Creation Care in a Maasai Context

Prepared by Suzana Sitayo

Lesson Plan #3) Integrating Climate Science in Maasailand

Context: TEE & Mamas

- This bullet and font style identify comments added by Beth.

Introduction:

The third lesson and follow-up survey

- Welcome to the third of three lessons that are about creation care in a Maasai context to better prevent and prepare for the challenges from climate change.
- This is part of a research project prepared by Mama Anya, a former teacher at MGLSS, that is designed to be a blessing to the Maasai.
- Anonymous surveys were taken at the beginning of lesson 1. After this lesson, the same survey will be taken—anonymously. This follow-up survey is NOT to evaluate you students, but rather the survey will help us teachers know how to improve the effectiveness of the lessons for the future.

Name	**3) Integrating climate science for a Maasai context**	**Teaching Equipment Needed**	➢ BEE: Perhaps some resources, such as a picture of the greenhouse effect may be helpful.
Context	TEE students and Maasai mamas	**Student Supplies/ Handouts**	• Blank paper and pen/pancil

Main Point		**Integrating climate science—that is appropriate for a Maasai context—can help prevent and prepare for the challenges from climate change.**
Learning Outcomes	As a result of this lesson, the learner will:	

Cognitive: Know 	**Climate science** 
	• Know a standard definition of climate change.
	• Know the difference between climate and weather.
	• Know that greenhouse gases (GHG) are the primary source of human-caused climate change.
	• Know what are the sources of GHGs.
	• Know the primary effects of climate change.
	• Know the difference between mitigation (reduction) and adaptation (resilience).
	• Know important ways of mitigation and adaptation that is: 1) informed by climate science and 2) appropriate for a traditional Maasai context.
	
	Maasai 
	• Know best practices of mitigation appropriate for a traditional Maasai context.
	• Know best practices of adaptation for resilience appropriate for a traditional Maasai context.
	• Know the ongoing challenges in Maasai context:
	  ○ Land rights
	  ○ Population growth	

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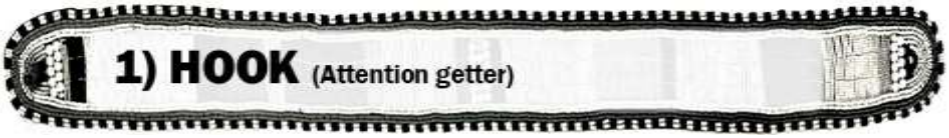
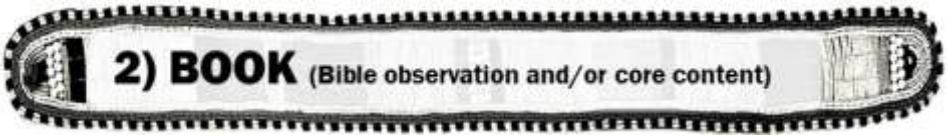
	Hope ➢ BEE: Content on hope is included below, yet it is good to include the learning outcome here. 
Affective: Feel 	• **Equipped** with appropriate knowledge • **Empowered** with knowledge for climate change mitigation and adaptation in Maasailand • **Eager** to make a difference • **Hopeful** for their future, because God loves the world and will never abandon it.
Applicative: Do 	• Identify 3 appropriate ways that one can make a difference in climate change mitigation (reduction) in a traditional Maasai context. • Identify 3 appropriate ways that one can make a difference in climate change adaptation (resilience) in a traditional Maasai context. • Draw a table with two columns and fill the best practices of climate change mitigation on one column and of Adaptation on the second column. (practices that fit in Maasai context.)

Introduction

Welcome to the third lesson on **Integrating Climate Science for a Maasai Context.** These three lessons will enable us to understand the causes and effects of climate change, best practices of mitigation, and best practices of adaptation for resilience.

Time	Content
5	 • The students should form groups of five and discuss the climate changes effects that has occurred in their indigenous environment. • Also, they should compare the environment during their childhood with the current environmental status. • One from each group should present their observation in front of the class.
1	**Transition statement: (connecting Hook to Main Point)** • From the views we head it is clear that there has been changes on our environment, something that affect our natural way of living negatively. • Now let us now see what is happening to our environment from scientific point of view, the knowledge that will enable us to better understand what is going on even outside of our context that affect even us on our land.

➢ need min-utes



Teaching notes: Ask the following 7 questions and guide the discussion, filling in gaps with the content below.

Climate science: Climate change mitigation and adaptation

Let's start by learning core concepts in climate change science.

