

EDUCATOR *GUIDE* | Activity 2

Earth Hazards (50 min)

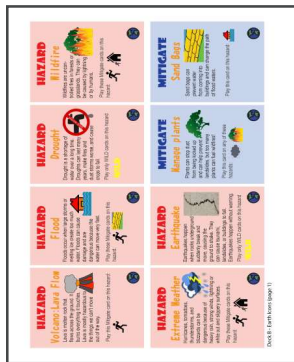
Overview

In this activity, youth will learn about hazards on Earth and the idea that humans have developed ways to mitigate some of them. Youth match appropriate mitigation strategies with their hazards in a collaborative card game. Youth also learn in the card game that chance events and human collaboration also play a role in hazard mitigation.

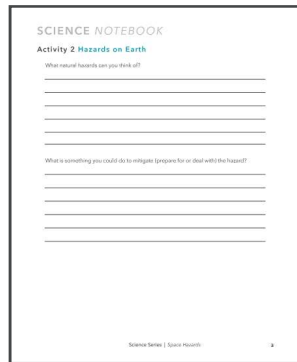
Youth will learn:

- » About different hazards on Earth
- » Humans have developed ways to mitigate hazards

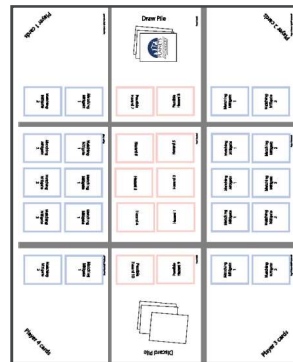
In this activity:



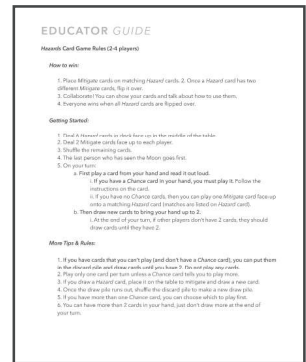
Hazards Cards
(Decks B & C)



Science Notebook



Mitigate Hazards
Playmat



Hazards Card
Game Rules

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Educator Preparation (40 mins)

» For each group of 3 or 4 youth:

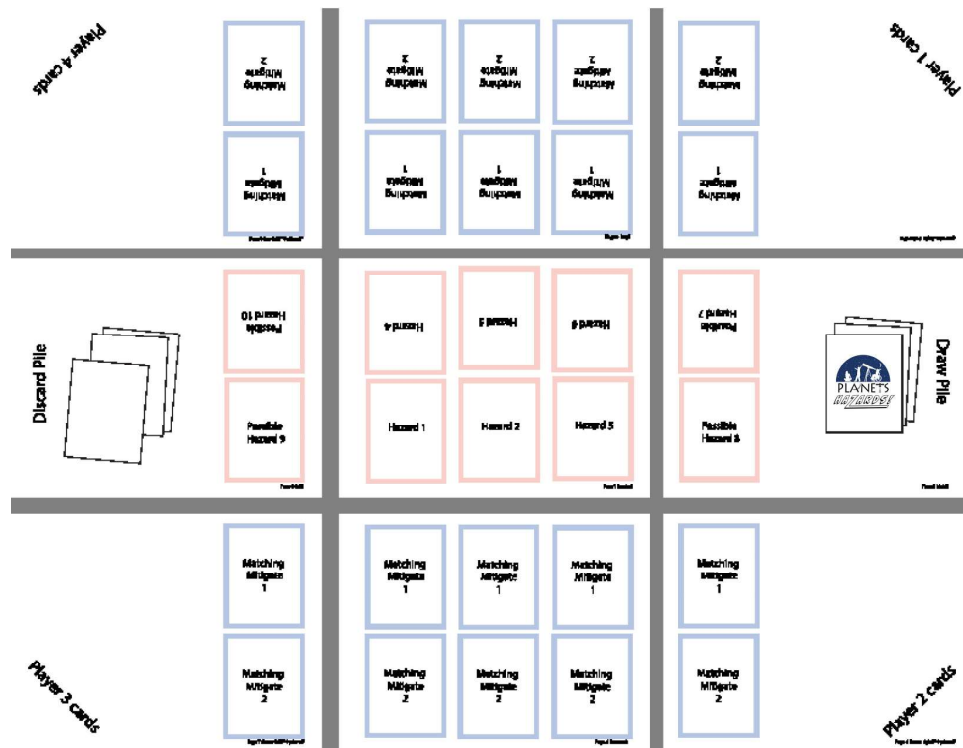
1. Print one copy of the Mitigate Hazards playmat.
2. Tape the pages of the Mitigate Hazards playmat together in the arrangement depicted at the end of this section.
3. Print Deck B - Earth Icons (in color if possible) (11 cards).
4. Print Deck C - Both Earth and Space Icons (in color if possible) (17 cards).
5. Cut the cards with a paper cutter and combine the decks to make individual stacks of 28 cards per deck.
6. Print and post the *Hazards* Card Game rules.
7. **Optional:** Consider laminating the self-printed cards or using card protectors to preserve materials for future use.

