + *How are the hazards and their impacts changing?*
- The teacher screens the first part of the film
- After the screening, the teacher asks 5 students to answer questions and asks other students whether they want to add more information to the discussion.
- The teacher divide the class into small group and organizes a competition. Group list. Vietnamese proverbs that relate to weather and natural hazards.

3. Collecting proverbs

Time: 15 minutes

- The teacher summarizes the types of hazards discussed in the film

4. Disaster crossword

Target participants: Secondary students

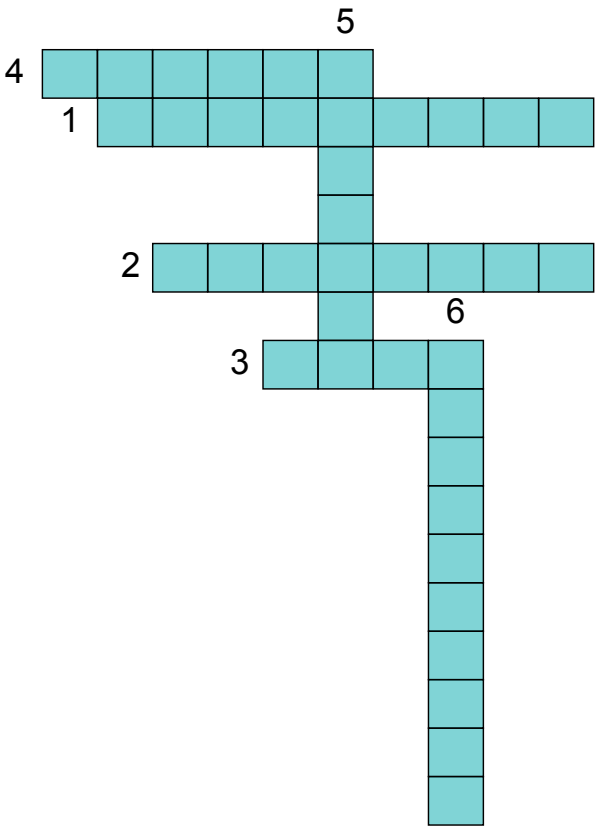
Time: 15 minutes

Across

1. A rapid movement of soil and rock down a slope in a mountainous area.
2. An abnormal natural phenomenon such as a typhoon, flood or earthquake, etc.
3. A hazard event that occurs in hot and dry conditions in wooded areas. It can occur naturally or be caused by humans.
4. A prolonged shortage of water caused by reduced rainfall. It causes the soil to dry and crack.

Down

5. This phenomenon occurs in coastal areas, often after an underwater earthquake or volcano. The event can have huge destructive power.
6. This phenomenon causes underground vibrations and can cause serious damage to buildings and cities.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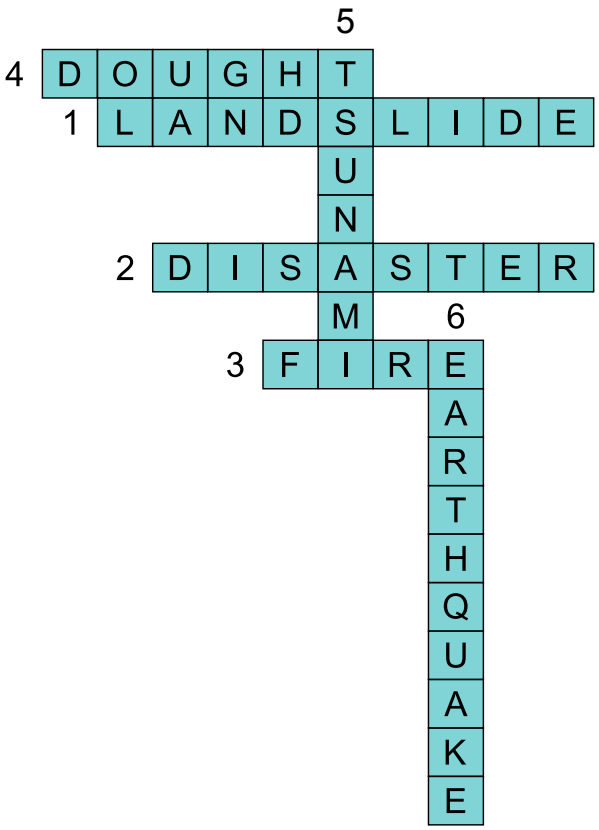
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Topic 2: Basic natural hazard concepts

Learning objectives:	***At the end of this module, students will be able to:*** Describe the concepts of a "natural hazard" and a "risk" List the risks they might be exposed to at school/in class and in their daily activities Explain the terms "capacity" and "vulnerability" in relation to themselves, their family and their community
Time:	30-45 minutes
Supporting materials:	Information for Teachers, Part 2, Topic 2 Handouts 2.1, 2.2, 2.3; Map of school/classrooms; colored cards, pens, sticky tape

INFORMATION FOR STUDENTS

*This module can be called **Risk and Natural Hazards**. The way the module is taught will depend on the capacity of the students. The objective of the module is to explain the following concepts simply and comprehensively to students:*

- *Natural hazard: a phenomenon with the potential to be dangerous.*
  For example: soil and rocks falling down a slope.
- *Risk: the possibility of encountering danger.*
  For example: building a house next to a mountain where soil and rocks might fall.

Natural hazards:

- Natural hazard is natural phenomenon that may cause losses of life and damage to property, environment, living conditions and socio-economic activities.

Risk:

- Risk is the combination of the probability of an event and the scale of its negative consequences.

Natural Disaster:

- Abnormal natural events that can cause loss of life and damage to property, environment, living conditions and socio-economic activities, which include typhoons, tropical depressions, whirlwinds, thunderstorms, torrential rain, floods, flash floods, inundation, landslides triggered by torrential rain or run-off, land subsidence triggered by flood or run-off, sea level rise, saltwater intrusion, heat waves, drought, cold waves, hail, frost, earthquakes, tsunami and other natural hazards.

Disaster:

- A serious disruption to the functioning of a community or a society causing widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Disaster risk:

- The potential disaster losses of life and damage to property, environment, living conditions and socio-economic activities.

Vulnerability:

- The characteristics and circumstances of a community, system or asset that makes it susceptible to the damaging effects of a hazard.
- Some examples of characteristics of a community that can lead to vulnerability include a lack of basic public services (health care, education, sanitation); a lack of security; a lack of strong social connections within the community; small or individual households leading to isolation.

Capacity:

- The combination of the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals including disaster risk reduction. Some examples of community strengths and attributes include well-resourced facilities, good health among community members, knowledge and skills among community members, strong institutional structures supporting community management and decision making and a united and caring community.

Disaster risk will increase *if natural hazards negatively impact on a vulnerable community that has a limited capacity to respond. Therefore, in order to* ***mitigate disaster risk****, each individual, household and community can undertake different activities to* ***limit the vulnerability status and raise capacity.***

MAIN ACTIVITIES

1. Warm-up

Time: 10 minutes

Materials required:
Handout 2.1

Case Studies – Responding to hazards

- The teacher gives the students a scenario that commonly occurs at their local area. For example: the weather forecast predicts: *"there will be heavy rain in the coming days and this may result in floods and landslides"*. Some local people are living in the foothills and along the streams.
- Role Play: the students act as if they were resident sliving in this community. They will answer the following questions:
  + *What could happen to local community if a flood occurs unexpectedly?*
  + *What could be the worst impacts? What could be done to mitigate these impacts?*

- After that, the teacher introduces lesson content:
  + *Natural hazards are phenomena with the potential to be dangerous and may cause injury, loss of life and damage to property. For example, the water level in rivers could rise quickly, causing flash flooding and killing people.*
  + *In the event of a natural hazard, if individuals and the community understand the risks they face and have the capacity to mitigate these risks, losses can be reduced or avoided. For example: local people living close to rivers or streams should be kept informed of the possibility of floods. Students who have to cross a river or stream to go to school should stay at home if it has been raining heavily or if it is unsafe, or they should carry life-jackets or travel in a stable boat if possible and if it is safe to do so. Taking these actions can avoid or reduce the negative impacts of a flood.*
  + *If a community or a society does not have the capacity to mitigate risk, natural hazards can lead to catastrophic consequences. For example: local people do not notice that a flood is coming. Students cross the river in a boat to get to school. Because they did not know that a flood was coming, they were not prepared, and got used the boat in flood conditions. The boat is destroyed by the flood, and some of the children are injured when they fall into the water.*

2. Problem studying

Target participants:
Secondary students

Time: 15 minutes

Materials required:
Handout 2.1

2.1 What can happen during a disaster event?

- The teacher shows the students a set of two pictures from Handouts 2.1.1 to 2.1.4 (a and b) and asks them to describe:
  + *What <u>may happen</u> in the first picture (a)?*
  + *What <u>has happened</u> in the second picture (b)?*
  + *The teacher summarizes their ideas and leads the discussion to the two concepts; "Natural Hazards" and "Disasters" (See Information for Students – Part 1, Topic 2)*
- The teacher uses picture 2.1.1a – things may happen and picture 2.1.1b – things have happened todiscuss the concept of "disaster risk" with the class:

"In picture (a), we can see many impacts that the community is at risk from. They are personal injuries and accidents, collapsing buildings and homes and traffic jams. The risk of these impacts comes from loose and crumbling rock on

the mountain slopes and human activities in the foothills. A situation like this can lead to a landslide."

*The **"Risk"** is the combination of the probability of an event and the scale of its negative consequences.*

- The teacher shows the class different pictures and describes possible dangers that may result.
- After students present their ideas, the teacher can summarize the content: *"In conclusion, the actions we take in preparation for and to respond to hazards can determine the level of risk we face and how dangerous the hazard will be for our communities. The level of risk we face is also influenced by our capacity to cope – the particular characteristics of our communities and the vulnerability to, and capacity to cope with, the hazard event."*

Time:15 minutes

Materials required:
Handout 2.2

2.2 Distinguishing between the concepts "capacity" and "vulnerability"

- The teacher introduces a story: *"We will now investigate a village where our friends live: a Rabbit, a family of Goats, sister Butterfly, brother Mouse, uncle Ant, grandma and grandpa Cow and a family of Frogs.This village has many items and different activities"*
- The teacher divides the class into groups of 5-6 students and gives each group Handout 2.2. The groups have 15 minutes to discuss and arrange the cards from the handout into 2 groups:
  + ***Group 1:*** *The "Vulnerability" group includes thecards that describe activities/resources that could cause risk and the animals whose behaviors might be dangerous for them in disaster.*
  - ***Group 2:*** *The "Capacity" group includes thecards that describe activities/resources that will keep us safe and the animals whose behaviors will keep themselves and others safe.*
- Each group can present their results and explain why they put the cards into each category.

Answer:

+ ***Group 1*** *"Vulnerability": Rabbit, sister Butterfly, baby Frogs, grandma and grandpa Cow*
+ ***Group 2*** *"Capacity": mother Goat, baby Goat, brother Mouse, Elephant, uncle Ant (head of the commune), mum and dad Frog; loudspeaker, radio, exit map, test drill, places for evacuating.*

- The teacher summarizes the students' ideas and explains the concepts to the students (see Information for Students, Part 1, Topic 4)
    + ***Group 1:*** *This group is called "Vulnerability", and it includes actions which might worsen the impacts of hazard events. During hazard events, these actions could lead to dangerous situations. They are dangerous because they reflect limited knowledge of the situation, they reflect limited access to relevant information and they increase the physical risk of the situation. The actions described could result in a seriesof negative responses or an increase in risk. Some of the characters are also more at risk than others, for example, children, elderly people, and people with disabilities.*
    - ***Group 2:*** *This group is called "Capacity", and it includes actions which can mitigate the negative impacts caused by hazard events. The actions are informed by knowledge of the event itself and a focus on disaster preparedness and mitigation. If the characters in the story are supported and well prepared, they will be able to help others in the community. For example, children who have been trained in disaster preparedness can share their knowledge with adults in their family and their community. This means that the whole community will be better able to respond to and mitigate disaster risk. "Capacity" also includes resources such as facilities and infrastructure which individuals, families and communities can use to mitigate disaster risk and keep safe in hazard events.*
- The teacher brings these issues for discussion to class:
    + *Are there any characteristics/factors that make you, your family and your community more vulnerable to disaster impacts?*
    + *What skills and resources do you, your family and your community have to mitigate the negative impacts of disaster events?*
- The teacher then summarizes how this will make the community safer from hazards impacts.
    + *"Disaster risk and the potential for negative impacts to be exacerbated will be greater if hazards occur in communities where there is higher "vulnerability", and people have lower capacity to respond to the hazard.*
    + *Therefore, in order to mitigate negative impacts of hazard events, capacity building is necessary to improve responses to hazard events and to mitigate "vulnerability" of individuals, families and communities.*

3. Lesson reinforcement

Time: 5 minutes

Suggested questions

Select the most correct answer to the following question:

1. **What is a natural hazard?**
   a. Human made event or risk which could cause loss of human life and damage to property.
   b. Natural event or risk which could cause loss of human life and damage to property.
   c. Human made or natural event which does not any consequences.
   d. A natural phenomenon that may cause losses of life and damage to property, environment, living conditions and socio-economic activities.

2. **What is the most common hazard in Viet Nam?**
   a. Snow storm
   b. Tropical Depression
   c. Tsunami
   d. Volcano

3. **An understanding of hazards would increase your…**
   a. Vulnerability
   b. Ability to respond
   c. Disaster risk
   d. Loss

4. **Which of these disasters occurs the fastest, is the most unexpected, and is the most difficult to predict?**
   a. Storm
   b. Flash flood
   c. Drought
   d. River flood

OTHER SUGGESTED ACTIVITIES

1. Role play – Overcoming disaster

Time: 15 minutes

1. **Role play: The teacher gives an example of a common local hazard. This could be an example for a coastal region:** *As forecast in the weather report, there is a tropical depression coming inland from the ocean very close to our town. Some fishermen are still fishing at sea. However, the tropical depression becomes a typhoon that is becoming stronger and stronger. There is a risk that the boats will be destroyed and the fishermen will be hurt or lose their lives. The fishermen must work together to avoid the strong winds and evacuate immediately to a small island to be safe during the storm.*
2. The teacher draws on the ground one big circle in the center called “the ocean” and 3-4 circles called “small islands” which are scattered around the central circle. Each “small island” circle has enough space for 3-4 students to stand inside it. Students play the role of fishermen out at sea.
3. **Rules:**

- When the teacher says “Go fishing”, the “fishermen” will move to “the ocean” circle and pretend to go fishing.
- When the teacher says “Storm!Storm!”, the “fishermen” will move quickly to a “small island” to evacuate. “Fishermen” who are too slow or cannot find an island to be safe during the storm are eliminated from the game.
- The teacher can reduce the number of islands to increase the competitiveness of the game.

4. **Discuss and sum up**

- The teacher asks questions:
  + *What were the impacts of the recent tropical depression and typhoon? How many fishermen were hurt during the storm? Why?*
  + *What were some factors that could increase or mitigate the risk of impacts from the tropical depression and typhoon?*
- The teacher summarizes the impacts of the tropical depression and typhoon in particular and hazards in general, leading the discussion toward the content for the next lesson *(See Information for Students, Part 1, Topic 1)*

2. Identifying disaster risks in our school/ classroom

Target participants:
secondary students

Time: 15 minutes

Materials required:
Map of school/ classroom,crayons, tape

- The teacher shows a map of the school/classroom on the board.
- The teacher gives students green and yellow cards. On the yellow cards, the teacher asks students to draw risks they have identified in unsafe places in and around the school/classroom. On the green card, the students are asked to write ideas for how to mitigate these risks.
- The students have 5 minutes to write and draw. They are then asked to stick their yellow risk cards in the appropriate place on the map and their green mitigation cards next to them.
- The class looks at the map together and discusses the potential risks in and around the school/classroom. The teacher can ask students or they can ask each other to explain if their cards are unclear. The teacher can also give students homework: draw a map of potential risks in your neighborhood/home using the same method (See Information for Students, Part 1, Topic 6)

3. Writing task

Target participants:
secondary students

Time: 20 minutes

- The teacher asks students to work in small groups or in individual and to choose one of the following topics to write about:
  + Describe your understanding of a hazard in your region or in Viet Nam. If that hazard were to occur near your home or school, what would you do to keep yourself safe? Has this ever happened before? What did you do?
  + Write a forecast of a natural hazard that is coming to your area. Write a warning and a guide to help local people and children in the area prepare for and respond to the hazard. What could they do to minimize the risk of experiencing negative impacts?
- These exercises can be shared in class or used in activities for the following lessons.

Topic 3: Climate Change

Objectives:	***At the end of this module, students will be able to:*** Distinguish between the terms "weather" and "climate" Explain the concepts "climate change" and "greenhouse gases", describe the greenhouse effect and explain the causes of climate change Describe the impacts of climate change on patterns of natural hazards in Viet Nam and potential responses to climate change and climate impacts
Time:	90 minutes
Supporting materials:	Information for Teachers, Part 2, Topic 3 Handout 3.1, 3.2, 3.3, 3.4

INFORMATION FOR STUDENTS

1. What is Climate Change?

Weather and Climate

- ***Weather*** *is the atmospheric conditions at a particular place in terms of air temperature, pressure, humidity, wind speed and precipitation. The weather can change from day to day, even from hour to hour.*
- ***Climate is*** *the weather averaged over time, typically measured over 30 years or more. Climate is comparatively stable and is used to describe trends in weather patterns.*

Climate Change *generally refers to the long-term changes in climate patterns that have occurred over a period of time. The climate can become warmer or colder. Climate change may be caused by natural factors or human activities that are changing the composition of the Earth's atmosphere.*

Throughout history, the climate of the Earth has changed many times. However, the term "climate change" is commonly used to refer to the current changes in rainfall and temperature patterns being seen across the globe that are caused by human activities, particularly over the last century.