1. What is climate change?

- Global climate is the average climate over the entire planet.
- Climate scientists are concerned because all over the Earth the climate is changing.
- Any process or event that produces differences to a climate system can create climate change. This can include events such as volcanic eruptions.[1]
- While the climate has changed over the many thousands of years that science has studied, the planet is getting hotter and faster than at any other time in the history of the Earth.[2]
- The main cause of climate change now is a result of human activity. This is called "**anthropogenic climate change,**" which means human-caused climate change.[3]

2. What is the difference between weather and climate?

- **Weather** "is local and temporary. Weather happens at a particular time and place…"
- **Climate** "describes conditions over the long term and over an entire region.
  - "Climate is the **big picture**. It is the big picture of temperatures, rainfall, wind and other conditions **over a larger region and a longer time** than weather."[4]
- So, I will give you some circumstances, and you all tell me if each one is related to **weather or climate.**
  - There was 13 mm of rain yesterday. [Weather]
  - The average high temperature of Arusha in the month of January over the past 25 years is 28 degrees. [Climate]
  - The average rainfall in Arusha for the month of April is 360 mm. [Climate, because the average over many years.]
  - Last week, the average high temperature was 28 degrees. [Weather]
  - Arusha's average annual rainfall is 1,180 mm. [Climate, because the average over many years.]
  - The average windspeed in Arusha yesterday was 5 km per hour. [Weather]

3. What is the primary source of human-caused climate change?

- "The principal way in which humans are understood to be affecting the climate is through the release of **heat-trapping greenhouse gases** into the air."[5]
- Greenhouse gasses can be abbreviated or written as **GHG.**
- These are called greenhouse gasses because **these gasses collect in the atmosphere** and trap the heat that would normally rise into space. Thus, **they warm up the surface of the earth** like a greenhouse keeps warm air in the building.

*Show a picture or draw a simple image of the **greenhouse effect** on the blackboard—based on the image below.*

