FLOOD MANAGEMENT (LEVEL 2)

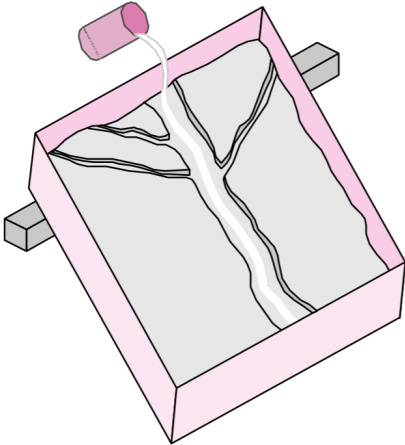|	
Description	Learners will explore floods, a common natural disaster, by beginning to understand their causes and far-reaching effects. They will research the effect of the floods on plants, animals and people, and design an emergency response kit including safety guides and disaster kits.
Leading Question	Can you manage a flood in your community?
Total Time Required	5.5 hours over 5 days
Resources Required	- 1 large flat container or tray with sides (a deep tray), soil or modeling clay, sponge, little rocks, - Empty plastic container and marker - Plastic bottles, rope, thread and large plastic bag
Subjects	Social science, Art and Design, Literacy, Numeracy
Self-guided/ Supervised activity	High
Learning Outcomes	By the end of this project, learners will be able to: 1. Explore the impact of human action on creating natural disasters. 2. Identify how hazards are measured to provide early warning to reduce the impacts of disasters. 3. Discuss the consequences of the flooding. 4. Identify and design emergency measures to protect from the consequences of flooding.
Previous Learning	None

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DAY 1

Today, you will begin to explore floods.

Time	Activity and Description
5 minutes	• A flood is an overflow of water that submerges land that is usually dry. • Brainstorm and make a list of the causes of floods that you know. Think of reasons besides excessive rain that would result in more than normal water by thinking of other water sources – these would include overflowing rivers, broken dams, storm surges cyclones, and melting ice/ snow etc.
15 minutes	• Make models to explore the impact of human activity on creating floods. First explore the impact of placing human settlements close to river bodies, straightening river paths and deforestation. Record the outcome of each experiment with drawings and notes on the implications of the floods and draw conclusions. • **Flood model set up:** - Take any large flat container or tray with sides. - Place sufficient modeling clay or soil at the bottom of the pan. - Carve a river path for water in the container in the clay/soil. - Place little stones, wood cubes, or toy houses alongside the river to define the path and also define the settlements. - Pour water into the model in the river and observe the water staying within the river path. You can add a 'rainstorm' by increasing the volume of the water.

	- Observe what will happen to the neighboring areas. Place the homes in different parts of the model and test the impact depending on the location and proximity to the river and write these down. Usually, the settlements close to the river will get submerged first and there will also be more of an impact on the downstream settlements
15 minutes	**Let's explore the multiple human factors that cause floods:** ● Straightening river channels and paths - Try keeping a straightened river path as shown above and testing the speed of the water flow and the amount of flooding. - Then attempt to create a meandering or zig-zag / curved river path and test the speed of water follow and the amount of flooding. - Observe that the curving river path slows down the speed and the intensity of the water flow and reduces the flooding. - Also, add more bends to the curvature to the test assumption.
15 minutes	**Let's explore the multiple human factors that cause floods:** ● Deforestation of mangroves and wetlands. - Place some small strips of kitchen sponge (or any other absorbent materials including cotton if unavailable) beside the river path to represent a mangrove or wetland. Pour water along the river and observe how the mangrove trees, wetland grasses and vegetation act like sponges and reduce our vulnerability to flooding. - Background: Mangroves grow on the edge of warm ocean coasts and their spongy roots soak the water. Similarly, wetland marshes surround rivers and their vegetation soaks up water. Mangroves and wetlands can also spread out water over large sections of land, and slow the dangerous flow of water. This plays an important role in protecting the nearby communities. - Due to deforestation and urbanization, these important natural features are no longer available to play their important role.
15 minutes	**Let's explore the multiple human factors that cause floods:** ● Reduction of natural vegetation causing landslides - Observe how plants can prevent soil erosion by pouring some water on any incline or slope outdoors that has soil or dirt. - Try the experiment on a slope with some grass or shrubs. - Observe how the grassroots hold the soil in place and keep it from washing away and draw conclusions. Alternatively, you can try the same experiment using a tray held at an incline first with the soil without grass and then with grass.
15 minutes	**Let's explore the multiple human factors that cause floods:** ● Reduction of natural drainage basins - Create a small pit or hole close to the river path and once again pour water into the model. - Observe how the water will drain into the basin created and reduce the intensity of flooding. As our human need for land and space increases, we have decreased the number of natural drainage basins increasing the chances of floods.