Global warming *refers to the trend of rising average temperatures across the globe. Climate change is a broader concept referring to the long-term changes in climate including temperature, precipitation and sea level rise, and the impacts of these phenomena on natural systems and human beings.*

2. Observations of climate changes

- ***Global average temperatures*** *are increasing. The global average temperature has risen by more than 0.7°C since the Industrial Revolution. In Viet Nam, the average temperature has increased 0.5-0.7°C over 50 years (1958- 2007);*
- ***Polar ice*** *is melting at an increasingly rapid rate;*
- ***Sea levels*** *are rising due to the thermal expansion of water and the melting of glaciers and continental ice, especially at the two poles and high mountains;*
- ***Natural hazards and extreme weather events*** *such as heat waves, cold snaps, typhoons, floods and droughts are occurring with more frequency and intensity, as well as becoming more difficult to predict.*

3. Causes of Climate Change

Climate change is being caused by an increase in concentration of greenhouse gases(GHGs) in the atmosphere resulting from human activities.

Let's get to know more about greenhouse gases and greenhouse effect.

The Earth's atmosphere contains some special gases that are called greenhouse gases because of their ability to warm the Earth in the same way that warm temperatures are maintained in greenhouses for plants. Energy from the suns rays hit the Earth's surface. Some of this energy is reflected back into space, and some is trapped by the greenhouse gases in the atmosphere, and stored as heat.The main greenhouses gases are water vapor(H_2O), carbon dioxide(CO_2), methane(CH_4), halocarbons(CFC, HFC and HCFCs, etc.),nitrous oxide(N_2O)and ozone(O_3). These gases act as a blanket around the Earth, which is thick enough to keep the Earth within the appropriate temperature range for life to exist. Without these gases, all the heat from the Sun would escape back out to space and the Earth's surface would be much colder.

The greenhouse effect is the natural process of the atmosphere letting in some of the energy we receive from the Sun and trapping it before it is reflected back out into space.

1. *Solar energy from the Sun passes through the Earth's atmosphere as heat*
2. *Some solar energy is then reflected back into space*
3. *Some solar radiation is absorbed as heat energy and warms the Earth's surface*
4. *Greenhouse gases in the atmosphere trap some of this heat*

This process is called the greenhouse effect (Handout 3.1a)

Greenhouse gases exist naturally and the greenhouse effect is a natural process. A big problem has been occurred only when the Earth's atmosphere contain too much these gases since the Industrial Revolution spreading throughout the world in 19th century. According to scientists, human activities over the last 150 years arethe main causes of climate change. These activities include digging up and burning fossil fuels like coal, oil and gas, industrial agriculture, and cutting down forests. These activities are increasing the levels of greenhouse gases in the at mosphere. Because the level of greenhouse gases in the atmosphere is too high, too much heat energy from the sun is trapped in the atmosphere and the planet becomes hotter (Handout 3.3).

4. What impacts will climate change have on our lives?

Climate change is causing negative impacts now, all of which will become more serious in the future. These include:

- *Impacts on agriculture, forestry and fishing systems: it is becoming more difficult to grow crops and to manage livestock as climate conditions become hotter and drier and extreme weather events become more frequent, intense and difficult to predict;*
- *Human health problems: a changing climate means that geographical regions that support tropical diseases are expanding;*
- *Increasing frequency and intensity of disaster events: drought and flood events are becoming worse as rainfall patterns change, typhoon patterns are changing (although little is known about how and why this is happening) and storm events are becoming more frequent and more intense around the world;*
- *Social unrest: rising sea levels, large areas of land becoming uninhabitable, and increasing resource scarcity will lead to mass migration and conflict.*

5. How can we respond to climate change?

An effective response to climate change will involve both "mitigation" and "adaptation".

- ***Climate mitigation** refers to any actions taken to reduce greenhouse gas emissions and their impacts on the global climate system. For example, reducing fuel consumption.*
- ***Climate adaptation** refers to any adjustments in natural or human systems, intended to reduce vulnerability to current or anticipated climate change and variability or exploit beneficial opportunities. For example, changing the crops that we grow so that they are more suited to the new climate conditions.*

MAIN ACTIVITIES

1. Warm up

Time: 5 minutes

1.1 Distinguishing between "weather" and "climate"

- The teacher introduces the concepts: In order to understand climate change, we should define "weather" and "climate".
- The teacher uses these examples:
  - + *What is the weather like in our commune today?*
  - + *Do the three-day forecasts predicting storms, rain or sunshine speak about the weather or climate?*
  - + *What is the climate of the northern, central and southern regions of our country?*
- The teacher explains the difference between weather and climate (See Information for Teachers, Part 2, Topic 3, Subtopic 1).

Time: 5 minutes

1.2 Small exercise about weather and climate:

- The teacher leads a class discussion and asks the students to fill in ”weather” or “climate” in the following sentences:
  a. *The …. is hot today.*
  b. *Viet Nam has a tropical monsoonal ….*
  c. *The … in the south has two distinct seasons: wet and dry seasons.*

Answers: a. weather; b. climate; c. climate.

2. Problem studying

Time: 15 minutes

2.1 limate change concepts

- The teacher asks: What is climate change?
- The teacher writes the students' ideas on the board, summarizing key points leading to an explanation of concepts associated with climate change. The teacher explains the difference between “climate change” and “global warming” *(See Information for Students, Part 1, Topic 3, Subtopic 1).*
- The teacher explains the main characteristics of global climate change.
- The teacher explains about the temperature rise and sea level rise in Viet Nam *(See Information for Teachers, Part 2, Topic 3, Subtopic 2)*

Time: 10 minutes

2.2 Impacts of climate change on disaster events

- The teacher asks: Do you think climate change will impact disaster events in Viet Nam? How?
- The teacher summarizes and presents information on the way the patterns of disaster events will change with climate change in Viet Nam *(See Information for Teachers, Part 2, Topic 3, Subtopic 2).*

Time: 10 minutes

Materials required:
Handout 3.1a, 3.1b

2.3 Causes of climate change

2.3.1 The greenhouse effect

- The teacher introduces the activity: *In order to understand what is causing climate change, we need to know more about the greenhouse effect.*
- Using Handout 3.1a, 3.1b, the teacher explains about the process of how greenhouse gases keep the Earth warm.

- The teacher explains why greenhouse gases and the greenhouse effect are important to human life *(See Information for Students, Part 1, Topic 3, Subtopic 3).*

Time: 10 minutes

Materials required:
Handout 3.2, 3.3

2.3.2 Climate change causes

- Using the Handouts 3.2 and 3.3, the teacher introduces the processes that have led to climate change since the Industrial Revolution *(See Information for Teachers, Part 2, Topic 3, Subtopic 3).*

Time: 25 minutes

2.4 Responding to climate change

2.4.1 Activity: Tracking the culprits – who emits greenhouse gases?

- The teacher divides the class into groups of 5-7 students.The task of "tracking culprits" is to list activities which create greenhouse gases (or to list machines or equipment which require electricity, gases, oil... to run).
- After the certain time (3-5 minutes), one member of each group writes their ideas on the board. The winner is the group who has the most correct ideas.

2.4.2 Activity: What can you do to respond to climate change?

- The teacher asks the students: *What can you do to respond to climate change?* and invites 3-5 students to answer.
- The teacher introduces some adaptation and mitigation activities for the class to discuss, choosing activities that respond to the actions discussed in Activity 2.4.1.
- Based on the students' capacity, the teacher asks students to work in teams and compete by listing causes (activities/processes) and solutions (activities/processes) which students, their families, their schools and their communities can do to respond to climate change *(See Information for Teachers, Part 2, Topic 3, Sub-topic 5).*

3. Lesson reinforcement

Time: 10 minutes

Suggested questions

Question 1: Choose the most correct answer for the following questions

1. **What is the name of the phenomenon that is causing a change in the Earth's climate patterns?**
   a. Global warming
   b. Greenhouse effect
   c. Climate change
   d. Disaster

2. **Climate change adaptation can be defined as:**
   a. Human activities that prevent climate change.
   b. Human activities that mitigate global warming.
   c. Human activities that mitigate the level and intensity of greenhouse gas emissions released into the atmosphere.
   d. Human activities that reduce vulnerability and take advantage of opportunities that come with climate change

3. **Climate mitigation can be defined as:**
   a. Adjustment of natural and human systems to reduce vulnerability and take advantages of opportunities that will come with climate change.
   b. Human activities that reduce the level and intensity of greenhouse gas emissions.
   c. Human activities to prevent climate change impacts.
   d. Human activities to reduce vulnerability.

4. **Which of the following activities does not mitigate climate change?**
   a. Reducing traffic congestion.
   b. Using air conditioners.
   c. Reducing electricity use.
   d. Biking instead of riding motorbikes.

5. **Which of the following lights is the most energy efficient?**
   a. Incandescent light bulbs
   b. Compact fluorescent lamps (CFLs)
   c. Light emitting diodes (Leds)
   d. Pressure lamps

Question 2: Is the following statement is true or false? Tick (√) in the appropriate box

	True
1. Throughout history, the Earth's climate has changed significantly.	√
2. Greenhouse gases absorb heat from the sun and keep the atmosphere and the surface of the Earth warm.	√
3. The greenhouse effect has only negative impacts for humans and animals.	
4. Climate change will cause temperature rises in every region on the Earth.	

Question 3: Choose one or more correct answers to the following questions:

1. **Which of the following phenomena are observations of climate change?**
   a. Volcanoes.
   b. Melting ice.
   c. Decreasing average temperatures
   d. Rising sea levels.

2. **Which of the following gases are not greenhouse gases?**
   a. Water vapor
   b. Oxygen
   c. Nitro
   d. Carbon dioxide

3. **Which of the following activities make the greenhouse effect worse?**
   a. Driving motorbikes, cars and trucks
   b. Decreasing electricity use
   c. Breeding cows and growing rice for food
   d. Planting trees

4. **Climate change could decrease….**
   a. The number of species on Earth
   b. The average global temperature
   c. The number of storms
   d. The amount of land available due to rising sea levels

5. **Which of the following activities may mitigate climate change and save money?**

   a. Leaving the lights on when you leave the house.

   b. Planting vegetables.

   c. Using plastic water bottles.

   d. Travelling/commuting by public transport or bicycle.

Question 4: Arrange the following sentences into the correct sequence to explain the greenhouse effect:

a. Sunlight hits the Earth's surface after entering the atmosphere.

b. Part of the sunlight is trapped as heat energy in the atmosphere by greenhouse gases.

c. This heat energy warms up the surface of the Earth

d. Some of the sun's energy returns into space.

Answer: a,d,b,c

OTHER SUGGESTED ACTIVITIES

1. Warm up activities on climate and weather

Time: 5 minutes

The teacher introduces the game by explaining the rules:

- When the teacher says "light rain", the students clap two index fingers together and say "ti tach, ti tach" (imitating the sound of light rain);
- When the teacher says "strong wind", the students raise their hands, waving to the left and right, saying "ao, ao" (imitating the sound of blowing wind);
- When the teacher says "heavy rain", the students stamp their feet, saying "lop bop, lop bop" (imitating the sound of heavy rain drops);
- When the teacher says "thunder", the students tap the table with their fists, saying "ung ung, ung ung" (imitating the sound of thunder);
- When the teacher says "lightening", the students open their palms, stretching their arms to the front, saying "doang doang" (imitating the sounds of lightening);

The teacher can change the order of the questions to see if students are able to quickly react or not. Then the teacher explains that such events are known as "weather".

2. Game "Tracking the culprits" - who emits greenhouse gases?

Target participants:
Secondary students

Time: 20 minutes

Materials required:
Handout 3.4 (with copies for each group)

- The teacher divides the class into groups of 5-8 students and provides copies of Handout 3.4 to each group.
- Groups have 10 minutes to complete the task "tracking the culprits". The groups have to find out what impacts the objects/activities shown in the handout have on the environment and climate.
- The teacher uses the information below as a guide:

1. *Trees (and forests) are made up of plants that have "woody" bodies. The wood is mostly made from carbon. Trees have a special ability of getting their energy from the Sun. When a tree breathes, or respires, it draws carbon dioxide (CO_2) into its leaves, and releases oxygen (O_2). The carbon is stored in the wood and underground in the roots. Each tree can store many tons of carbon; therefore, a forest can store many thousands or millions of tons of carbon.*
2. *Humans and animals breathe in (O_2)and breathe out (CO_2).*
3. *In many regions, vast areas of forests have been cut down. This happens because people want to sell the timber, or to clear the land to make way for agriculture or other purposes. When trees are cut down, they stop absorbing carbon from the atmosphere, and they release their carbondioxide back into the atmosphere. This may happen slowly as the tree rots (decomposes) or rapidly if the trees are burned. When a forest is cut down, the many thousands of tons of carbon dioxide that were stored in the trees are released back into the atmosphere.*
4. *The oil and gas we use to run vehicles such as motorbikes, cars and planes is produced from petroleum, which is a fossil fuel. It is made from the forest and living animals that were buried underground millions of years ago. Immense pressure crushes the trees and turns it into crude oil over time. Like trees, fossil fuels are made from carbon, so, when burned, for example in a motorbike engine, they release carbon dioxide into the atmosphere.*
5. *Power plants that burn fossil fuels (coal, gas and oil) supply electricity to most cities around the world. The process of powering turbines and turning heat into electricity releases millions of tons of carbon dioxide every day.*

6. *Aircrafts are very powerful and move very fast – hundreds of kilometers per hour, thousands of feet above the ground. However, to do this, they burn a large amount of fuel and release a large amount of carbon dioxide.*
7. *Waste disposal: The global population has increased greatly over the last century, and this has led to our communities producing an increased amount of waste. Waste is usually burned or buried in the ground, and in time it breaks down to create the carbon dioxide and methane. The more waste discharged, the more GHGs will be emitted into the atmosphere.*
8. *Agriculture: In addition to carbon dioxide produced via the respiration process, livestock such as cattle and buffalo also produce methane when they digest their food, due to enteric fermentation and waste. The growing demand of meat and dairy products leads to an increase in farming and associated deforestation to clear land for grazing. Both deforestation and meat and dairy production emit a huge amount of GHGs each year. Rice production also results in the release of a significant amount of methane. Methane is produced when part of the rice plant ferments underwater.*

3. The relationship between human activities, climate change and natural hazards

Target participants: Secondary students

Time: 40 minutes

Materials required:

Map drawing materials (can be used as the homework)

- The teacher introduces the topic, and uses the following information as a guide:
- *In recent years, natural hazards and extreme weather events such as heat waves, cold snaps, storms, floods and drought have been increasing, both in frequency and intensity as well as becoming less predictable. This is happening both on a global scale and here in Viet Nam. This is being caused by climate change. Let's find out how:*
- The students work in groups of 4-7 people, and discuss the following question: *What local activities contribute to climate change and increase the risk of, and vulnerability to, natural hazards?* The teacher may suggest to the students that they think about activities including transport, agriculture, mining and construction.
- After the discussion, representatives of each group present the main points from their discussion.
- The teacher summarizes: *It is the fact that modern science and engineering have made important steps forward, but human intervention has become a threat to nature and broken the balance of nature.*

- *In agricultural areas, the land and water are overexploited, and harmful chemicals are overused, making the soil quickly discolor.*
- *Expansion of industrial activities on agricultural land degrades soils and can affect water resources.*
- *Activities like mining also contribute to soil erosion and increase the risk of soil contamination and risk of landslides.*
- *Deforestation results in: soil degradation, erosion, and an increase in the risk of flooding and drought events.*
- *The process of urbanization can cause groundwater depletion and land subsidence (lowering of the land surface) and can cause areas, particularly delta or low land areas to become more flood prone. More rainwater is lost as runoff, as concrete covers more surface area, resulting in a reduction of water absorption and an increase of the risk of great floods.*

4. The relationship between human activities and the natural environment

Target participants:
Primary and secondary students

Time: 20 minutes

Materials required:
Projector, Film -
"Silver Forest, Golden sea" or "Cut down the tree"

- Before the movie, the teacher asks the class to observe and record the following details:
  - *What are some actions that humans have taken? Why?*
  - *What are the consequences of these actions?*
- After the movie, the teacher invites several students to discuss the questions, and some of other studentsto make additional comments.
- The teacher summarizes the human activities and their impacts on the natural environment and the climate.

Topic 4: Who is most affected by natural hazards and climate change? - The vulnerable people

Learning Objectives:	***At the end of this module, students will be able to:*** Name the different vulnerabilities to natural hazards and climate change Explain the potential impact of natural disasters and climate change for vulnerable people Help in raising awareness for the community about the impact of natural disasters and climate change on vulnerable communities and vulnerable people
Time:	45-60 minutes.
Supporting materials:	Information for Teachers, Part 2, Topic 5. Handout 4, A0 paper, crayons, colored cards.

INFORMATION FOR STUDENTS

Natural hazards and climate change will most heavily impact vulnerable people. Vulnerable groups include people living in poverty, people with disabilities, women who are pregnant or raising under one year baby, children, elderly people, ethnic minorities, and people living with HIV/AIDS and other severe illnesses.
When a hazard event occurs or climate change issues take effect, it can seriously affect those who are vulnerable and at risk more than others because they are more susceptible to problems such as:

- **Economic:** people with low incomes or those who have not enough or just barely enough to meet their basic needs; their vulnerability can be due to a lack of facilities, temporary housing or a lack of housing, and difficulty in accessing basic public services (for example health, education and clean water);
- **Social:** people who are isolated from the community - less involved in social organizations and activities in the local community; this isolation means that their voices are less easily represented in community decisions and community activities;
- **Environment:** people who live in areas that are vulnerable to natural disasters or that are impacted by environmental pollution;
- **Attitudes:** not confident, pessimistic, lack of socialization and communication.