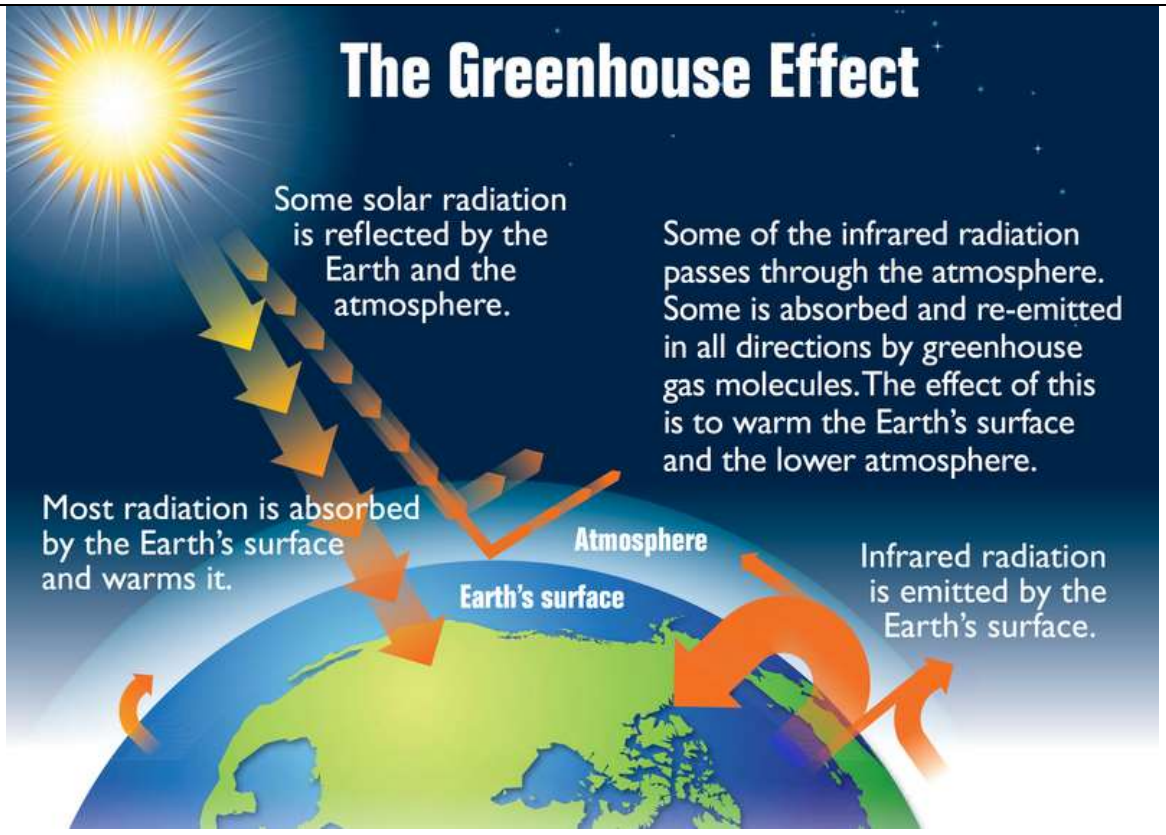


Image source 1: https://commons.wikimedia.org/wiki/File:Earth%27s_greenhouse_effect_(US_EPA,_2012).png; Author US EPA; Public Domain

4. What are the sources of greenhouse gasses (GHG)?[6]

- **Main human-caused GHGs:**
  - **carbon dioxide** (CO_2) is produced by burning fossil fuels, like coal and petrol in cars
  - **methane** (CH_4) is produced by modern agriculture and burning biomass
- **Other common human produced GHGs:**
  - **nitrous oxide** (N_2O) is used in medical uses, rocket propellants, and motorcar racing
  - **ozone** (O_3) is formed by the reaction of sunlight with air containing hydrocarbons and nitrogen oxides
  - **chlorofluorocarbons** (CFCs and HCFCs) are manufactured chemicals found in refrigerants, chemical agents used to make foams such as for mattresses, aerosol propellants in medicinal applications, and degreasing solvents.
- **There are other GHGs** and substances that occur naturally. These include:
  - **water vapor** (H_2O) is caused by evaporation of rain and "contrails" or vapor trails that are straight line clouds following airplanes caused by engine exhaust or changes in air pressure; and
  - **volcanic ash**, caused by eruption of volcanos.

5. What are the primary effects of climate change?[7]

- Trapped heat in the atmosphere as a result of human-produced greenhouse gases is causing **the Earth to heat up.** A hotter Earth causes problems.
- Below are 4 categories of problems, though the impacts may overlap in one or more categories.

1. **Extreme weather events**
   - **Drought** in some areas

- **Floods** and **soil erosion** in other areas
- **Hurricanes and typhoons,** which are more frequent and stronger due to warmer ocean waters.

2. **Effects upon humans**
   - **Famine and food insecurity**, due to droughts and flooding that ruins crops
   - **Freshwater shortages**
   - **Health problems**
     More malaria and other climate-sensitive diseases
     Poor air quality causes respiratory diseases
   - **Heat waves** that are longer and hotter than normal which causes
     Heat related health problems, especially for pregnant and older women
     Death for vulnerable people, especially the sick and elderly
   - **Destruction of homes**, due to flooding and hurricanes
   - **Migration or "climate change refugees"** due to migration caused by lack of water, crop failure, extreme weather, etc.
3. **Impacts on ecosystems**
   - **Africa** is expected to warm up 1.5 times faster than the global average affecting the ecosystems and natural resources.
   - **The rise of sea levels,** due to melting ice caps at the North and South Poles and other icebergs, is destroying coastal communities and some island nations, such as the Marshall Islands, Kiribati, Tuvalu, and the Maldives.
4. **Impacts on national security**
   - Conflicts will increase over limited natural resources, both within regions within a country and between nations.
   - Rivers and their precious waters are often shared resources between regions and nations. Downstream areas have less water.

- While most of the climate crisis has been **caused by large industrial areas** like Europe, USA, and China, the **poorer countries**—like Tanzania—will be more effected!
  - One reason is that many Africans are dependent upon natural resources for their livelihoods.
  - Unfortunately, poorer countries—which will be impacted the most—have the least amount of resources to manage the effects!

6. What is the difference between mitigation and adaptation?[8]

- **Mitigation** measures are those actions that are taken to reduce greenhouse gas emissions.
- **Adaptation** measures are based on decreasing vulnerability to the effects of climate change.
- Thus, **Mitigation** seeks to *reduce* the causes of climate change,
  while **adaptation** seeks to make people more *resilient* or less vulnerable to the impacts of climate change.

7. What are ways of mitigation of and adaptation to climate change that are:

1. informed by climate science and
2. appropriate for a traditional Maasai context.

- Take out a piece of paper and draw a line down the middle of the paper with the left heading of **Mitigation** and the right heading of **Adaptation**.

- I will name different items. Let's discuss them and work together to identify which of these practices are related to climate change **mitigation** (reduction) and/or **adaptation** (increased resilience for climate change impacts).