Tip: You may not need to print and tape the outer pages to make a workable playmat. Determine if using a skeleton version is appropriate for your specific group dynamics or even if youth would intuitively understand the game layout without a playmat.

Tip: Print Deck D - Space Icons to save yourself prep time for Activity 3.



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Introduction to Natural Hazards (5 min)

» Lead a discussion to introduce the idea that humans must mitigate natural hazards.

1. Ask youth: Think to yourself, what are some natural hazards you can think of? Alternatively, you can shuffle the deck and deal the cards to youth randomly. In this scenario, the youth will find each one of their reservoirs on the corresponding chart and fill in the water droplet values individually.
2. Now ask youth to share their answers one at a time. *Accept all answers.*
3. Add any hazards listed below that were not already stated:

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Lightning	Extreme Hot/Cold	Flood
Wildfire	Earthquake	Drought
Structure Fire	Landslide	Tsunami
Hurricane	Duststorm	Impact
Tornado	Volcano	

4. Next, choose one example from the original list that is the most relatable to your particular group of youth.

» Ask: What are some things people could do to mitigate (prepare for or deal with) this hazard? *Accept all answers. Examples include warm clothing for a blizzard, staying inside during storms with lightning, watering schedules for drought, evacuation for wildfire, not going on a planned vacation because of a volcanic eruption, etc.*

Tip: While its best to discuss hazards that are locally relevant and therefore more relatable to youth, be mindful of the potential for trauma, especially if you live in an area that was hard hit by a natural disaster in recent years.

Getting to Know the Cards (10 min)

1. Distribute card decks B (Earth Icons) & C (Both Earth and Space Icons) to groups of 3-4. Note: There are not enough cards to accommodate more than 4 players in a group for the next activity.
2. Have youth sort through the Hazard cards and pull out the cards that they believe are most dangerous and least dangerous in their own view.
3. Have youth sort through the Mitigate cards and pull out the cards that they believe are most useful and least useful in their own view.
4. Ask youth if any group would like to volunteer their choices and share why they chose their cards. All answers can be valid if supported with reasoning.



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Hazards on Earth Card Game (25 min)

» Set-up and play a collaborative card game that allows students to choose how to best mitigate hazards on Earth.

1. Introduce the idea and reason for the game. NASA missions must mitigate hazards when they explore space and this is easier to do if we first learn how humans mitigate hazards on Earth. In fact, some of the hazards are the same!

2. Each group of 3 or 4 youth should have card decks B & C. There are not enough cards to accommodate more than 4 players in a group.

3. Pass out the rules of the game (1 copy per group). Let youth know that the game is a lot like the one they played in Activity 1. The goal is to mitigate all hazards as a team.

4. Review the “Getting Started Section” of the Rules with the whole group.

5. Start game play. Circle around to all groups and check for understanding of the rules, vocabulary, and concepts. For example, if you see *Filters* in someone’s hands, say can anyone tell me what *Filters* means and why it would be useful in a dust storm? Another example, “Oh I see you have a chance card, you must play that one first” or “Looks like there is nothing you can use Sand Bags for, did you know you can use your turn to trade that for a new card?”

Tip: Having more players in a group encourages collaboration because they can see more cards at one time. Players can warn each other and play their hands with other’s cards in mind.

Tip: The game can be made quicker by dealing less hazards. The game can be made easier by taking out a couple Chance cards with negative effects. The game can be made harder by taking out a couple Chance cards with positive effects. Read the card carefully to make sure you are removing the intended effect.

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Hazards Card Game Rules (2-4 players)

How to win:

1. Place *Mitigate* cards on matching *Hazard* cards.
2. Once a *Hazard* card has two different *Mitigate* cards, flip it over.
3. Collaborate! You can show your cards and talk about how to use them.
4. Everyone wins when 6 *Hazard* cards are flipped over.

Getting Started:

1. Deal 6 *Hazard* cards in deck face up in the middle of the table.
2. Deal 2 *Mitigate* cards face up to each player.
3. Shuffle the remaining cards.
4. The last person who has seen the Moon goes first.
5. On your turn:
 - a. First play a card from your hand and read it out loud.
 - i. If you have a *Chance* card in your hand, you must play it. Follow the instructions on the card.
 - ii. If you have no *Chance* cards, then you can play one *Mitigate* card face-up onto a matching *Hazard* card (matches are listed on *Hazard* card).
 - b. Then draw new cards to bring your hand up to 2.
 - i. At the end of your turn, if other players don't have 2 cards, they should draw cards until they have 2.