MAIN ACTIVITIES

1. Warm up

Time: 10 minutes

Game: Flash floods

- The teacher asks the class or group (10-15 children) to play a game. The teacher gives each student one card, which describes a character for them to play, for example: an elderly man, a woman, a child, a person with disability, and a person living in poverty. Other students are local residents. Arrange a large space with a starting line and students will stand in a row in front of that line.
- The teacher explains the context and the rules of the game: There is a peaceful village in a mountainous area. One day, a flash flood occurs. What can the people living in the village do to protect themselves? The teacher asks the students the following questions, and the students who answer "yes" will move one step over the line.
  - Who can go to find a safe place to shelter?
  - Who has knowledge or information to respond to disasters?
  - Who can swim when the water rises?
  - Who can reserve enough food and clean water for drinking?
  - Who can prepare medicine or provide health care or emergency first aid?
  - Who is calm, and does not panic?
- The teacher lets students see their standing position. After that, the teacher asks discussion questions:
  - *Why are many of you able/unable to do these things? What is your character?*
  - *Will the group that your character belongs to be at risk when a natural hazard event or climate change occurs? Why is your character vulnerable?*
  - *What can we do to prevent these negative consequences from occurring? How can we reduce the vulnerability of this group?*
- The teacher summarizes the discussion and leads to the next lesson *(see Information for Teachers, Part 2, Topic 4).*

2. Problem Studying

Time: 30 minutes

Materials required:
Handout 4

Vulnerable people: Who are they and what are the impacts of natural hazards/climate change on their lives?

- The teacher introduces the session: When natural hazardsor climate change impacts occur, a group of people in society and community is severely impacted and lack capacity to respond. Today we will find out who are the most vulnerable to hazards and impacts, and how these impacts are likely to affect their lives.
- The teacher invites the students to list the different groups of people that could be negatively affected by hazard events and climate change impacts.
- The teacher then divides the class into 5 groups and gives each group one case study, which focuses on a vulnerable group of people. The teacher then asks the groups to read the information they have been given,to reflect on their own observations from within their local communities, and to discuss these reflections within their group. Each group discussion should aim to answer the following questions (the students can be asked to play the role of that group):
  - *When natural hazards occur, what **difficulties** do they have to deal with?*
  - *What **strengths and capacities** do they have to respond to hazards/impacts from climate change?*
  - *Have you seen **any similar stories** near your home or in other areas?*
- The groups discuss these questions for 10 minutes and take 3 minutes to present.
- After the group presentations, the teacher asks the class to share any additional stories or information they may know.
- Teacher then summarizes ideas from the students and provide further information *(see Information for Teachers, Part 2, Topic 4).*

3. Lesson reinforcement

Time: 10 minutes

Suggested questions

Question 1: Choose the best answer for the following question:

1. **Which of the following factors contribute to increased vulnerability?**
   - **a. Living alone**
   - b. Having good health

c. Positive life experiences

d. Being financially secure

Question 2: Choose the two most correct options for the following questions:

1. **Which of the following groups of people are most at risk of experiencing negative impacts resulting from climate change?**

   a. Children

   b. Wealthy people

   c. Adult men

   d. Ethnic minorities

2. **Which of the following factors can increase your ability to respond to natural disasters and climate change impacts?**

   a. Underestimating the hazard

   b. Regularly listening to the weather forecast information

   c. Not having preparedness and contingency plans

   d. Learning from past experiences of responding to hazards

OTHER SUGGESTED ACTIVITIES

1. Interview - Impacts of a hazard event or climate change

Participants: Secondary students

Time: 30 minutes

- The teacher introduces the activity: *Many people in your hometown have suffered badly and are affected by natural hazards and climate change. You will interview relatives or people where you live to write about local natural hazards and the impact that these hazards have on those people.*
- The teacher asks the students to work in groups of 3 to 5 (try to group students together who live in the same residential area). Each group will have 15 minutes to discuss in order to identify the questions that should be in the interview, so the students can collect relevant and important information.
- After the groups have had time to work on their questions, the teacher asks a few groups to share their questionnaire with the class. The other students and the teacher can give feedback.
- The teacher asks 1 or 2 groups to practice their interview techniques in front of the class, 1 student will write down the interview. The class can comment on their performance. The teacher must ensure that feedback

is critical but positive, and the students should feel confident about the interview at the end of this session.

- The students now go home and conduct the interviews. Each group interviews a few households or individuals, writes the findings in a newspaper-style story and returns it to the teacher. The results of this exercise will be shared at the next session or in a book or school newspaper on natural hazards and climate change.

These questions can be used as a guide if the students are stuck:

- *Students first state the purpose of the interview*
- *Ask for some personal information of the interviewee: name, age, gender, family background, cultural/ ethnic background*
- *How long has she/he lived in this area?*
- *When she/he was young, what was the weather like? How has the weather changed? Have there been noted changes in:*
  + *degrees of heat/cold*
  + *number of days of sunshine/rain*
  + *frequency and/or intensity of drought and flood events*
- *How do changes in weather affect the interviewee? If there have been noted changes in the climate, how has this affected her/him?*
- *Ask how his or her life has changed? What new difficulties have been encountered? Has their health changed?* Is this related to weather or climate in any way?

2. Painting a safe village

Time: 40 minutes

Preparation: sheets of A0 paper and colored pens

- Separate the students into groups. The teacher asks each group to spend 20 minutes drawing a picture of a village in the future (it can be their own village, or an imaginary village). The village is safe from natural hazards and climate change impacts. While drawing, the students play the role of vulnerable group that they have discussed (people living in poverty, children, the elderly, people with disabilities, women).
- The teacher then invites a student to represent the group in a 3-minute presentation of their drawing. The other groups listen and ask questions.
- The teacher can ask some leading questions:

- *When you were painting, did you find any difficulties?*
- *Do you think the village is safe for the group that you play the role? Have you ever observed people from these groups or talked to them about their experiences?*
- *What do you think can be done to help vulnerable people stay safe from natural hazards and climate change?*

- The teacher compiles a complete picture selection from the most interesting and accurate ideas. These images can be saved and made into a school newspaper or kept to be used in the following activities.

3. Share experiences and lessons learned from affected groups and individuals

Time: 45 minutes

Preparation: Invite people who have have experienced local hazards

- Invite people who have experienced local hazards to share these experiences with the class. Stories can share content including:
  a. The impact of natural hazards on daily life – before and after the hazard event
  b. Lessons learned in preparing to respond to natural hazards.
- The teacher encourages students to ask questions of the guest. Conclude the presentation and ask students to discuss and list the main points that they have learned.

Topic 5: Disaster risk reduction and adaptation to climate change – my actions

Learning Objectives:	***At the end of this module, students will know:*** How to respond in specific situations when natural hazards occur, including floods, typhoons and earthquakes, etc. What action people should and should not take when natural hazards occur, and they will be able to take the required actions. What to do in an emergency situation at home with their families and in their school.
Time:	45-60 minutes
Supporting materials:	Information for Teachers, Part 2, Topic 5 Handouts 1.1-1.8, 5.1, 5.2.

INFORMATION FOR STUDENTS

What should I do?

Tropical depressions and typhoons

Before the rainy season, and once you know that a typhoon is coming:

- *Get involved in planting trees around your house and school to create a protective barrier agains typhoons and erosion;*
- *Help your parents to reinforce your house to make it more resistant to high winds.*
- *Keep books and important documents in sealed plastic bags;*
- *If there are any trees that look old and weak, or like they might fall down in a strong storm, ask your parents if they can cut them down. Remove any branches that might break during a storm and be picked up by the wind;*
- *Help parents reserve food, water supplies, medicines, and gather other essential items in a high and safe place;*
- *Keep track of information about the storm and start preparations early with plenty of time.*

During the typhoon:

- *Children should stay inside a house or building with a strong structure and are not to go outside during the typhoon. If you are outside, quickly find safe shelter, stay away from trees and poles and anything else that can be blown over;*

- *Listen carefully to your parents and other adults and help to look after the younger children;*
- *Listen to the messages on the radio and the community loudspeakers for updates.*

When the typhoon ends:

- *Help parents and neighbours clean up and make repairs to damaged homes;*
- *Make sure that you stay away from electrical outlets, electricity cords or power poles/ powerlines. Remind your parents to check the power source in order to ensure the safety of your family;*
- *Always remember to eat cooked food only, boil water before drinking, and use sleeping screens and mosquito nets to avoid mosquitos. These actions will help you to avoid the diseases that often come with typhoons;*
- *Continue to monitor the typhoons information on television, the radio or the local village notices.*

We can learn from our ancestors. *For thousands of years, our ancestors have known how to observe natural cycles to predict weather patterns. You can ask your grandparents how they can predict the weather and climate patterns.*

Flooding

Before the flood:

- *You and your family should keep track of weather information on the community loudspeakers, the radio and television to know about the storm and the possible risk of a flood;*
- *Help parents reserve food, water supplies, medicines for at least one week in a high and safe place.*
- *Help your parents to prepare an emergency kit, and store it where all family members can access it.*
- *If possible, ask your parents to purchase life jackets to have ready. If your family or neighbours have a boat, make sure it is ready for use;*
- *You can also prepare your house so it is resistant against water – you can use sandbags to stop water coming in at the doors and around the walls;*
- *Keep books and important documents in sealed plastic bags in a high, dry location.*

During a flood:

- *Listen carefully to your parents and other adults, and move to a safe place, for example, a two storey building.*
- *If you evacuate, turn off electricity, gas and water, and unplug all electrical appliances. Take only essential items with you, including your emergency kit. Do not walk or drive in moving water, even if it is not high.*
- *Warning: be aware of snakes, centipedes and other dangerous insects or animals. They will also be looking for a high place to avoid the floods;*

- *Do not walk into water if you see that an electricity wire or post has fallen into water;*
- *Stay away from any rivers or streams. Do not play near water and do not swim in the flooded areas, because it is very easy to fall into the water and be washed away quickly;*
- *If you have to walk near rivers or moving water, wear a life jacket. If you do not have a life jacket, you can use floating objects such as tube, empty cans, empty plastic bottles tied to each other or floating banana tree trunks;*
- *If you do not evacuate, stay inside until it is safe to leave your house.*
- *Do not eat spoiled food or food that was soaked in floodwater. Such food is not clean and you could be infected by bacteria and become ill.*

After the flood waters have receded:

- *You should wait for your parents to check around your home for any damage that may have happened during the flood; especially electricity source at home;*
- *Help your family with cleaning, and keep drains cleared;*
- *Be careful when entering buildings and homes – the floodwater may have caused damage that you can not see;*
- *Always remember to eat cooked food only, boil water before drinking, and use sleeping screens and mosquito nets to avoid mosquitos. These actions will help you to avoid the diseases that often come with floods;*

Landslide

Before a landslide occurs:

- *To prevent landslides, you can start by planting trees and keeping hills green with vegetation;*
- *Find out if any landslides have occurred in your area in the past – if a debris flow has occurred before in the area, it is likely to occur again;*
- *Look and listen for warning signs, especially if you live in a mountainous area or there has been heavy rains;*
  - *leaning trees;*
  - *bulging ground at the base of the hillslope;*
  - *depressions on the ground;*
  - *turning muddy in colour in rivers.*
- *Listen carefully– sometimes you can hear strange sounds. These can be moving or rolling rocks or falling trees. It will sound like a faint rumbling sound that gets louder and louder.*
- *You can also look for signs around your home. These can include:*
  - *doors and windows jamming for the first time;*
  - *cracks in utility pipes;*
  - *cracks in walls;*
  - *cracks in footpaths;*
  - *fences, walls, utility poles start to tilt;*

- *If heavy rains are prolonged, you might hear warnings from loudspeakers, radio and television. If you hear these warnings, you can promptly evacuate to a safe area.*

When a landslide occurs

Landslides can occur very fast, so you should immediately run away from the danger zone. If it is absolutely impossible to run away, protect yourself by rolling into a ball, crouching low to the ground and wrapping your two arms around your head.

After the landslide:

- *You must remember to avoid the landslide areas because the ground is not stable and could collapse again;*
- *Do not go into any houses or building before adults have checked that it is safe;*

Drought

Water is vital for life, so we must be very careful how we use our precious water resources.

Before the drought season:

- *With your parents, inspect the pipes and faucets around your house to find and fix any leaks;*
- *Conserve your drinking water source like jars, tanks, etc . Cover them to prevent water from contamination.*
- *With your parents, plan how you can preserve seeds, food and livestock for your family. Remember that planting crops during a drought is very difficult.*

During a drought period:

- *You should regularly listen to weather forecast for advice about what to do during the drought period;*
- *Conserve water – this is the most important thing to do during a drought. Make sure you use water sparingly in the house and outside.*
- *Reuse the water from your day-to-day activities to irrigate plants and flush toilets. Be careful to avoid water pollution when watering plants – make sure there is not too much soap or chemicals in the recycled water;*
- *Help your parents to get access to clean, safe water and help them to transport and store it;*

After a drought period:

- *Help your parents to plant the seeds for the new season;*
- *Help your parents to check the pipes and faucets around your house for leaks, and fix any leaks that you find;*

Lightning and Thunderstorms

- *During a thunderstorm, you need to stay inside in your home, do not go out;*
- *Unplug any electronic devices in your home such as televisions, telephones and computers. Remove any large antenna or cables from the TV;*

- *During the storm, sit off the ground on a chair or a bed made of wood.Make sure your feet are not touching the ground and do not use the telephone;*
- *If you are outside during a thunderstorm, do not stand near tall trees or power poles and do not hold metal objects such umbrellas or bicycles;*
- *If you experience a tingling feeling like an electric current running through your body, you may be very close to lightning.You should immediately get as close as you can to the ground - squat down on your toes, cover your ears with your hands and lower your head between your legs;*
- *If you are on a boat or swimming, go to the river bank immediately. Water conducts electricity, and it is very dangerous to be in or near the*

Whirlwinds

- *If a whirlwind approaches, stay out of its path and find safe shelter if possible.*
- *Stay inside until the wind has passed. Whirlwinds only last for a short amount of time, so take shelter as soon as you find out the whirlwind is coming;*
- *If you are caught outside, avoid high ground and seek shelter in a nearby ditch or any nearby building;*
- *If you are inside when a whirlwind approaches, you should shelter under the stairs, under a table or under a bed. Stay away from windows and any glass, as it can shatter; Stay away from the windows and doors.*

Earthquakes

Before:

- *Decide on a safe place that you can shelter in atyour home and in your classroom. This could be underneath a sturdy table or a desk, or against an inside wall;*
- *DROP - COVER - HOLD ON. Practice this in drills.*
- *Make sure you have a torch with batteries, a fire extinguisher*
- *Remind your parents not to put heavy furniture like bookshelves, cabinets, or heavy picture frames close to the doors in case they topple and block your exit;*

During:

- *If you are inside a house, try to find a safe place within few steps.*
- *DROP – COVER – HOLD ON: DROP to the ground; take COVER by getting under a sturdy table or other piece of furniture or against an inside wall; and HOLD ON until the shaking stops; Make sure your head and neck are covered by the structure;*
- *Stay away from windows, outside doors, glass objects and light fixtures – anything that might break or fall;*
- *If you are outside,stay away from buildings, high walls, trees and power poles/wires. Stay away from anything that you think could fall down.*

After:

- *After the earthquake, listen carefully to your parents, emergency workers and other adults;*
- *If you are inside a building, wait until the shaking stops, and it is safe to exit the building;*
- *Observe hazards and keep away from any dangers, including structures that are damaged and might fall;*

THE MAIN ACTIVITIES

1. Warm up activity

Time: 10 minutes

Game: Mountain Genie and the Water Genie

- The teacher divides the class into two teams and the students form two lines, facing each other.
- The teacher explains the rules of the game:
  + This is a fierce battle like a fight between the Mountain Genie and the Water Genie. Following the story, the Mountain Genie can win over the Water Genie, the Water Genie can win over the Princess, and the Princess can win over the Mountain Genie;
  + Following their turn, each team must choose a movement/action that corresponds to their role. For example, if your group chooses the Mountain Genie character, the whole group can pretend to draw their swords. If your group chooses the Water Genie character, the whole group can pretend to make waves. If your group chooses the Princess: dress up (rock-paper-scissor-sword);
  + The team whose members do not perform the same actions lose the game;
  + Before starting the game, each team has one minute to discuss the role the team will play;
  + When playing, the team will listen to the instructions and perform their actions at the same time.
- After the game, the teacher can summarize the lesson:
  + *We have witnessed the fight between the Mountain Genie and the Water Genie from thousands of years ago. The Mountain Genie is the winner! However, in the current context of climate change, the battle between the Mountain Genie and the Water Genie and the fight between humans and natural hazards is much more complicated. Typhoons and floods occur more frequently, with greater intensity, and are becoming more difficult to predict. So what can humans do to cope with natural hazards like the Water Genie?*

2. Problem Studying

Time: 30 minutes

Materials required:
Hand-out 5.1

2.1 Discussion – What to do when hazards occur[1] - Your actions

- The teacher organises children to work in groups of 3-5. The teacher can select 5-10 scenarios that are given in Hand-outs 5.1, and that are relevant to the local area.
- In groups, the students choose a scenario card and discuss for 10 minutes.
- The group has 5 minutes to present the results of their discussion. The results can be expressed in many forms, for example, lectures, painting, or drama, etc.