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	● Improper garbage disposal - Place some rigid objects in the river path to represent garbage. Pour water along the river and observe how the build-up of garbage obstructs the natural flow of water leading to flooding of the surrounding areas,
10 minutes	● Complete your notes from the different experiments to understand the human causes of floods. ● Complete your notes from the different experiments to understand the human causes of floods. ● Share notes with family members for feedback and additional input.

DAY 2

Today, you will explore and measure the intensity of natural hazards.

Time	Activity and Description
5 minutes	● Categorize the intensity of natural hazards as: - Minor risk: A relatively small possibility of harm. - Moderate risk: A possibility of harm that is neither small nor great, but in between. - Major risk: A serious and significant possibility of harm. ● Understand how hazards are measured and build scientific instruments to measure hazards. Read and record measurements, analyze measurements and understand how these instruments can provide early warning to reduce the impacts of disasters. ● Flooding is often caused by strong winds, heavy rains and high tides because of tropical storms called cyclones and hurricanes. Design 2 instruments to measure the intensity and assess the risk:
15 minutes	● **Measuring floor depth:** Learn how scientists record and monitor floods by observing how rain affects the depth and breadth of local streams. Record and mark the water level during the dry (non-flooded) season and then again during the rainy season. For example, the recording in the rainy season is 5 fingers or 10 cm above the level recorded during the dry season. If you are unable to go visit a local stream or river, you can use the model made from the first day and mark the levels during the dry and again during the rainy season
15 minutes	● **Rain gauge to measure the amount of rainfall.** Mark a large, thin, straight-sided, empty plastic container using a ruler or using your horizontally placed finger as one unit – you will use tape or a pen to mark the outside of the container. This gauge will be placed outside in an open area where it is not tampered with (or on

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	some elevated surface) when it begins raining. As the rain fills the gauge, you can measure this after each rainfall. ● Make a permanent measuring post that can also withstand winds and make a stable base to hold the container above the ground.
5 minutes	● Use these instruments to predict weather changes and also to understand better how scientists can measure changes and keep track of changes to put out warnings.

DAY 3

Today, you will gather research on the impact and result of floods on humans.

Time	Activity and Description

20 minutes	● Design a questionnaire to capture the different types of impacts of flooding. The questionnaire can include the following questions:
	  - Emotional: How can we prepare ourselves emotionally for a disaster? Prompts: How do people feel when disasters happen? How do people get through a disaster?
	  - Infrastructure: What happened to your home and what was permanently or temporarily damaged? Prompts: What happened to homes and belongings? What could be salvaged and how?
	  - Health and Life: Were people affected and how? Prompts: Was there any loss of life? What were the common injuries or illnesses and how did these happen?
	  - Basic Needs: Were there disturbances to all the basic needs? Prompts: Was the clean water supply disrupted? What happened to the connectivity through phone, internet, TV or radio? How quickly were you able to access healthcare and schools? What was the access to food supplies and rations?

20 minutes	● Ask family or community members who have experienced the devastating floods and collect their responses.
20 minutes	● Capture all these results and impacts in a report that includes a section compiling strategies on how families best dealt with the disaster and draw an image of the same. ● Share the draft report with family or community report for feedback and additional input. ● Use the feedback to revise their draft report to produce your final report.
20 minutes	*Literacy Extension:*

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	● Compose a poem/song about the impact of floods. The poem/song may illustrate the emotional aspects of flooding or depict the floods' impacts on infrastructure, health and life, or basic needs. ● Share and present the poem/song to the family or community members.

DAY 4

Today, you will prepare yourself and your community for floods.