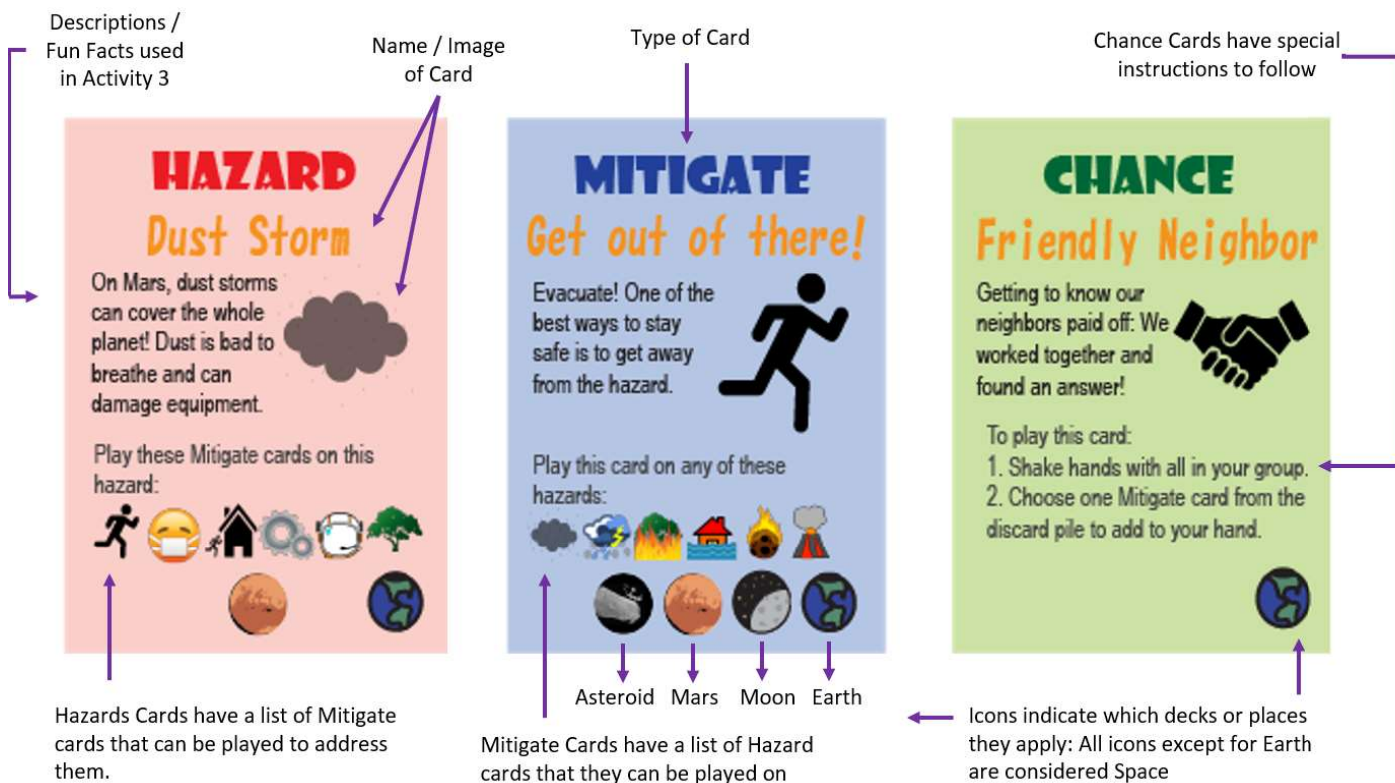
More Tips & Rules:

1. If you have cards that you can't play (and don't have a *Chance* card), you can put them in the discard pile and draw cards until you have 2. Do not play any cards.
2. Play only one card per turn unless a *Chance* card tells you to play more.
3. If you draw a *Hazard* card, place it on the table to mitigate and draw a new card.
4. Once the draw pile runs out, shuffle the discard pile to make a new draw pile.
5. If you have more than one *Chance* card, you can choose which to play first.
6. You can have more than 2 cards in your hand, just don't draw more at the end of your turn.



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Hazards Cards Explanation



Icons:

Each card has its own large image or icon near the top plus rows of other icons listed below. Note that one row of icons indicates potential matches for hazards and mitigation strategies. The other (bottom row) indicates what environment the card is known to apply to. For example, some cards just have an Earth icon, meaning they are only applicable on Earth, but others may have an icon for the Moon, Mars, and/or an asteroid. These environment icons are used by youth in Activity 4, and used throughout the unit by educators to sort the cards into Decks B (Earth icons only), C (Earth and Space icons), and D (Space icons only).

Icons were either designed for this project or taken from Creative Commons for educational and non-commercial purposes.

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Reflect (5 min)

Lead a discussion to reflect on Earth's hazards and how humans have developed ways to mitigate them. Use 2 or 3 of the following questions to guide the discussion:

- » Are there hazards in the card game that are harder to mitigate than others?
Accept all answers.
- » Are some hazards in the real world harder to mitigate than others? *Yes, in the real world, an impact would be harder to mitigate.*
- » Are some hazards in the real world harder to mitigate than others? *Yes, in the real world, a meteor impact would be harder to mitigate.*
- » Are there some mitigations that work for all or a lot of different hazards? *Yes, emergency kit, engineering, and training mitigate all hazards.*
- » What chance events made it easier to solve hazards? *Teamwork helped a lot; Research, early warning system, and friendly neighbors helped too.*
- » Are there multiple ways to mitigate hazards? *Yes, all hazards have at least 2 ways to mitigate them. In real life this is true too; a hazard is better mitigated if you use multiple strategies.*
- » Do you think humans can develop ways to mitigate hazards in space like we have on Earth? *Sure we can! Let's check it out in the next activity.*