Examples:

Example responses to Scenario 1:

- *Try to move to a safer, higher position. This can mean leaving your house if it is safe, or moving to the top floor or roof;*
- *Do not play or jump into the water – remember that flood water will be dirty and there may be dangerous debris concealed under the water;*
- *Use life jackets when movingaround the flooded areas. If you do not have a life jacket, you can use floating objects such as tubes, empty cans or plastic bottles tied to each other or trunks of banana trees;*
- *Listen to updated information from the radio or village loudspeaker.*

Example responses to Scenario 2:

- *Do not walk home alone;*
- *Contact friends who live near your house. If their parents come to pick them up, you can ask to come along;*
- *Inform your teacher or school to find a solution.*

Example responses to Scenario 3:

- *Stay away from rivers or streams in flooded areas because these areas may not be safe. Flash floods/ landslides are more likely if it has been raining heavily;*
- *If the river floods quickly, you should go to a high, safe place to shelter. For example, a two-story building or a nearby hill.*
- *Remember to look out for snakes, spiders and other dangerous animals.These animals will also seek high places for shelter;*

[1] Vietnam Red Cross. New Zealand Ministry of Civil Defence and Emergency Management, 2009. What is the Plan Stan teacher's guide.

- *Try to contact with adults. Listen carefully to what they tell you to do.*

Example responses to Scenario 4:

- *Stay indoors. A storm can create strong wind. The wind can pick up/blow aroundobjects outside which may be dangerous and cause injury;*
- *Shelter inside, avoid doors, windows and glass that may shatter;*
- *Listen to updated radio information or notifications from community loudspeakers in your village;*
- *With your parents, prepare the items you will need if you have to evacuate quickly;*
- *Talk with your parents and see where it is safe for the whole family to shelter.*

Example responses to Scenario 5:

- *If you are near your friend's house, return there. Find an adult to notify immediately, and listen carefully to what the adult tells you to do;*
- *If you are far from your friend's house, stay away from the flood waters;*

Example responses to Scenario 6:

- *Quickly return to the classroom;*
- *Find places to shelter that are away from anydoors, windows and glass that could break or objects that could fall;*
- *Listen carefully to the instructions that your teacher gives you.*

Example responses to Scenario 7:

- *Try to remain calm, do not panic;*
- *Stay in a safe place until the ground stops shaking;*
- *If this is a strong earthquake, get under a bed or table;*
- *Listen for breaking glass, and be very careful. Furniture may also be broken;*

Example responses to Scenario 8:

- *If you can feel the ground shaking, drop to the ground and get underneath a table or desk. Hold tightly onto the table leg. Make sure that your head and neck are covered by the table;*

- *Be quiet so you can hear the teacher's instructions;*
- *Be aware of the objects in the class that might fall and hurt you. Look out for ceiling fans, lamps and small tables;*
- *Wait until the shaking has stopped before you move out from under the table;*

Example responses to Scenario 9:

- *Try to remain calm, do not panic;*
- *Stay in one place -it is dangerous and difficult to move around when the ground is shaking;*
- *You are outside – stay there. Crouch on the ground, cover your neck with your hands and rest your hands on the ground. Stay in this position until the tremors stop;*
- *When the ground stops shaking, run to the evacuation point;*
- *Pay close attention to where you are running – stay away from any buildings that could collapse or trees/ electricity poles that could fall down.*

Example responses to Scenario 10:

- *Try to remain calm, do not panic;*
- *Try to get off the bus, but do not rush, as this will cause panic;*
- *Call for someone to inspect the fire, use a fire extinguisher, sand or a thick blanket to extinguish the fire immediately. If you are sure that it is not an electrical fire, you can use water to put it out.*

Example responses to Scenario 11:

- *Notify your parents or an adultthat is nearby so that they know what is happening;*
- *Listen carefully to what the adults tell you to do;*
- *Do not go near the rising smoke.*

Example responses to Scenario 12:

- *Try to remain calm, do not panic;*
- *Report any information to your teachers quickly;*
- *Listen carefully to what your teacher tells you to do, and follow the instructions*
- *Stay away from the smoke.*

Time: 15 minutes

2.2 Discussion: What should we do before, during and after disaster events?

- From the above scenarios, the teacher divides the class into discussion groups. They will discuss the following questions associated with a specific type of natural hazard that is common in the area:
  - + ***Before a disaster occurs,*** *what should the students do?*
  - + ***While a disaster is occurring,*** *what should the students do?*
  - + ***After a disaster has occurred,*** *what should the students do?*
- The groups have 15 minutes to discuss.
- The teacher asks the groups to share the key points from their discussions – their presentations should include what they would do before, during and after a disaster event. The teacher summarizes the information shared by the students, and ties it into a specific form that clarifies activities that students can undertake at school and in their communities/homes, and associates the answers with disaster prevention plans in the school.

3. Lesson reinforcement

Time: 5 minutes

Suggested Questions

Question 1: Choose the best answer for the following questions:

1. **When there is a typhoon, you should:**
   - **a. Stay away from the windows**
   - b. Stand near the windows
   - c. Open the windows
   - d. Leave the house

Typhoons can carry debris, knock down trees and smash windows. If you are inside a building or house, you should be sealed in and stay away from the windows.

2. **What should you do after a flood?**
   - **a. Clean up any mess around your neighbourhood**
   - b. Plug in electrical appliances right away after the power has been cut for many days due to the flood
   - c. Cook food which has been exposedto flood waters
   - d. Use flood water for cooking

Floodwater is very dirty and contains gabages, dead trees and animals that can impact badly to the environment. Therefore, it is necessary to clean up any mess. Electrical appliances may be wet, and, if used immediately, are likely to cause accidents. Floodwaters carry germs andcontaminants. Food that has come into contact with dirty water should not be used.

3. **What is one thing that we can do that will help us to prepare forevery kind of hazard?**
   a. Evacuate
   b. Reinforce buildings and homes
   c. Equip ourselves with adequate knowledge about hazards
   d. Prepare and store adequate medication

Natural hazards sometimes occur unexpectedly, and we cannot always be fully prepared. If we seek knowledge and give ourselves full information about the nature of the hazards, we will be better able to cope when they occur.

Question 2: Is the following statement true or false? Please mark (√) in the appropriate box.

	False	True
Cutting down trees will help us to avoid landslides?		√

Trees and vegetation help to increase the capacity of soil to hold water, improves soil structure and increases soil adhesion.

Question 3: Choose the two correct answers for the following question:

If you are outside travelling along the road when an earthquake occurs, what should you do?

a. Run into the closest building.

b. Find a tree or pole to hold on to.

c. Find an open space, away from buildings, trees and power lines.

d. Crouch on the ground and put your head between your legs.

Earthquakes are dangerous because of collapsing buildings and falling objects. Injuries are caused when infrastructure, buildings, trees and objects like furniture collapse or fall.

For this reason, it is safe to look for open spaces, away from buildings, trees, power lines and anything else that could be dangerous.đãng, tránh xa các tòa nhà, cây cối, đường dây điện.

OTHER SUGGESTED ACTIVITIES

1. Roundtable discussion–students can address the question: what should and should not be done when a hazard event occurs?

Participants: Secondary students

Time: 35 minutes

Materials required: Hand-out 1 or Picture cards for each natural hazard, paper and pens.

- 5 pictures from Hand-out 1 are put in different parts of the classroom: typhoons, floods, landslides, drought and lightning and thunderstorm.
- The teacher divides the class into 5 groups of 5-6 children. Each group will appoint one leader who is responsible for recordingthe key informationfrom the group discussions, presenting and adding comments of following discussions.
- For the first discussion, each group has 15 minutes to discuss the following questions
  + *When hazards occur what should you do to be safe?*
  + *What should you NOT do when a hazard strikes?*
- After hearing the signal “Stop” from the teacher, the group moves clockwise to the next point. The leader remains in the same location, working with a different group.
- After 3-5 discussion points moving around the room, the teacher invites a representative from each group to present key points from their discussions. The other groups listen and raise issues and questions.
- The teacher summarises the opinions and key information about natural hazards and responses to these hazards (*See Information for Teachers*, Part 2, Topic 5).

2. Activity Cards Do’s and Do nots

Time: 15 minutes

Materials required: Hand-out 5.2

- The teacher divides the class into two groups. On each of two tables, the teacher puts two signs, one saying “should” and the other saying “should not”.
- The teacher put the paper cards on each team’s table.
- The teams take turns with the cards, reading them and deciding “should” or “should not”.
- The teacher asks the students to explain their answers. The team with the most correct answers wins.

3. Communicating disaster risk reduction

Participants: Secondary students

Time: 30 Minutes

Materials required:
A0 sized paper

- Ask students to work in groups: choose a natural hazard which is likely to occur locally and plan a communication activity for children, families and communities. The activity aims to improve awareness of what should and should not be done before, during and after a hazard event of children, their family and neigbourhood, and can be in a form like a school newspaper, a theatre or dance production.

4. Developing a plan for disaster risk reduction in schools

Time: 30 minutes

Materials required:
A0 sized paper

- Before the class, the teacher should refer to the school's planned response to natural hazards and local policy, as well as the types of hazards that occur locally.
- The teacher divides the class into 4 discussion groups of 5-6 children.
- The teacher introduces discussion groups for the following questions, and asks the students to discuss the specific types of hazard that are common in the local area:
  + ***Before a disaster occurs,*** *what should the students do?*
  + ***While a disaster is occurring,*** *what should the students do?*
  + ***After a disaster has occurred,*** *what should the students do?*
- The groups discuss these questions for 15 minutes.
- The groups present the key points of their discussions to the class, and the class decides on the best responses for action before, during and after hazard events. The teacher links this information to hazard prevention plans in the school:

PLAN FOR PREVENTION AND DISASTER MITIGATION School:.....District:.....Commune:……..				
Time	Type of natural hazard	Things you should do to prepare before a hazard event	Things you should do during a hazard event	Things do you should after a hazard event

5. Developing DRR plans at home

Participants: Secondary students

Time: homework

- Select a natural hazard that is common in your area. Discuss with your parents some activities that you could do at home before, during and after natural hazard events, and develop a plan for a hazard response for your family.
- Name of your household.....
  - ***a. Before a disaster occurs***
  - ***b. While a disaster is occurring***
  - ***c. After a disaster has occurred***

Number of people in your household.....

Name of the person responsible for this action.....

How long will this take?	Action	Time
A. Before a hazard		
…		
…		
B. While a hazard event is occurring		
…		
…		
C. After a hazard		
…		
…		

Topic 6: Practicing disaster risk management skills for children

Learning Objectives:	***By the end of this module, students will be able to:*** Assess risk, capacity and vulnerability in their communities using two tools: + risk/hazard mapping and + historical disaster timelines Practice some activities responding to hazards: preparing first aid kits; practicing emergency evacuation and using life jackets
Time:	45-60 minutes
Supporting Materials:	A0 sized paper, crayons, felt tip pens

6.1 Mapping our risks, capacities and vulnerabilities[2]

Time: 45 minutes

Participants: Secondary students

Materials required: A0 sized paper, crayons, felt tip pens

Main activities:

1. **The teacher explains the purpose of drawing a map** of risks, capacities and vulnerabilities:

- This mapping activity can help us to understand and define common risks, safe places and the resources that are available to our community;
- It can help us to plan how to respond to natural hazards.

The teacher explains the mapping process to students using the following steps: (1) Draw a simple map of your school or community; (2) Identify risks; (3) Identify resources; (4) Identify vulnerabilities.

2. **Draw a simple map**

- The teacher divides the class into 4 small groups of 5-6 students.
- The teacher explains some of the common symbols used in the maps.

[2] Save the Children, Material for Training on community-based disaster risk management and capacity and vulnerability participatory assessment

- Keep in mind that this is a process-oriented exercise. Do not worry too much about details like correct ratios for the pictures
- The teacher reminds students of the concepts they have learnt so far. This will help them to identify the risks, capacities and vulnerabilities they will need to include on their map.
- The teacher asks the students what they should include when they are drawing their map:
  + the school
  + the main road crossing near their school
  + community buildings: this can include the People's Committee building, the medical centre,cultural house, play grounds, etc.
  + houses of students

Picture drawn by students[3]

3. Identifying risks:

- The teacher asks the students to mark on the map the places they consider dangerous for them and their community. They are asked to explain why.
- Dangerous places could include:
  + Areas affected by flooding
  + Areas affected by drought
  + Open areas that will be dangerous in a typhoon
  + Areas affected by pollution or contamination from hazardous waste.

[3] Plan in Vietnam.

4. Identifying capacity

- The teacher asks the students to mark the different resources and capacities of the community on the map. This could include workshops, safe evacuation places, information or communication systems, dykes or stone embankments.

5. Identifying vulnerabilities

- The teacher asks students to mark on the map vulnerabilities that they have identified. This could include vulnerable people, for example people with disabilities, elderly people or young children, or objects or systems that contribute to vulnerability, for example temporary houses or damaged dykes, stone embankments, bridges or drains.

6.2 Collecting historical disaster information

Time: 120 minutes

Participants: Primary and secondary students

Materials required: A0 sized paper, colored pens, felt tip pens

Main activities:

1. ***The teacher introduces the objectives of this tool:*** *Collecting and understanding historical information help us to get to know more about natural hazards that have occurred previously in our area,and identify any changes in historical patterns.*

2. **The teacher explains how to conduct the interviews:**

- *"To collect historical information from the last 15 years, you can interview your family, elders from your community, and people who have lived in the community for a long time.*
- The teacher asks the students to work in pairs. Each pair has to discuss and write down questions that they will ask in the interviews.
- The teacher suggests some questions for the interviews:
  + *What hazard events have occurred in this area before? When?*
  + *What were the early warning signs of each type of hazard? When did you notice the warning signs? Was it long before the hazard event occurred?*
  + *How long did the event last?*

+ What were the consequences of the hazard to the community?
+ What the causal factors of these consequences?
+ Have there been any big changes in the way we use the land? For example, have any areas undergone deforestation?
+ Have there been any big changes to the local social system? For example, have poor people who used to live in forests been able to find jobs in the village?

- The teacher gives the students the activity table and shows them how to fill it in.

3. **Practice:** The teacher can ask 1-2 pairs of students to practice interviewing and filling in the table. The class observes and gives feedback.

4. **Homework:** The teacher asks the students to interview 1-2 people in their village/community. The results of this exercise will be shared in the next lesson.

Example: Hazard information from Community A, 1995 - 2013

Year	Type of hazard	Impacts	Causal factors	Response/recovery actions
1995	**Flood**	• Landslide, roads were blocked; • 1-meter of flood water, houses were inundated, property, furniture and documents were damaged; • Damaged crops, vegetables and other plants; • Damaged dyke.	• Road are not made of concrete; • Heavy rain, storm surges and high tides; • Poorly designed dyke system.	• Young people worked to restore the dyke; • The People's Committee in the commune evacuated some households in low-lying areas to higher ground.
1998	**Heavy rain, typhoon**	• Fallen trees; • Fallen electric poles; • Damage to houses – roofs of 10 houses were destroyed.	• Poor quality housing and infrastructure, particularly among people living in poverty.	• The People's Committee evacuated some households in low-lying areas to higher ground; • People were provided with clean drinking water;

Year	Type of hazard	Impacts	Causal factors	Response/recovery actions
				• Damaged roads in the commune were cleared and repaired; • Spray anti-bacterial drugs. • The poor were supported to repair the damage to their houses.
2003	**Storm**	• The floodwater rose to 70 cm and lasted for 24 hours; • Intrusion of contaminated water into drinking water supplies; • Intrusion of contaminated water into soil, causing damage to vegetables and other crops.	• Wells were uncovered; • Drains and drainage systems were designed badly, which led to the contamination of water supplies for both drinking and irrigation water.	• Young people cleared roads that were blocked and cleared and fixed damage in public spaces in the village.

6.3 Practicing emergency evacuation

Time: 45 minutes

Participants: Primary and Secondary students

Preparation:

- The teacher needs to know whether the school has an emergency response plan for hazard events
- The teacher prepares different emergency evacuation procedures, including:
  - + *Locally relevant hazard scenarios;*
  - + *Warning signals;*
  - + *Evacuation signals (bell, drum, whistle);*
  - + *Exit routes: the shortest and safest route out of the building.*
  - + *Evacuation location*
  - + *Time to evacuate*

Main activities:

- The teacher introduces the objectives and explains the importance of emergency evacuation procedures
- The teacher explains the scenario, and the students practice the procedures:
  + Warning signals;
  + Guiding students along the evacuation route;
  + Gathering students in the evacuation shelter;
  + Checking the number of students;
  + Noting the time it takes.

Other activities:

The teacher can ask students to discuss this lesson with their family, and to develop a similar household hazard response plan. Students can then share these plans with the class.

6.4 Practice: how to use a life jacket

Time: 30 minutes

Participants: Primary and secondary students

Materials required: At least 1 life jacket for 2 children

Steps:

1. **The teacher introduces the objectives of the session** – for the students to practice putting on and using a life jacket.

2. **The teacher guides students to use life jackets properly:**

- The teacher demonstrates for the students what a life jacket is
- The teacher guides how to put it on properly

3. **Practice:**

- The students work in pairs, taking turns to practice. One student puts on the life jacket; the partner observes and comments to help her/his partner.
- The teacher helps each pair, and asked them to demonstrate the correct procedure.

4. **The teacher asks 5 students to perform the act in front of the whole class. The class observes and comments.**

6.5 Making an emergency bag

Time: 30 minutes

Participants: Primary and secondary students

Preparation: Paper, pens, cards representing objects to go in the emergency bag

Main activities:

1. **The teacher explains the importance of having an emergency bag ready to go before a disaster event**

- *In emergencies, we may have to evacuate quickly if we are caught in the path of a hazard event. We may not have enough time to look around for the things we will need to bring with us – this is why we need to have these things prepared ahead of time.*
- *We can prepare this bag before the disaster occurs. You should put the items you will need into a bag and put this bag in a convenient place, for example, close to your front door.*
- *In this exercise, you can practice making an emergency bag.*

2. **Discussion:**

- The teacher divides the class into 5 small groups of 5-6 students.
- The teacher asks each group to discuss and write down objects they consider necessary for them to use to keep safe during a hazard.
- The groups discusses this question for 10 minutes, and then each group explains the objects they chose and the reasons for their choices. The students can write their lists on the board.
- Other groups may ask questions to the presenting group for further understanding.