Time	Activity and Description

20 minutes	● Begin by designing an emergency protocol for your family and community to prepare for floods.
	● Begin by brainstorming how a flood would typically play out
	● Some prompt questions can be answered based on the initial model:
	  - If there is a flood, what would be the safest part of your home and why? (answer: a higher floor or roof)
	  - If your home has no higher floor or access to the roof, where in the community would they gather? (an elevated area in the community)
	  - How would you reach these safe higher grounds?
	  - What are the most dangerous areas in the community? E.g. proximity to the water bodies etc.?
	  - What are the emergency phone numbers to ask for assistance?

10 minutes	● Answer the questions in the worksheet in the appendix.

20 minutes	**Design a survival kit:**
	● Begin by choosing the items that are needed to stay alive and healthy and make a list. Mark whether these items: i) are essential, ii) are durable/long-lasting, iii) can be easily carried and iv) are water-proof. The list may include the following items:
	  - Food (especially long-lasting non-salty energy food and/ or canned food)
	  - Water
	  - Medicine and/ or first aid kit
	  - Clothing and blankets
	  - Flashlight
	  - Radio
	  - Batteries
	  - ID card and papers
	  - Cash or credit cards
	  - Toiletries (soap)

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	- Whistle or colored flag to attract attention
	● Make the colored flags and a help poster to attract attention from the ground.
10 minutes	● Put all the items together in a survival kit.

DAY 5

Today, you will pretend to be weather forecasters.

Time	Activity and Description

40 minutes	● First write a script as a warning issued by your National Weather Service. The warning has to alert people when bad weather might happen.
	 ● In the news report, you need to cover:
	    - Where is the flood happening and why?
	    - Where is the most dangerous place?
	    - How severe is the intensity of the flood and how is it being measured?
	    - What might be the consequences?
	    - How can you prepare for it?

20 minutes	● Present this weather warning report to all their family members.
	 ● Reflect on your experience in doing the project activities:
	    - What did you enjoy doing most?
	    - What challenges did you meet and how did you overcome them?
	    - What new things did you learn that you did not know before?

Additional Enrichment Activities	● Learners can design their own personal flotation devices if floods are a reality in their context ● Learners will design their own makeshift personal flotation device (PFD) from clothing, thick plastic bags, plastic bottles and ropes.

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	• Learners need to first use a plastic backpack, or make a life jacket (sleeveless t-shirt that they can wear) from an existing one at home or cut it out using any thick plastic bag. They will create "pockets" within this life jacket using thick thread or rope. They will then tie multiple empty plastic bottles (with their caps on) upside down together and secure it in the pockets of the lifejacket with the rope. • Try floating this life jacket in water to observe the concept of density in action. Since the life-jacket is filled with light material i.e. plastic bottles it can displace a lot of water compared to its light weight and therefore can float
Modifications for Simplification	• Learners can reduce the number of models and the instruments being used for measurements

ASSESSMENT CRITERIA

By the end of the project, most of my learners were able to:
- Identify how human actions can cause flooding.
- Design the emergency protocol card.
- Differentiate between items as essential, important or optional in the event of flooding.
- Produce a final weather watch report.

APPENDIX

1. How many people are part of the family? _____
2. Water: You need a 3-day supply. Each person needs 1 gallon per day. How many gallons will your family need? _____
3. Food: You need a 3-day supply of canned foods. List some foods you might put in your supplies kit: _____
_____
4. 4. Medicine and Supplies for your First Aid kit:
_____
_____
5. How will you listen to the news for weather updates and official instructions?
_____
6. If the power goes out, what will you use to see in the dark?
_____
7. What will you need to open cans of food?
_____

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WATER, WATER EVERYWHI

Hi everyone, my name is Rising Waters. We all know that "April showers bring May flowers," bu showers that turn into heavy rains can also cause floods. I'm here to remind you that during a flo you and your family can get to higher ground to stay safe.

My friend Sasha needs your help! Last week, there was a lot of rain where she lives. Now the river in her town is rising fast. The river is spilling over its banks. There is flooding near her hom Sasha find her route to evacuate. Draw a path through the maze below. Help Sasha and her family a safe place!