3. **The teacher summarizes:** *If you decide to bring your entire personal outfit, your bag will be as big as a house. How can you bring this bag with you in the hazard? The more you are carrying, the harder it will be to carry. Therefore, your emergency bag should only carry the absolute necessities. Try to think about the scenarios we are preparing for, for example, if a typhoon occurs – what are the sorts of things we will need to bring with us?*

Suggested objects to include:

- *In hazards, you or your family may get injured or sick.* ***Medicine and a first-aid kit*** *will be useful.*
- *The electricity in your house might go out. If a hazard event occurs at night, it will be necessary to have a* ***flash light and batteries.***
- ***Instant food*** *such as dry provisions, cookies, canned food and instant noodles are also necessary for you in case you get hungry.*
- *Typhoons and floods might destroy drainage systems or pollute wells. Your family will need to reserve* ***clean water*** *to drink. You can include water purification tablets or fresh water in your emergency bag.*
- ***Matches or a lighter*** *will be useful for when you need to keep warm and cook.*
- ***A bowl, chopsticks, a spoon and other personal*** *things such as a towel, tooth-brush,* ***clothes*** *can make you feel more comfortable.*
- *Objects inside your house may be damaged or even destroyed by the hazard. You should bring along* ***important documents****. These documents can be* ***wrapped in plastic bags*** *to keep them water proof.*
- *Besides, many people might bring* ***money/hand book*** *because those are important to them. However, the most important point is to remember what you* ***should*** *do and* ***should not*** *do in a hazard. If your house is in affected area and you are in a safe place, you should not come back to take the emergency bag.*

PART 2

TEACHER FACT

Sheet

Topic 1: Identifying types of natural hazards

Located in the tropical monsoon zone, Viet Nam is one of the countries most badly affected by natural hazards in the Asia Pacific region. Due to its geographic features, Viet Nam is easily affected by typhoons, floods, droughts, sea water intrusion into groundwater and river systems, landslides, forest fires and occasionale arthquakes. The average number of deaths and people going missing as a result of natural hazard events is up to 450 per year, and losses in damage to property is estimated to be around 1.5 % of GDP. Both the frequency and intensity of natural hazard events in Viet Nam are increasing. Moreover, hazard events are becoming more difficult to predict.

Tropical Depressions and Typhoons

Characteristic features	Conditions leading to formation	Potential Impacts
• Tropical depressions and typhoons are characterized by rapid circulating winds accompanied by heavy rains and a large ocean swell. • When the wind reaches Force 6 or 7 (from 39 to 62km/h), it is called a tropical depression; when the wind speed rises to Force 8 or above (63km/h and above), then it is called a typhoon. Tropical depressions can become stronger and be upgraded to typhoons. Likewise, typhoons will be downgraded to tropical depressions as the wind speed decreases. • Tropical depression and typhoons can affect areas as large as 200 – 500 km • The calm center of the typhoon is known as the “eye of the storm”.	• Storms are formed in tropical areas above warm waters over the sea (above 26oC). When the surface ocean temperature is warm, there is a temperature transfer between the ocean and the atmosphere (the air and the water) and the process forms the center of the depression. The atmosphere in the surrounding area then moves toward the center. • The temperature difference between the ocean and the atmosphere causes evaporation and the water in the atmosphere concentrates and becomes thick cloud which then creates heavy rain and strong whirlwinds. • When the system moves closer inland or over colder water in the ocean, typhoons lose energy from moist and warm atmospheric changes.	***Strong winds:*** • Houses and assets may be damaged or destroyed. • Trees can be damaged, uprooted and may block roads. • Damage or cut electricity lines which may cause fires and electrical accidents ***Heavy rain and flooding:*** • Landslides • Roads blocked by debris, supply lines interrupted • Houses inundated, property and furniture damaged • Injury and loss of life • Loss of livestock • Interruption to information and communication systems. • ***High ocean swells and high tides*** • Damage to fishing boats, ships and other ocean vessels. If the storm is strong enough, it can cause boats and ships to sink • Inundation in coastal areas

Characteristic features	Conditions leading to formation	Potential Impacts
	Friction force from the land also causes the system to lose energy. As a result, typhoons become weaker and disappear as they move inland. • The typhoons in Viet Nam are usually formed over the Eastern Sea and the Pacific Ocean.	• Sea water intrusion into freshwater systems and groundwater • Inundation and damage to wells and other sources of clean water.

Floods

Characteristic features	Conditions leading to formation	Potential impacts
• During flood events, the water levels in rivers and streams is often very high, and the water can flow very fast • Floods occur when water levels and the speed at which the water is flowing exceed the normal levels in a river or stream • Inundation occurs when water floods areas that are not normally underwater. This can happen from water rising over the banks of rivers and dykes, or it can happen when heavy rain causes runoff to flood low-lying areas. • The different types of floods include: river floods, flash floods and coastal floods.	• Heavy rain over prolonged periods can lead to high water levels in rivers, leading to flooding and inundation • Infrastructure such as road systems, and irrigation and drainage systems may prevent the natural flow of water • Deforestation reduces the capacity of soil to hold water • Hydroelectric power plants interrupt the natural patterns of water flow/cycles in river and wetland systems • Dykes, stone embankments, and dams can cause flood events, particularly flash flooding if they are damaged	***Human life and property:*** • Injuries and loss of life from drowning or accidents • Damage to property and houses – villages and agricultural areas can be damaged from inundation, houses can be flooded and personal property damaged or destroyed • Loss of livestock from drowning and disease • Disease outbreaks are common after flood events. This can result from damage to drainage and sewage systems and associated impacts on water sanitation and hygiene. Stagnant water can aid the spread of water borne and mosquito borne diseases.

Characteristic features	Conditions leading to formation	Potential impacts
River floods: • Water levels rise above the river bank and cause inundation to surrounding areas • River floods can occur slowly and seasonally (for example: cyclical floods in the Mekong Delta). ***Flash Floods*** • Flash floods occur in rivers or streams, often in mountainous areas • Water levels rise and recede over a very short time period, often only a few hours • Flash floods can be the result of massive influxes of water from runoff resulting from heavy and sustained rainfall or from water breaching infrastructure, for example a dam wall breaking • Water can flow at extremely high speeds during flash floods and can pick up and sweep along everything in its path ***Coastal floods*** • Coastal floods often occur during tropical depressions or typhoons which are near the shore • Coastal floods often occur when storm surges or sea arise suddenly in combination with high tides	• Rising sea levels, high tides and coastal storm surges can cause intrusion of sea water into freshwater systems, ground water and onto low lying coastal land areas	***Infrastructure:*** • Interruption to information and communication systems from damage to phone and electricity wires • Blocked roads can lead to interrupted supply channels and interrupted access into and out of impacted towns and villages • Damage to clean water systems and supplies – there is a risk of intrusion of sea water and/or contaminants into drinking water and ground water where it can affect irrigation for crops and livestock ***Economics:*** • Loss of livestock from disease or drowning can impact subsistence farming families and communities • Sustained, heavy rains and inundation can destroy food crops as well as interrupt the timing for crops the following season However, in some areas such as the Mekong Delta, floods can sustain important ocean products, enrich the soil with alluvium and provide valuable water flows which can flush out agricultural fields and provide water for ecosystems that depend on it.

Landslides, landslips and rock falls

Characteristic features	Conditions leading to formation	Potential impacts
• Landslides occur when mud, soil and stones slip downward from the hillside. • Landslides are more common in mountainous areas.	• Landslides are results of the natural vibrations in the earth that loosen the soil and rocks on hills or mountains. • Heavy rain and floods can loosen soil and cause ground collapse, particularly where trees and plants have been removed. • Poorly planned construction of buildings or roads in unstable areas and on hill slopes can also lead to ground collapse.	• Landslides can cause serious injury or loss of life. People are at risk from flowing debris, falling rocks and collapsing buildings and infrastructure. • Infrastructure, buildings and homes can be damaged, and property and furniture can damaged or destroyed. • Roads can be damaged, destroyed or blocked. • Land for cultivation can be damaged if topsoil is removed or covered by rocks/debris. • Landslides/rock falls can cause death/injury to livestock.

Drought

Characteristic features	Conditions leading to formation	Potential impacts
• A drought is a period of below average rainfall, typically lasting for a season or longer. Drought events can have serious and lasting effects on surface and ground water stocks. • Drought may occur when there is a shortage of rain in raining season or when the raining season comes late.	• Lack of rainfall or below average rainfall for a sustained period of time, typically a season or longer. • Deforestation leads to a destruction of soil quality and structure and an increase in the amount of water lost as runoff from a system	• Droughts often result in a shortage of clean water for day to day activities and for irrigated agriculture and industrial activities. This can lead to food shortages and a loss of income for families and communities. • Disease risk can increase in drought situations. This is because risks to water sanitation and hygiene increase as access to safe drinking water decreases. Children and elderly people are the worst affected by diseases.

Characteristic features	Conditions leading to formation	Potential impacts
• Drought can happen even when there is no shortage of rain. For example, deforestation can lead to a reduction in soil quality and the ability of the soil structure to hold water, resulting in water being lost as runoff in these areas.	• Overexploitation of water resources within a system can lead to drought conditions, for example over-extracting water from rivers for irrigation or from ground water systems for use by communities.	• An increase in diseases risk can also affect livestock populations, in turn affecting food security. • Drought conditions cause a reduction in crop and livestock productivity. • Drought impacts on estuarine environments – as river levels drop, salt water intrusion into freshwater environments can impact on finely balanced ecosystems.

Whirlwinds

Characteristic features	Conditions leading to formation	Potential impacts
• A whirlwind is a vortex, or conical formation of wind or air circulation. • Whirlwinds can move at high speeds over land and sea. • Whirlwinds are visible because of the dust and debris that they pick up, it will often look like a swirling cone of dust reaching upwards from the ground. • Whirlwinds can occur unexpectedly and can be formed over a short time period.	• Whirlwinds may arise when there are sharp differences in wind speed. • Whirlwinds may be worse in hot weather.	• Whirlwinds can be destructive, causing significant damage in their direct pathway. • Impacts include severe wind damage to infrastructure, buildings, homes, roads, electricity and telephone wires and anything else that is in the pathway of the whirlwind. • If severe, whirlwinds can cause injury and loss of life for people who are caught in the pathway.

Thunderstorms and lightning

Characteristic features	Conditions leading to formation	Potential impacts
• Thunderstorms are huge dark clouds, which reach high into the sky and are accompanied by heavy rain, thunder, flashes of lightning, gusts of strong wind, sometimes hail and flying debris, sand or dust. • Lightning occurs mainly in such huge dark clouds and accompanied by thunder. Lightning is a giant spark of electricity, which comes from a cloud and hits the earth. • Lightning has a high voltage and everything, including air, becomes an electrical conductor. Lightning is also attracted to metal objects and water, which are good conductors of electricity.	• Thunderstorms happen everywhere in the world, most frequently in tropical regions, and least frequently in the polar regions because of cool air temperatures. • Lightning is often associated with monsoon seasons.	• Thunderstorms are dangerous and can cause serious injury or loss of life. Lightning can strike a human if caught in an open area, and can cause death. • Thunderstorms can destroy infrastructure, buildings, houses, trees and electric system. • Thunderstorms can also cause other natural hazard events, including flash floods, landslides or wildfires.

Hail[6]

Characteristic features	Conditions leading to formation	Potential impacts
• A hailstorm is rain accompanied by hail, which are solid balls or lumps of ice, in different sizes and shapes, which fall to the ground. • Normally hail ranges from the size of a pea to the size of a corn seed but sometimes they can be as big as a chicken egg or even bigger.	• Hail forms when clouds move upwards in the atmosphere, freezing the water in the clouds to ice when they meet extreme cold temperatures higher up in the atmosphere. • These hailstones fall when they are big enough to become heavy.	• The hailstones that often come with thunderstorms can destroy crops, plants, houses, and other property. • Hailstones can be big enough to injure people and livestock.

[6] .....

Earthquakes[7]

Characteristic features	Conditions leading to formation	Potential impacts
• An earthquake is a tremor in the earth's crust that creates violent vibrations or movements of the Earth surface. • Earthquakes vary in size and frequency, some areas, for example areas along fault lines, experience earthquakes often, and some areas experience earthquakes extremely infrequently. • Earthquakes often occur in sequence, with small tremors before and after the main shock. These are called the foreshocks or aftershocks.	• Earthquakes generally occur from the rupture of faults in the Earth's crust, when there is enough stored energy underneath to create a fracture. • Most of the earthquakes occur along the boundaries of tectonic plates, or along faultlines in the tectonic plates.	• Earthquakes occur very frequently – almost constantly in some places - but most are unnoticeable and harmless. • Earthquakes that are high in magnitude can be very dangerous. The immediate danger to humans comes from secondary causes rather than the earthquake itself. Humans can be injured or killed by collapsing infrastructure, falling buildings or debris. • Earthquakes can cause other natural hazard events including landslides, ground ruptures and tsunami, which cause serious injury and loss of life, and can damage buildings, roads and infrastructure.

Tsunami[8]

Characteristic features	Conditions leading to formation	Potential impacts
• Tsunamis are a series of long and broad waves created by the displacement of a large body of water in the ocean. • A wave can be small in height (around 30cm) in the open ocean, but the wave amplitude (height)	• Tsunamis are created by strong and sudden movements in Earth's surface, often from earthquakes or volcanoes that occur under the seabed. When a disturbance like this occurs, it displaces a large	• Tsunami cause damage by the smashing force of the fast moving wall of water on the shore, followed by the large volume of water moving inland before dragging the water back to the ocean along with debris from the immediate impact.

[7] New Zealand Ministry of Civil Defence and Emergency Management, *Teaching and learning resources*, [internet] http://vi.wikipedia.org/wiki/%C4%90%E1%BB%99ng_%C4%91%E1%BA%A5t, last accessed on 17/4/2012.

[8] Seeds Asia, Handbook for teacher: Risk Disaster Education, page 13.

Characteristic features	Conditions leading to formation	Potential impacts
increases as it approaches land. The height of the wave reaches its peak and stands as a fast moving wall of water(more than 10m). • If you are near the ocean when a tsunami occurs, you will see the ocean suddenly disappear. This is the drawback period, when the wave recedes away from the shore. Drawback can exceed hundreds of metres. This is followed by the wave itself, which forms a wall of water, which can move very fast, equivalent to the speed of a plane, and be very destructive.	volume of water, creating a powerful wave.	• Tsunami can be incredibly destructive, the wave often destroying landscapes, buildings and infrastructure, houses, and often causing significant damage to property and loss of life.

Regional Hazards[11]

Region	Common hazards
Northern mountainous region	Flash floods, landslides
Red River Delta	Floods, typhoons, landslides, drought
Central region	Typhoons, floods, landslides, flash floods, 2..drought, and sea water intrusion into fresh water/land systems
South central region	Flash floods, landslides, drought, forest fires, whirlwinds
Mekong Delta	Floods, typhoons, whirlwinds, landslides, forest fires, sea water intrusion

[9] Dyke Management and Flood Preparedness Department, Research and international relations Center. *Handbook and Manual system of Community based Disaster risk management*

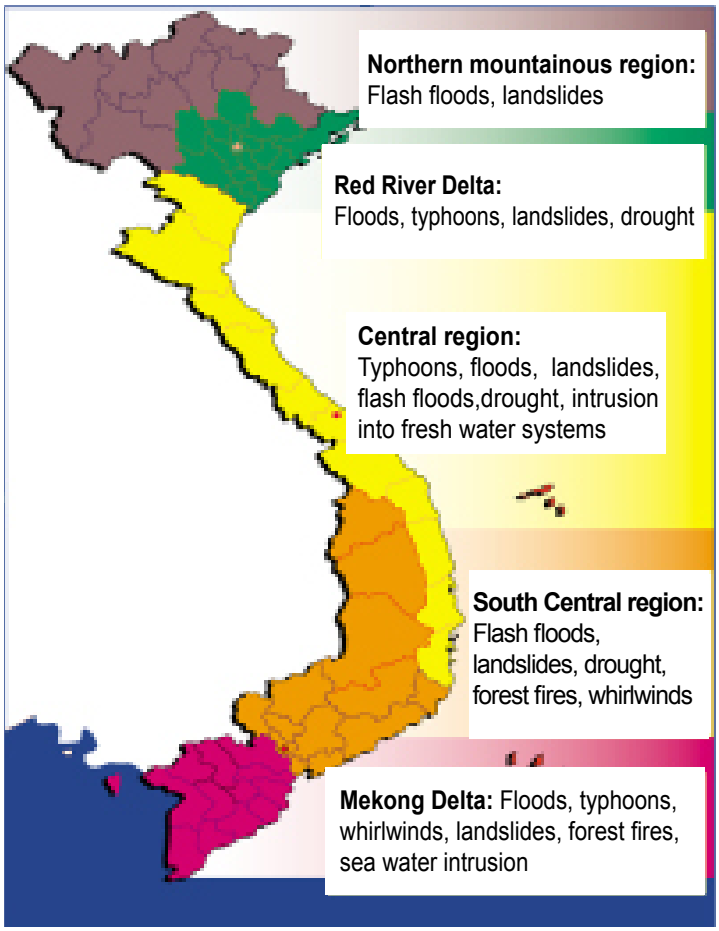


Figure 1: Map of regional Hazards in Viet Nam

Frequency of hazards in Viet Nam[12]:

High frequency	Average frequency	Low frequency
Floods and inundation	Hail	Earthquakes
Typhoons	Drought	Industrial accidents
Inundation	Land slides	Frost
Erosion/	Fires	
Sea water intrusion	Deforestation	

[10] As above

Topic 2: Some basic hazard concepts

Natural hazard: A natural phenomenon that may cause loss of life, and damage to property, environment, living conditions and socio-economic activities.

Natural hazards in Viet Nam: Some common natural hazards that occur in Viet Nam are floods, landslides, typhoons and droughts. There are also other hazards such as wildfires and whirlwinds.

Natural hazards	Hazards caused by human intervention	Natural hazards impacted by human activities
Typhoon, flood, earthquake, volcano, tsunami.	War, terrorism, radioactive leakage, pollution, traffic accidents, diseases.	Deforestation, urbanization and pollution are some human activities that contribute to climate change; impacts from floods, landslides, drought and forest fires can all be impacted by human activities.

Natural disaster: Abnormal natural events that can cause loss of life and damage to property, environment, living conditions and socio-economic activities, which include typhoons, tropical depressions, whirlwinds, thunderstorms, torrential rain, floods, flash floods, inundation, landslides triggered by torrential rain or run-off, land subsidence triggered by flood or run-off, sea level rise, saltwater intrusion, heat waves, drought, cold waves, hail, frost, earthquakes, tsunami and other natural hazards.

Disaster: A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses and impacts which exceed the ability of the affected community or society to cope using its own resources.

Risk: The combination of the probability of an event and the scale of its negative consequences.

Disaster risk: The potential disaster losses of life and damage to property, environment, living conditions and socio-economic activities.

Capacity: The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.

Vulnerability: The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

The relationship between disaster risk, capacity and vulnerability can be explained as follows: Disaster risk would increase if a natural hazard affected a vulnerable community with limited capacity. Therefore, to mitigate disaster risk, a community should take action to mitigate the negative impacts of a natural hazard and vulnerability and enhance the community's capacity to cope.

$$\text{Disaster risk} = \frac{\text{Natural Hazard x Tình trạng dễ bị tổn thương}}{\text{Capacity}}$$

Topic 3: Climate change[1]

1. What is climate change?

The difference between Climate and Weather

Weather	Climate
Weather is the meteorological state of the atmosphere at a specific place and time, possibly for an hour, a day or several weeks. Weather includes elements such as: precipitation, air pressure, temperature, wind, humidity and other phenomena such as rain, thunderstorms and whirlwinds, etc. It can change from hour to hour and day to day. For example, it could be raining for hours then suddenly become sunny.	Climate is the average state of the weather of a region over a long period of time (typically at least 30 years). Climate is relatively stable. For example, the Northern region of Viet Nam has a climate unique to the area which is different from the climate in the South of Viet Nam. You could describe a climate as being tropical monsoonal or as being a temperate climate. When describing a particular climate, you would also describe any extreme weather events experienced within that climate – for example: storms, heavy rains, heat waves in the summer and cold snaps in the winter. These events occur in specific geographic areas. Such information helps to distinguish the climate of regions that have similar average weather conditions.

Climate change

The term “climate change” refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that change persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use (MONRE, 2008).

Another term often used synonymously with climate change is global warming, but these two terms are not the same. Global warming is the rising average temperature of the Earth. Climate change is a broader concept referring to the long-term changes in climate including temperature, precipitation, sea level rise and its impacts on natural and human systems. When scientists talk about climate change, they refer to human induced climate change, or change caused by human activities.

[1] Live&Learn and Plan in Viet Nam, 2011.A ABC Handbook on Climate Change.

2. Some observations of climate change

	World	Viet Nam
Average temperature	The global average temperature has risen by 0,7°C since the beginning of the Industrial Revolution. Recent data shows an even greater temperature rise. According to IPCC, the global temperature has risen by 0.74°C over the last 100 years (1906-2005). The rate of warming averaged over the last 50 years is nearly twice the rate of warming for the last 100 years. The last decade (1991-2000) was the warmest since 1861 and among the hottest in the last 1000 years in the Northern hemisphere.	During the last 50 years (1958- 2007), the temperature in Viet Nam increased by about 0.5 - 0.7°C. The average temperature for the last four decades (1961 – 2000) was higher than that of the three previous decades (1931 – 1960). According to the climate change scenario developed by MONRE in 2011, by the end of 21st century, the annual temperature will have increased by 1-3.7°C in the north and 1.1-2.6°C in the south relative to the baseline period 1980 – 1999.
Rising sea levels	Sea level is rising due to the thermal expansion of water and the melting of continental glaciers (especially at the two poles). The observed sea level data from 1961 – 2003 shows an increasing rate of rise for the average global sea level of about 1.8mm/year. This has increased significantly in the period 1993-2003, to a rate of 3.1mm/year.	Data from tidal gauges along the Viet Nam coast show that the sea level was rising at the rate of about 3mm/year during the period 1993-2008. This rate of rise is comparable with the global rate of sea level rise. According to the climate change scenario developed by MONRE in 2011, by mid 21st century, the sea level is projected to have risen by 18-29cm, and by the end of 21st century, by about 49-95cm, relative to the baseline period of 1980 – 1999.
Disaster and extreme weather events	Heat waves, cold snaps, storms, floods and droughts are projected to increase in frequency and intensity and become more difficult to predict.	There has been an observed increase in frequency and intensity of natural hazards events and related disasters including heavy rain, floods, heat waves, drought, fire, a change in disease patterns and an increase in disease outbreaks associated with disaster events. The impacts of these hazard events are difficult to control. ***Typhoons:*** In recent years, there have been more typhoons with higher intensity affecting Viet Nam. Typhoons are tending to move southwards and the typhoon season lasts longer. There are increasingly more typhoons that are following unusual tracks.

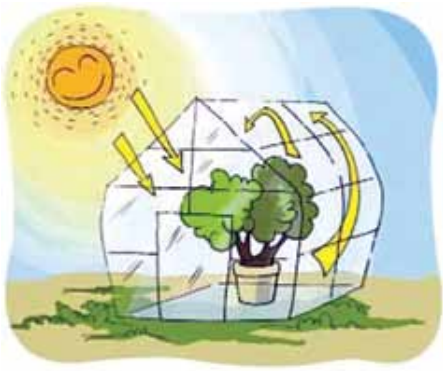
	World	Viet Nam
		Typhoons are formed in warm, moist and windy conditions over the ocean. The surface temperature of the ocean is increasing, and we are noticing changes in the patterns of typhoon activity. ***Flooding and drought events:*** Climate change shifts patterns in the Earth's hydrological cycle. This leads to an increase in frequency and intensity of flood events in some areas that already experience heavy annual rainfall and regular flooding, and also leads to increased frequency and intensity of drought events in areas where this is a characteristic feature of the climate. Both droughts and floods can cause other extreme events, for example forest fires are more common under drought conditions, and landslides often occur after flood events.

3. Causes of climate change

The main cause of climate change is the increased concentration of greenhouse gases (GHG) in the atmosphere.

According to scientists, the climatic changes which have occurred over the past 150 years have mainly been caused by human activities such as unprecedent exploitation and use of natural resources, especially fossil fuels and other resources such as land and forests. These activities have increased GHG concentrations in the atmosphere.

Let's get to know more about green house gases and the greenhouse effect.



- **A green house is made of glass:** A green house absorbs and traps heat from the sun to maintain a warm temperature even on cold days. A greenhouse keeps the air warm, so you can grow vegetables in cold climates or in winter.
- **The greenhouse effect:** Solar energy from the sun passes through the Earth's atmosphere. Some of this energy is reflected back out into space, and some is absorbed by special gases called greenhouse gases that are in our atmosphere.
- **Greenhouse gases:** Gases which have the special property of absorbing the heat energy from the sun in our atmosphere, making the greenhouse effect happen.

The Earth's atmosphere contains some special kinds of gases which are called greenhouse gases due to the fact that they warm up the Earth as with the way they warm up a green house for growing plants. Water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), Halocarbons (CFC,HFC, HCFC, etc), nitrous oxide (N_2O) and ozone (O_3) in the troposphere are the most common GHGs.

These gases are like a blanket which is thick enough to keep the Earth warm enough to sustain life. Without these gases, the temperature from the Sun would not be trapped in the atmosphere and the Earth's surface would be much colder.

The Greenhouse Effect is the natural process of the atmosphere letting in some of the energy we receive from the Sun and trapping it before it is transmitted back out into the space.

1. Solar energy from the sun passes through the Earth's atmosphere.
2. Some of this energy is then sent back to space
3. Some solar radiation is absorbed and warms the Earth's surface
4. Greenhouse gases in the atmosphere are trapping this energy as heat. If there are more greenhouse gases in the atmosphere, more heat is trapped.

This process is the Greenhouse effect

"The natural greenhouse effect" plays a very important role for life on Earth. Without it, the Earth would be too cold and humans and other living things could not survive.

GHGs and the greenhouse effect becomes a problem when the concentration of these gases in the atmosphere becomes too high. This is happening right now. Industry, agriculture, transportation and even landfills around the world dump large amounts of GHGs such as CO_2, CH_4, N_2O and others into the atmosphere. The greenhouse effect caused by the emission of GHGs through human activities is called the **"enhanced greenhouse effect"**.

The main cause of climate change is the increased concentration of greenhouse gases in the atmosphere. The two main activities leading to this increase is the burning of fossil fuels (coal, oil, gas) and the over-exploitation of our natural systems which absorb greenhouse gases. These systems are our oceans and our forests.

There are around 24 types of gases in the Earth's atmosphere. CO_2 contributes the most to the greenhouse effect. CO_2 can exist in the atmosphere for up to 200 years.

- Before the Industrial Revolution, the concentration of CO_2 in the atmosphere was around 280 parts per million (ppm).
- Since the Industrial Revolution, this concentration has increased up to 380ppm. The enhanced greenhouse effect has led to increases in the average global surface temperature and is leading to many disruptions in our natural and human systems.
- Scientists agree that a temperature increase of more than 2°C above the average global temperature will lead to changes in our Earth's climate system that will have catastrophic impacts on our human systems, the ecosystems that support us and the global environment. Scientists predict that an atmospheric concentration of CO_2 above 450ppm will lead to a temperature rise exceeding 2°C, leading to dangerous climate change.

Since the Industrial Revoluation, N_2O in the atmosphere has increased 18% (IPCC). N_2O can exist in the atmosphere for a long time, so activities which produce N_2O today can influence the greenhouse effect and cause climate impacts for the next several decades.

CH_4 concentrations in the atmosphere today have doubled compared with levels before the Industrial Revolution (IPCC).

Produced by human activities only, HFC and HCFC are used in air conditioners and refridgeration, etc. These chemicals damage the ozone layer as well as having a greenhouse impact thousand times more powerful than CO_2. They are also present in the atmosphere for longer, meaning that their effect on the climate also lasts longer.

The enhanced greenhouse effect is like using a thicker blanket. Over the last 150 years, the global climate has changed dramatically and average temperatures are becoming warmer and warmer.

According to the IPCC (2007), GHG concentrations have increased significantly in the last decades. In 2004, anthropogenic GHG emissions came from the following sources:

- Energy supply, industry, transportation and construction contribute the majority of global GHG emissions:
  + Energy supply: 25.9%
  + Transport: 13.1%
  + Industry: 19.4%
  + Commercial and residential buildings: 7.9%
- Forestry including deforestation, decay of biomass (after deforestation) and fires, etc contribute to around 17.4%.
- Agricultural processes including soil preparation before planting, fertilizer use and livestock grazing, etc contribute to around 13.5%.
- Other activites including waste and sewage management contribute to around 2.8%.

4. How can climate change impact us?

In addition to the consequences already mentioned, climate change has the following impacts:

- Impacts on human health: changes in climatic zones will change the areas impacted by tropical diseases;
- Impacts on agriculture, fishing and forestry: some species of animals, plants and ecosystems (for example coral reefs) are more at risk of damage/extinction due to the impacts of climate change;
- Social unrest: mass migration, mass scale disaster events and civil conflict are more likely due to the loss of land and food and water insecurity; and
- New average conditions becoming closer to conditions that lead to the formation of hazard events, for example, rising sea levels make salt water intrusion happen; a long period of hot weather makes drought occur, etc.

5. What can we do to respond to climate change?

In responding to climate change, we can “mitigate” and “adapt”.

- **Mitigation** addresses causes of climate change, and involves activities which reduce the level and intensity of greenhouse emissions. By reducing our use of polluting fossil fuels, we can reduce our climate impacts. There are many ways that we can do this. By changing the way we generate electricity, we can cut down on greenhouse pollution. Instead of using coal, oil and gas to generate electricity, we can use renewable energy sources, like wind and solar power. By changing our lifestyles, we can also reduce the amount of energy that we use. We can cut down on the amount of energy we use to heat and cool our homes, and we can buy food and other products that are made locally, and that do not need to be transported long distances. If we all make small changes like this, together, we can make big changes.
- **Adaptation** addresses the impacts of climate change, and is an adjustment in natural or human systems to a new or changing environment, intended to reduce vulnerability to current or anticipated climate change and variability or exploit beneficial opportunities. Adaptation activities include changing livelihoods, for example, changing agricultural crops or diversifying farming incomes in response to reduced crop yields, or community based disaster risk reduction activities, for example, building dykes for flood prevention or strengthening community buildings for shelter in high risk areas for typhoons or storms.

What can you do?

The mitigation and adaptation of climate change can be start from our family and ourselves.

At home

- Lights: Use natural light whenever you can during the day and use energy saving light bulbs throughout your home;
- Hot water: Set your water heater to medium instead of high from 7 to 10 minutes. Where possible instal solar water heaters;

- Electronics: Unplug all electronic devices (TV, lights, fan, washing machine) when you are not using them or when you leave the room/house. This saves electricity and also increases the lifespan of these devices;
- Air conditioner: Set your air conditioner at 26°C or higher and use the eco mode. Only turn on your air conditioner when you absolutely have to;
- Keep your house green: do not use chemicals unless you have to - they are harmful to our health and to the environment.
- Your diet: include more vegetables in your meal. This is both good for your health and helps reduce GHG emissions from agriculture;
- Reduce waste: when it decomposes, waste releases methane. Use recyclable packaging and buy good quality products that will last for a long time. Compost organic waste or use it as fertilizer;
- Reuse plasic bottles and use cloth bags instead of plastic.

On the street:

- Go green: Walking or cycling short distances saves fuel and helps to reduce greenhouse gas emissions;
- You can share rides with friends and colleagues (to work or when socialising) where possible;
- Using public transport reduces CO2 emissions.

At school/work:

- Cut down on paper. If you do have to print or photocopy, remember to print double-sided and to use scrap paper for drafting. Use less staples and recyled paper;
- Create a green culture: make signs reminding people to save water and electricity in the rest rooms, classrooms and in your workplaces.

When you shop:

- Do not use plastic bags: they can take decades to break down and accumulate in the environment, choking waterways and killing wildlife. You can help by remembering to bring your own reusable shopping bag to the market;
- Buy locally produced products: the things we buy, including food, clothing and electronics, all result in GHG emissions. By purchasing locally produced goods, you support local industries and cut down on transport emissions.

Within your community:

- Plant trees and help to protect our forests and oceans. Trees help to slow climate change because they absorb carbon dioxide. Oceans also absorb large quantities of carbon dioxide;
- Teach children and women to swim because it will help them protect themselves during rainy seasons. You can also teach children and anyone that you think will be vulnerable in a disaster scenario.

Communication – education: Share your ideas and knowledge with friends, your family and your teachers to promote environmentally friendly behavior.

Volunteer: Contribute your knowledge, skills and labour to environmental activities. Your involvement has the potential to profoundly impact sustainable development efforts in your local community.

Connect and mobilize collective actions for positive change: Believe that "together, we can change the world" and that every little thing we do will add up and make a big positive change.

Topic 4: Impacts of disasters and climate change on vulnerable people

Who is vulnerable and why?

A person or a group is considered vulnerable when that individual or group cannot independently rely on their own resources, and when support is required to enable safe and active participation within the community.

In practice, vulnerable groups are often faced with one or more of the following barriers:

- Lack of economic autonomy (e.g. children, the elderly, etc.).
- Being physically weak and in need of help from others (for example, pregnant women, sick people, people with disabilities, etc.).
- Lack of opportunities to access information, social activities and basic services (ethnic people and people living in remote area, people with disabilities, etc.

These groups are vulnerable to shocks in external systems – they can be easily pushed into situations of poverty or distress after being exposed to shocks affecting their livelihoods.

What is "vulnerability"?

In the face of climate change, vulnerability can be understood as the set of characteristics or conditions that adversely affect individuals and communities in coping with and responding to hazard events.

Vulnerability can be considered by looking at different aspects of sustainable development:

- **Economy:** at-risk groups have low income, not enough or just barely enough to meet basic living requirements; they live in poor conditions or temporary housing; they cannot afford basic public services such as health services, education and basic sanitation.
- **Society:** they are less involved in civic organizations and activities in local communities.
- **Environment:** They have live in areas vulnerable to natural hazards or are at risk from waste/sewage discharged by local economic activities.
- **Attitude:** they are often not self-confident and do not cooperate with the others.

Impact of Climate Change on vulnerable people[11, 12]

Vulnerable groups include children, the elderly, women who are pregnant or raising under one year old baby, people living with disabilities, people living with HIV/AIDS, ethnic minority groups and people living in poverty.

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
Children (under 16)	• Children are dependent on adults for physical and emotional support; • In early stages of development, children have limited emotional or intellectual awareness of situations that may lead to increased risk; • They can be at risk of becoming emotionally exposed to difficult situations. • They do not have much experience as adults, and their behavior in disaster scenarios may negatively impact on themselves, their family and community. • The immature of children makes them easily take part in wrong actions and has bad impact in themselves, family and community.	• Children require a comprehensive education to prepare them physically, mentally and emotionally to become positive and effective members of society. If access to appropriate education and care is disrupted for any reason, this may mean that children will suffer developmentally. • Their need of entertainment has not been satisfied. • Children often have lower social status than adults and, theirs needs and opinions are not fully respected.	• They are able to assist their family and community in the event of natural disasters and extreme weather events; • Children play an important role within the family structure, caring for younger children and helping the elderly; • They also play an important role in the community, establishing networks of children their own age and strengthening community ties and social structures; • They can play active positive roles within their schools and communities, often driving activities such as volunteer groups and working for positive change in disasters and other contexts; • Children are effective learners with flexible and creative ways of thinking. Therefore, they can create positive changes

[11] Live & Learn, 2010, Information collected.
[12] Vietnam Red Cross, 2010, Vulnerability and Capacity Assessment (VCA) (Hand book for VCA facilitatiors, Vietnam Red Cross)

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
The elderly (above 60)[4]	• Elderly people often suffer from poor health and are physically compromised and so are easily affected by environmental factors like heat stress. • Elderly people are often economically vulnerable, which can lead to feelings of insecurity and isolation. • Due to physical restrictions, elderly people may have limited physical mobility.	• Social isolation is often associated with limited opportunities for the elderly to participate in community activities. • There is limited active inclusion of the elderly from the wider community, resulting in limited access for the elderly to social structures and services that are available. This includes health care, entertainment and public information etc. • Associated with social isolation, elderly people may feel uncomfortable depending on their families and children for their basic needs.	• Longevity and life experience often results in awareness of environmental changes over time, and lived experience of past extreme weather events and disasters; • They often have deep knowledge of history, and the community often holds a depth of experience in a wide range of fields; • Elderly people have a significant level of respect and are able to influence the community
Women who are pregnant or raising under one year old baby	• Women have reproductive health requirements in regard to pregnancy, childbirth and sexual health. • They have limited opportunities for further training and working during the maternity period.	• Women and girls experience impacts of gender inequality in some areas. For example, Eastern countries have a historical ideology that values boys over girls. • Social discrimination is often experienced by single mothers, widowers and female-centered households.	• Women play active roles in family and society, and as such are sensitive to changes in the environment; • Women often play a major role in emergency response and disaster recovery; • Women play a direct economic role in production and are often economically independent and mobile;

[4] Regulation No. 39/2009/QH12 issued on 23/11/2009 of National Assembly on the Elderly, Article 2.

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
		• Women have limited opportunities to voice concerns and play an active role in decision-making processes within communities. • Women have limited opportunities to earn high salaries. On average, their salaries are lower than their male counterparts. • Women often experience more limited access to social services than men. • Women are at risk of becoming victims of domestic abuse.	• Women hold their own understandings of gender which has important implications for decision making.
People with disabilities (Who have dis-advantages or limited function in one or more part of their bodies. These disadvantages make it difficult for the PWD to live, learn and work)[14]	• PWD are often physically restricted so that their access to support is limited. • Without effective support networks and financial stability, people with disabilities can become financially or physically vulnerable to external shocks or disaster situations; • Lack of physical mobility means that people with disabilities often face social isolation;	• People living with disabilities are often socially restricted, and so are often less able to access support services. • People with disabilities often face social stigma and active discrimination within society; • Social and financial isolation can limit access to education and economic opportunities. This can turn into a negative feedback, and exacerbate financial problems;	• People with disabilities can play an active and important role in society and in disaster management, for example they can contribute to management through activities to raise awareness and disseminate information on climate change; • With effective support, people with disabilities can maintain valuable social networks;

[5] Regulation No. 51/2010/QH12 issued on 17/6/2010 of National Assembly on People with Disabilities, Article 2.

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
	• There is still a significant economic disparity between people living with disabilities and the general population.	• Due to limited social capital, people with disabilities are often unaware of their rights, and the social support structures available to them. • There is a lack of supportive physical infrastructure, including wheelchair access for public buildings and public transport, and support services); • There is limited planning and support for people with disabilities in emergency management and disaster relief. Logistics planning for evacuation, emergency rescue and emergency shelter often does not effectively provide for the needs of people living with disabilities. • They often have restricted access to information - limited social capital and access to social support networks means that people with disabilities often have poor knowledge of early warning systems;	• They are able to contribute to the policy development for people with disabilities; • They can play an important role in disaster response and relief activities (such as support staff, etc.); • People with disabilities have a valuable insight and experience that can be utilised when planning for safer communities. Through inclusion, representation and participation, safety can be improved for everyone living in the community.

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
Ethnic minorities	• Ethnic minorities often face barriers that reduce their access to education and public information. • Compared with the general population, ethnic minority groups experience high levels of poverty; • Inhabiting mainly rural and regional areas, the income and livelihood of many ethnic minority groups is tied directly to weather conditions and the environment, thus increasing their vulnerability to economic shocks associated with extreme weather events; • They often face economic isolation, due to their being physically removed from business centres and lower levels of education	there is an absence of systematised communication channels for the disabled, in particular those with hearing or visual impairment; • Personal assistants have no experience or skills to support PWD. • Often living in remote, disadvantaged and isolated areas, they have reduced access to social services; • Ethnic minority groups have low levels of literacy and numeracy, and often do not speak Vietnamese; • The infrastructure in remote areas is often underdeveloped; • Ethnic minority groups can be socially isolated – many people outside these groups have a limited understanding of the traditions and customs of some the minority groups; • Livelihoods in remote communities are often limited in diversity, and so highly susceptible to economic shocks associated with extreme events;	• Ethnic minority groups often have a deep and culturally embedded understanding of the natural conditions of their environment; • Ethnic minority groups live close to nature, with very low impact lifestyles; • They have a rich cultural identity that is passed from generation to generation; • They have a high level of social and community capital – individuals in communities are well supported;

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
	• The areas where ethnic minorities live are prone to natural disasters.	• Individuals and communities living in remote areas often live subsistence lifestyles, and so have a lower economic threshold below which they can withstand shock; • Individuals and communities living in remote areas often live subsistence lifestyles, and so have a lower economic threshold below which they can withstand shock; • There remains a level of discrimination and prejudice directed towards ethnic minority groups, and a misunderstanding in the community about the rights and value of these groups in contributing to society.	• Minority groups tend to utilise natural resources and the local environment effectively; • With strong, coherent communities, minority groups are able to effectively mobilize the whole community; • They have invaluable indigenous knowledge with highly developed ways of coping with natural disasters and extreme weather events.

VUNERABLE PEOPLE	FACTORS INFLUENCING VULNERABILITY		CAPACITY
	Intrinsic factors	Societal factors	
People living in poverty (Who have an average income of VND 400,000/ month in rural areas and VND 500,000/ month in urban areas)[16]	• They face financial hardship; • People living in poverty often face barriers to education, access to health care and social services, and access to economic systems. This means that they often face difficulty in meeting their basic living requirements; • Because of a lack of access to basic health care, people living in poverty are often at greater risk of experiencing serious illness; • People living in poverty have a low threshold below which they can cope with environmental or economic disruptions.	• Because of financial hardship, people living in poverty often live in inadequate or temporary housing, and are often exposed to environmental factors like exposure to poor sanitation or exposure to human or industrial waste; • They have limited access to social services.	• People living in poverty often have strong communities, and are able to effectively connect with each other; • Because of necessity, people living in poverty are often flexible and resourceful in obtaining basic living requirements; • They are often adaptable and can adjust to changing conditions; • The urban poor often have better education than those in rural areas.

[16] Ordinance No 09/2011/QD-TTg of the Prime Minister on issuing the Standard of poor households, and pro-poor households in the period 2011-2015 (Article 1)

Topic 5: Mitigating disaster risks and adapting to climate change – changing our behavior

FLOODS & INUNDATION

Before	During	After
• Look for updated information on flood events from TV, radio or loudspeakers in the community. • Discuss with family members about what should be done during a flood event – make a plan. • Is your home in a floodplain or low-lying area? If it is, have a place to which you can evacuate – this can be a friend's home in a higher area, or a community building that will be safe; • Protect valuable personal property and important documents by keeping them in water proof bags and storing them in dry, safe places. • Prepare an emergency bag with important documents, clothes, matches/lighter, drinking water, non-perishable food, a flash light and anything else you might need. Check this emergency bag periodically to ensure that the contents are in good condition. • Help your parents to make any repairs in and around your house before the flood if necessary.	• Listen carefully to your parents and other adults, and move to a place which is safe; • Only travel outside if absolutely necessary; • If you evacuate, turn off electricity, gas and water, and unplug all electrical appliances. Take only essential items with you, including your emergency kit. Do not walk or drive in moving water, even if it is not high. • WARNING: be aware of snakes, centipedes and other dangerous insects or animals. They will also be looking for a high place to avoid the floods; • The water is very dangerous in a flood: there can be dangerous objects submerged where you can not see them. Underneath the water, there may be electricity cords or wires or power poles that have collapsed; • Stay away from any rivers or streams. Do not play near water and do not swim in the flooded areas, because it is very easy to fall into the water and be washed away quickly;	• You should wait for your parents to check around your home for any damage that may have happened during the flood; • Help your family with cleaning, and keep drains cleared; • Stay away from the floodwaters until they recede – they may be moving fast, be deeper than you expect, or be contaminated; • Beware of power lines that have fallen down – the electrical wires may be live, and will be very dangerous; • Avoid roads where flood waters have receded – the water damage may have caused them to weaken and they may be unstable and at risk of collapse; • Be careful when entering buildings and homes – the floodwater may have caused damage that you can't see; • Do not eat the rancid food or food that has been soaked in flood water because it can be contaminated;

Before	During	After
Arranging sand bags around the house is a good way to protect the house in a flood event. • If possible, ask your parents to purchase life jackets to have ready. • If your family or neighbours have a boat, make sure that the boat is ready for use and available when the flood comes. • You can prepare bamboo and ropes to construct a mezzanine in your house to live in temporarily. Remember to construct an exit leading to the roof in case you need to leave the house if the water level rises too high. • Think about where you can leave your vehicles – is there a high, dry place you could leave them? • Protect your drinking water supply by covering wells or the water reservoir – flood water is dirty and will contaminate drinking water if the two mix. • Keep water purification products such as Cloramin B, Cloramin T, and Aquatabs. • If anyone in your family gets injured, you should know who to ask for help. Some examples of help that may be available include: health workers and local Red Cross staff. Make sure you have a way to contact them.	• If you have to walk near rivers or moving water, wear a life jacket if you have. If you do not have a life jacket, you can use floating objects such as tube, empty cans, empty plastic bottles tied to each other or floating banana tree trunks; • If you do not evacuate, stay inside until it is safe to leave your house.	• Always remember to eat food that has been cooked, to drink water that has been boiled and to use insect nets when you are asleep. This will help to prevent the diseases that often come with floods; • Before you start drinking fresh water again, ask an adult to make sure the water supply has not been contaminated; • Clean everything that has been touched by floodwaters – it may contain contaminants including sewage.

TROPICAL DEPRESSION AND TYPHOON

Before	During	After
• Plant trees around your house and school to protect them from wind and rain damage in storms and from erosion. • In your neighborhood and around your home, talk to your parents and other adults about cutting down any tree branches that are dead or that are big enough to cause damage if they fell. • Clean up – if there are objects around your house, or inside that you think could become dangerous projectiles if picked up by the wind, make sure these items are secure; • Keep important documents in a plastic, water proof bag. • Prepare enough food, water, fuel and medical supplies for the whole family for at least 1 week and store it in the high and safe place that you plan to go if there is a typhoon. This might be a solid, high platform, or another house in the village. • Help your parents to make any repairs in and around your house before the typhoon if necessary. • Look for updated information on flood events from TV, radio or loudspeakers in the community. • Prepare batteries for a radio and a flash light in case of a power cut. • Prepare the house to be protected in strong winds. You can do this by putting tape across the windows to strengthen them, making sure the doors close properly and removing things outdoors that could be picked up in a strong wind. These objects can become dangerous debris in a typhoon.	• Children should stay inside a house or building with a strong structure and are not to go outside during the storm. If you are outside, quickly find safe shelter, stay away from trees and poles and anything else that can be blown over; • If you are in your home, turn off the electricity, gas, water and unplug any electrical appliances; • Listen carefully to your parents and other adults and help to look after the younger children • Move to the strongest room in the house; • If your house starts to break apart, shelter under stairs, a strong table or a mattress • In the middle of the storm there will be calm – this is the eye of the storm. Do not go outside during the eye of the storm; • Listen to the messages on the radio and the community loudspeakers for updates. Wait until the community messages tell you that the storm is over before you go outside.	• Help parents and neighbours clean up and make repairs to damaged homes; • Make sure that you stay away from electrical outlets, electricity cords or power poles/power lines. Remind your parents to check the power source in order to ensure the safety of your family; • Always remember to eat cooked food only, boil water before drinking, and use sleeping screens and mosquito nets to avoid mosquitos. These actions will help you to avoid the diseases that often come with storms; • Continue to monitor the storms information on television, the radio or the local village notices.

Before	During	After
• Protect your drinking water supply from the risk of pollution and contamination. You can do this by covering your wells and any water storage basins that you and your family use. • Clean out gutters on your roof and around your home to prevent flooding. • Identify safe places that your family can use for shelter if you need to evacuate. • Is there anywhere you can move your livestock to ensure safety? • Make sure you have stored and protected any farming or fishing equipment that your family needs and that you have protected areas that you use for activities like fishing and shrimp and crab breeding. If you have a car or another vehicle, make sure they doors and windows are shut, the fuel tank is full, and, if possible, find somewhere on high ground to park it, in case of flooding; • Keep track of information about the storm and start preparations early with plenty of time.		

LANDSLIDES

Before	During	After
• The areas most at risk from landslides are – at the bottom of hill slopes, close to mountain edges, near drainage systems or along natural erosion lines. If you live in any of these areas, you will need to exercise caution; • To prevent landslides, you can start by planting trees and keeping hills green with vegetation; • Find out if any landslides have occurred in your area in the past – if a debris flow has occurred before in the area, it is likely to occur again; • You can talk to your parents about taking steps to protect your home – this can include planting ground cover on slopes and building retaining walls. You can also build channels or deflection walls to direct flows away from your house; • Look and listen for warning signs, especially if you live in a mountainous area or there has been heavy rains: - Changes in the landscape, like changes in drainage patterns of storm water; - Leaning trees; - Bulging ground at the base of the hill slope;	• During a severe storm, stay awake and alert. If a landslide occurs, you must be ready to evacuate immediately. • Listen to local radio and the local community loudspeakers for warnings of heavy rain; • If you hear a faint rumbling sound that gets louder and louder as the landslide is getting closer. The ground will slope downwards, and may start shifting beneath your feel. Take action immediately. • If you are near a stream or channel, pay attention if you notice the water flow increasing or decreasing suddenly, or if you notice the water turn from clear to muddy. This can indicate mudflow activity upstream; • Stay inside if you are inside and run to the top floor if you are on the ground floor. Immediately run away from the danger area if you are outside, and run inside any shelter you can find; • Debris and mud flows move faster than you can walk or run. You need to get out of the path immediately. The danger increases if you are close to a river or stream.	• If possible, go to a shelter; • You must remember to avoid the landslide areas because the ground is not stable and could collapse again; • Watch for flooding – flooding and flash flooding can often occur immediately after a landslide event. Be careful around rivers, streams and broken ground; • Check for injured or trapped people around the landslide area; • Do not go into any houses or building before adults have checked that it is safe; • Be careful and look for fallen power lines and broken utilities in the area. This can be dangerous, particularly if there are live wires.

Before	During	After
- Depressions on the ground; - Rivers turning muddy in colour; - Water bubbles up through the ground where it didn't before; - Listen carefully – sometimes you can hear strange sounds. These can be moving or rolling rocks or falling trees. It will sound like a faint rumbling sound that gets louder and louder. • You can also look for signs around your home. These can include: - Doors and windows jamming for the first time; - Cracks in utility pipes; - Cracks in walls; - Cracks in footpaths; - Fences, walls, utility poles start to tilt • If heavy rains are prolonged, you might hear warnings from loudspeakers, radio and television. If you hear these warnings, you can promptly evacuate to a safe area.	Look upstream before you cross a stream or bridge. If you see a mudflow coming, do not cross. • Avoid river valleys and low lying areas; • Landslides can occur very fast, so you should immediately run away from the danger zone. If it is absolutely impossible to run away, protect yourself by rolling into a ball, crouching low to the ground and wrapping your two arms around your head.	• If possible, go to a shelter; • You must remember to avoid the landslide areas because the ground is not stable and could collapse again; • Watch for flooding – flooding and flash flooding can often occur immediately after a landslide event. Be careful around rivers, streams and broken ground; • Check for injured or trapped people around the landslide area; • Do not go into any houses or building before adults have checked that it is safe; • Be careful and look for fallen power lines and broken utilities in the area. This can be dangerous, particularly if there are live wires.

EARTHQUAKES[17]

Before	During	After
• Make sure you have an emergency kit ready in your classroom and at home. This kit will contain any medicine that you might need, as well as emergency medical supplies (bandages, saline solution etc.), non-perishable food, drinking water and anything else you might need in an emergency; • Decide on a safe place that you can shelter in at your home and in your classroom. This could be underneath a sturdy table or a desk, or against an inside wall; • DROP - COVER - HOLD ON. Practice this in drills. • Make sure you have a torch with batteries, a fire extinguisher • Remind your parents not to put heavy furniture like bookshelves, cabinets, or heavy picture frames close to the doors in case they topple and block your exit; • Store any breakable or heavy objects close to the ground, in a ground level cupboard, for example; • Make sure any heavy shelves are securely fastened to the walls, and brace overhead light fixtures and heavy objects.	• DROP – COVER – HOLD ON; • DROP to the ground; take COVER by getting under a sturdy table or other piece of furniture or against an inside wall; and HOLD ON until the shaking stops; • Make sure your head and neck are covered by the structure; • Stay away from windows, outside doors, glass objects and light fixtures – anything that might break or fall; • If you are in bed, stay there and cover your head with a pillow. Stay away from light fixtures, windows and doors; • Do not use doorways unless you know they are strongly supported; • Do not try to leave the building until the shaking has stopped; • If you are outside, stay there; • Stay away from buildings, high walls, trees and power poles/wires. Stay away from anything that you think could fall down.	• After the earthquake, listen carefully to your parents, emergency workers and other adults; • If you are inside a building, wait until the shaking stops, and it is safe to exit the building; • Aftershocks can occur hours, day, weeks and months after an earthquake. These shocks can do damage to already weakened buildings • If you are trapped in a building, shout for help. There will be people around you trying to look for you. You can try to find ways to escape, but it is important to remember not to move any debris if it might cause more things to fall; • Fires are common after earthquakes. Be aware of this danger, and find help if you see any smoke or fire; • If you live in a coastal area, be aware of the risk of tsunami – talk to an adult about this risk; • Observe hazards and keep away from any dangers, including structures that are damaged and might fall; • Listen to updated emergency information on a radio or on the community loudspeaker;

[17] New Zealand Ministry of Civil Defence and Emergency Management, 2009. *What is the Plan Stan teacher's guide.*

Before	During	After
This includes big objects like refrigerators, hot water systems, gas bottles etc.; • Store any pesticides or chemicals safely – make sure they are secured if in big bottles that could tip or break, and make sure they are away from any areas where they could cause any damage or harm; • Repair any faulty electrical wiring or outlets or leaking gas connections – these will be fire risks after an earthquake; • Repair any cracks in roofs or walls – get expert advice if you think that any cracks indicate structural damage; • If possible, you can ask your teachers or parents about installing flexible gas and water pipes – these will be more resistant to breaking in an earthquake.		• Remind your parents or another adult to inspect water, electricity and gas connections for damage; • Be careful when opening cupboards and cabinets, as heavy objects may have broken or shifted; • Stay away from earthquake-damaged areas;

DROUGHT

Before	During	After
• Make sure that you have a secure and safe water supply. Do you think that there will still be water available after a whole season of dry weather? If not, think about what other water sources you can plan to use; • With your parents, inspect the pipes and faucets around your house to find and fix any leaks; • Conserve your drinking water source – whether you get your water from a stream or a well or from a reservoir, it is important to use less water in the lead up to a drought so there will be more in reserve when the rain stops; • If you can, it is a good idea to be able to store water near your house. This can be in a rainwater tank or a dam. To make sure you do not lose too much water to evaporation, cover your tank or dam; • With your parents, plan how you can preserve seeds, food and livestock for your family. Remember that planting crops during a drought is very difficult.	• You should regularly monitor the weather forecasts for updates; • Conserve water – this is the most important thing to do during a drought. Make sure you use water sparingly in the house and outside. • Reuse the water from your day-to-day activities to irrigate plants and flush toilets. Be careful to avoid water pollution when watering plants – make sure there is not too much soap or chemicals in the recycled water; • Help your parents to get access to clean, safe water and help them to transport and store it; • Drought impacts can lead to other related hazards that you should be aware of and prepare for. These include heat waves, dust storms and wildfires	• Help your parents to plant the seeds for the new season; • Help your parents to check the pipes and faucets around your house for leaks, and fix any leaks that you find; • What did you learn from this drought event? Make a long term plan, so the next time your area experiences drought, you won't be as badly affected. This could mean building a water storage tank/dam near your house, fixing the plumbing in your house so you can be more water-efficient or securing a water source that is less likely to run dry in times of drought.

HAIL[8]

Before	During	After
• Listen to weather updates on the television, the radio and the community loudspeaker so you will know when a storm is coming • The weather reports often tell you what to expect – will there be thunder and lightening? Will there be heavy rain? Will there be hail? • Hail can be dangerous, so if it is forecast, plan to stay inside during the storm	• Hailstones can cause serious injury if you are outside during the storm. When a storm approaches, shelter indoors and wait for it to pass • If you are caught outside and cannot get to shelter, protect your head with anything you can find – a piece of wood, cardboard, a bag or a strong hat. Hailstones can be big and heavy – it is important to protect your head.	• Hail can be very destructive. You can help by looking for damage in and around your home, and telling your parents or an adult about it. • Do not walk too close to any buildings that look like they have been damaged, as falling debris can cause you harm. • Help clean up! Hail can cause a lot of damage. Help your family and village by helping to clean up the mess.

THUNDERSTORMS AND LIGHTNING

Before	During	After
• Thunderstorms can often be easily predicted, so make sure that you listen to weather updates on the TV, radio and the local community loudspeakers. This should be able to tell you how severe the storm will be, and how far away it is; • Keep an eye on the weather outside – as you see dark clouds coming over, do not stay outside; • Make sure you and your family have somewhere safe to shelter when the storm comes over.	• During a thunderstorm, you need to stay inside in your home, do not go out; • Unplug any electronic devices in your home such as televisions, telephones and computers. Remove any large antenna or cables from the TV and do not use the telephone – this will conduct electricity; • During the storm, sit off the ground on a chair or a bed made of wood. Make sure your feet are not touching the ground and do not use the telephone;	• Make sure that the storm has finished before you go outside. It is important to stay safe from lightning, heavy winds and heavy rain; • Thunderstorms can be very destructive. Be aware that the wind and rain may have damaged buildings and houses, and may have knocked down powerlines, electricity poles, trees or tree branches;

[8] Vietnam Red Cross, 2005. Introduction on Disaster Preparedness and Response for Primary School Students, Hanoi: ThanhNien Publication.

Before	During	After
Prepare an emergency bag with medical supplies, non-perishable food and drinking water in case the storm causes flooding and strong winds, and you are stranded or have to evacuate.	• If you are outside when an electrical storm approaches, do not stand near tall trees or power poles and do not hold metal objects such umbrellas or bicycles; • If you experience a tingling feeling like an electric current running through your body, you may be very close to lightning. You should immediately get as close as you can to the ground - squat down on your toes, cover your ears with your hands and lower your head between your legs; • If you are on a boat or swimming, go to the river bank immediately. Water conducts electricity, and it is very dangerous to be in or near the water.	• Be careful of damaged infrastructure, especially live electricity wires, and be careful when you enter buildings or houses – the damage may be worse than it looks, and you may be injured by falling debris.

You can calculate how far the thunderstorm is from where you are? Count the seconds between the time you see a flash of lightning and the time you hear the sound of thunder. 3 seconds between the lightning and thunder means that the lightning struck 1 km away from where you are.

WHIRLWIND

Before	During	After
• Whirlwinds are difficult to predict, but if you know that one is coming, make sure that you are indoors, inside a strong house or building • Put tape across the windows in your home or school to make them stronger against the wind • You should take down any heavy objects that are stored up high or in an insecure place. If you think anything is at risk of falling down, move it to a safe place where it can't cause any harm; • If there are any heavy objects around the outside of your house, or the building where you will shelter, make sure you secure them. These objects can be picked up by the wind and can be turned into dangerous projectiles/debris.	• If a whirlwind approaches, stay out of its path and find safe shelter if possible. • Stay inside until the wind has passed. Whirlwinds only last for a short amount of time, so take shelter as soon as you find out the whirlwind is coming; • If you are caught outside, avoid high ground and seek shelter in a nearby ditch or hole. This will keep you safe from any flying debris; • If you can't find a ditch or building, try to find something strong to hold onto, for example a telephone pole or a tree; • If you are inside when a whirlwind approaches, you should shelter under the stairs, under a table or under a bed. Stay away from windows and any glass, as it can shatter; • If your house starts to come apart in the wind, shelter under a strong table or a mattress. Stay away from the windows and doors	• Whirlwinds can be very destructive. Be aware that the wind may have damaged buildings and houses, and may have knocked down power lines, electricity poles, trees or tree branches; • Be careful of damaged infrastructure, especially live electricity wires, and be careful when you enter buildings or houses – the damage may be worse than it looks, and you may be injured by falling debris

TSUNAMI[9]

Before	During	After
• If you live near the beach, find out if there have been tsunamis in your area before. How bad were they? • Find out if there have been earthquakes or volcanic activity in your area before. If this happens under the sea bed, there is a serious risk of a tsunami resulting. • If you live in a high risk area, find out if there is a tsunami warning system. What is it? What will happen if there is a tsunami? • Talk with your family. Make a plan for what to do if there is a tsunami. Make sure that everyone knows what they have to do. Will you evacuate? Where will you go? Will you be ready if it happens in the middle of the night? What do you need to take with you?	• If you see something, or if you hear the tsunami warning, run immediately to a high and safe place. It will be safe 15 meters above sea level and at least 1 kilometer from the shore. • If there is no safe place, or you do not have time to get there, you need to get as far from the ground as you can. You can climb a tall tree, or run to the top of any building. • If you are at sea on a boat, stay there. Tsunami are only dangerous on the shore – the ocean waves will not be as strong. Listen to the radio if you have one, and only return back when the danger is over. If you do not have a radio, but you know there has been a tsunami, wait away from the shore for a few hours until you can be sure there will be no more dangerous waves. • If you are in the harbor, leave the boat/harbor and run to a safe place	• After the main tsunami, there may be other tsunami or big waves following. If you have found somewhere safe, stay there for a few hours at least. • If there is still flooding, stay out of the water. This water will be dirty, and will be carrying lots of dangerous debris.

[9] United Nations, 2011. Basic information of earthquake and tsunami in Vietnam.

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PART 3

HANDOUTS

Handout Topic 4

When can we come back to school?

Our living area is usually affected by floods and inundation. After each flood, it is difficult to go to school because it takes a long time for the flood water to recede. Flooding also causes the roads to school to become blocked with mud and trees. Because of this, in each school year, there are around 7 to 10 extra days that we can not go to school compared with other students. Leaking and water intrusion in our homes can cause damage to our books and notebooks. We sometimes have to buy new books if the damage is severe, and this is expensive. At times, our family can not afford to buy new books, so we have to wait for support. Some of our classmates drop out due to financial difficulties. After the storm in 2006, many students lost personal property – their houses collapsed and their roofs were blown away. They had no school equipment or clothes (Students at 37 Group, Hoa Hiep Bac Ward, Lien Chieu District, Da Nang City).

Poor families can be affected the worst in storms

Tran Thi Nguyet who comes from An Vinh community in Ly Son District (Quang Ngai) is one of the victims affected by storm No.9. While fastening the roof in preparation for the storm, Nguyet's husband was injured by the strong winds. He suffered serious internal injuries and passed away a few days later. Ho, Nguyet's husband, was 39 years old when he died. After her husband's death, Nguyet was left alone to raise 5 children from the ages of 1 to 15, including a 7 year old child with a disability. Nguyet's family was very poor, but has become poorer after the storm. Nguyet does not know how long it might take to recover from this loss.

"I don't know what to do to raise all my children but I have to calm down and carry on. I have to figure out what I should do. It was hard enough for my poor children when he passed away" – Nguyet said in tears.

http://www.tin247.com/nhung_manh_doi_kho_khan_sau_bao_lu-1-21500391.html

People with disabilities are vulnerable to climate change impacts

Nguyen Van Rot cannot work because he is blind and became physically disabled in an accident in 1974. Having no income, he has to depend on his brother who works as a construction worker. Nguyen shares: *"In the future, there will be an increase in rain, temperature and storms, however, I'm afraid of cold the most because I am old and weak. Elderly people have specific needs, especially when they are poor and alone. They need to be provided with mosquito nets, blankets, medicines and food on time".*

Poor and elderly people are vulnerable to storms and floods

65-year-old Nguyen Thi Buoi, lives in Dai Dong commune in Dai Loc district, Quang Nam province, is the victim of the storm No.9 at the end of September 2009. She still faces problems after losing her rakes and plows because her family needs this equipment to earn money. Four members of her family own about 720m2 of land. They sometimes lose their crops, which is difficult because they are very poor. Moreover, the flood swept away their house and and all their belongings overnight. All they have left is the empty ground where their house used to be. Their neighbors helped to build a temporary tent, but the tent is too small for the whole family. It also gets very cold on windy nights. They still feel lucky to have a place to live and food to eat for the time being.

http://dantri.com.vn/c167/s167-355489/chia-se-kho-khan-voi-nguoi-dan-noi-bao-lu-di-qua.htm

Climate change has negative impacts on the livelihoods of poor people

"In the past, I have worked on the shrimp lakes in the surrounding communes. It has become more difficult to find jobs in the last two years. The unusual weather makes the shrimp get sick easily and the owners of the shrimp farms are losing money. At the beginning of this year, my wife and my daughter had to go to Ho Chi Minh City to work, because I don't have a steady job."

(Nguyen Thanh Nhan, 39 years old, Binh Loc commune, Binh Dai District, Ben Tre Province)

Handout Topic 5

5.1 - Card "If"

Flood/Inundation

Scenario 1:

At home

It has rained heavily since last night and continues to rain now. When you wake up, you find water has risen to your bed. Water is everywhere.

What would you do?

Scenario 2:

At school

Today your school closed earlier than usual because of bad weather. Your school is far away from your house and your parents are still at work.

What would you do?

Scenario 3:

On the road

You and your friends are walking on the road when it suddenly starts raining heavily. The water in the river next to the road is rising quickly, blocking your path.

What would you do?

Scenario 4:

At home

When you are having dinner with your family, the radio informs you that there is a storm coming to your neighborhood.

What would you do?

Scenario 5:

On the road

You are on the way back home from your friend's house after a heavy rain. You see a broken electric line in front of you.

What would you do?

Scenario 6:

At school

You are playing with your friends in schoolyard. Suddenly, a strong wind blows trees and sand around violently.

What would you do?

Earthquake

Scenario 7:

At home

You and your family are woken up by falling furniture. The ground is shaking. The electricity is cut off.

What would you do?

Scenario 8:

At school

During break time while you and your friends are reading books in the classroom, the ground, windows, chairs and tables start shaking.

What would you do?

Scenario 9:

On the road

You and your friends are coming home from school when the ground starts shaking. Nearby, little boys and girls start crying.

What would you do?

Other hazards

Scenario 10:

On the bus

You are on the bus when someone yells “Fire, Fire”. Other passengers start yelling and trying to escape.

What would you do?

Scenario 11:

At home

You are playing with your sister when you see smoke rising from the hill in the back of your house.

What would you do?

Scenario 12:

At school

You are playing with your friends in schoolyard when you see smoke coming from the storage room.

What would you do?

Handout 5.2a: "Shouldn't" Cards

Walk near river banks or play, walk around, swim near the flooding areas.

Turn on electrical appliances like the TV or computer during a thunderstorm.

Go out in an electrical storm without your parents' permission.

Go out during lightning and thunder.

When an earthquake occurs, you become panicky and try to escape by all means. You forget the basic steps: hide under the table, tightly hold the table, and make.

Put heavy furniture such as bookshelves and cabinets in front of the doors.

Do not help your parents to fix broken things in the house.

Do not update yourself with weather forecasts on TV, on the radio or in the newspapers.

Get into the water when you can see damaged electrical wires lines or collapsed electricity poles in the water.

After the flood, go and find food and drinking water in houses damaged by the floodwater. Drink unboiled water and eat contaminated fruit.

Play around the areas which have warnings for landslides and/ or rock falls.

Play in abandoned houses/buildings without your parents' permission.

Do not use life jackets or flotation devices, such as empty bottle or trunks of banana trees, to move around a flooded area.

Run to high buildings, walls, trees or electricity poles during a landslide event.

Before the storm, forget to keep books, notebooks and important documents in water proof bags or in a dry and safe place.

Store water in unclean and uncovered buckets, casks or barrels.

Handout 5.2b: "Should" Cards

Update your information of floods from information on the TV, radio and from community loud speakers.

Find out whether landslides have happened in the neighborhood before.

Shelter under stairs, tables or beds during whirlwinds.

Run away from dangerous areas if a landslide occurs. If you don't have enough time, protect yourself by crouching on the ground and holding your head with both hands like a ball.

If you live in a mountainous area, pay attention to signs of landslides: falling trees, cracked walls, sinking ground and moving rocks etc.

Save water in clean and covered buckets, casks, and barrels.

Check the water pipes and do not throw rubbish so as to avoid polluting the water source.

Help your parents to reinforce your house to make it more resistant to high winds.

Try to escape from collapsed or damaged houses , find a safe place

Store or keep food and seeds in a dry and safe place before the stormy season.

If you are outside, immediately find a safe place to shelter when a storm comes.

Obey instructions from your parents or adults, and take care of small children during the storm.

Remind your parents to check the electricity supply in the house to keep your family safe.

Help your parents and neighbors clean the drainage system and the areas in and around your house before the flood season.

Use household water, for example, to water the plants or in the latrine.

Eat well cooked food, drink boiled water and use mosquito nets to avoid diseases.

Center of Live&Learn for Environment and Community *is a Vietnamese non-profit organization whose mission is to reduce poverty and foster greater understanding and action towards a sustainable future through education, community mobilization and supportive partnerships.*

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1st publication October 2011

2nd publication February 2013

Printing license 312-2013/CXB/70-24/LĐ
Printed by Compass Printing Company
This material is compiled and released with support from ECHO – Humanitarian Aid and Civil Protection of the European Commission's Humanitarian Aid Department and in collaboration with partners from the Joint Advocacy Networking Initiative (JANI) in Vietnam

This publication has been produced by the Ministry of Education and Training and Live & Learn for Environment and Community (Live&Learn).

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In cooperation with Save the Children, Plan International in Vietnam, Care and other organizations in the Joint Advocacy Networking Initiative (JANI), sponsored by Humanitarian Aid and Civil Protection of the European Commission (ECHO)