Teaching notes:

- *Choose from the following lists randomly and guide a discussion.*
- *These lists are too detailed and are provided to support the teacher's understanding. The teacher should not discuss all of these but rather choose the most appropriate items for their group.*
- *Write the findings on the blackboard for later discussion.*
- *This climate science list has a GREY background.*

Mitigation	Adaptation

• **Plant trees** which absorb CO_2 (especially trees that are native to the local area)
Energy efficiency ("reducing the carbon footprint")
• Use more **efficient wood burning cooking stoves** to reduce burning of wood (which puts GHGs into the environment).[9] [See Teaching Notes on burning biomass at the bottom and an example fuel efficient stove.]
• Increase the use of **renewable energy** such as **solar power.**
• Use **energy efficient LED or compact fluorescent lights (CFLs)** instead of old incandescent light bulbs
• **Turn off electrical lights** when not being used.
• Use **public transportation** instead of driving or using fuel-efficient vehicles filled with more people than just one or two.
• Do not idle (run the engine while waiting) automobile engines.
• Governments can buy **electric buses** powered by hydro power for **public transportation.**
• Communities can invest in **solar powered water disinfection system** to reduce the use of plastic bottles, increase health
	Water
	• Develop water harvesting and storage mechanisms[1]
	• In acute water scarcity, temporarily migrate to areas where water is accessible[2]
	• Develop water catchment areas (reservoirs) boreholes, piped water, and dams[3] [See photo below in teaching notes.]
	Food security
	• Put in place food security enhancement strategies[4] (food reserve)
	  ○ The households' ability to purchase food is the most important food security strategy.[5]
	  ○ A reliable income source and asset base is crucial for household response to climate shocks.[6]
	  ○ 58% reported that they resort to selling livestock…in response to shocks.[7]
	Infrastructure resilience
	• More secure house and facility locations
	• Preventive and precautionary measures (evacuation plans, health issues, etc.)
	Ecosystem and landscapes
	• Landscape restoration (natural landscape) and reforestation
	• Using nature to build resilience
	• Conservation of natural ecosystem (biodiversity and water)
	Traditional environmental knowledge (TEK)
	• Identify and sustain indigenous/traditional Maasai knowledge with practices that are good for caring for the environment.
	• "…local knowledge systems and institutions should buttress policy-making and implementation to promote local resilience."[8]

	of the people, reduce burning biomass to boil water.
	• **Reduce the use of plastic bottles** and recycle the bottles that are used.
	  ○ Because single-use plastic is produced from fossil fuels, obtaining and creating these plastics produces large amounts of GHG.
	  ○ Burning plastics puts toxic chemicals into the air and land that is harmful to health.[10] (See footnote!)
	• Use **garbage collection** instead of burning garbage.
	  ○ Burning garbage releases carbon into the air. (See also note on burning plastic above.)
	  ○ Landfills can harvest methane that is produced.
		• "Gradual and medium to long-term livelihood diversification initiative is a highly recommended policy strategy to increase resilience among pastoral communities as opposed to the current policy which condemns pastoralism as a backward and environmentally destructive activity."[9]
		Agro-pastoralism/small-scale agriculture
		• Use flexible and diverse cultivation
		• Develop seed banking[10]
		• Incorporate crops that are more drought resistant than maize, "such as sorghum, pigeon-pea, finger millet, sweet potato and chickpea..."[11]
		Leadership and governance
		• Include women in decision making that affects their and their children's lives to reduce the vulnerability of the entire household
		• Strengthen local traditional leaders as the elders are in charge of resource control and allocation especially during periods of intense scarcity[12] and provide infrastructural, social, legal, and financial support[13]
		• Strengthen the village council[14] for how to seek government support...for infrastructural, social, legal, and financial support.[15]

	Maasai: Which are practices that the Maasai do already? • Take a look at our lists. <u>Underline</u> the things that the Maasai do. • *Below is an edited list of the one above that focuses on Maasai practices.*	

[1] Ndesanjo, Theilade, and Nielsen, 2602. The absence of piped water to be the main determinant of water storage mechanisms. "Water scarcity is a common determinant of migration among pastoral communities." (Berkhout 2012; Brockhaus et al. 2013)." (2603)
[2] Ndesanjo, Theilade, and Nielsen, 2602.
[3] Mwandosya, ix.
[4] Ndesanjo, Theilade, and Nielsen, 2601.
[5] Ndesanjo, Theilade, and Nielsen, 2601.
[6] Ndesanjo, Theilade, and Nielsen, 2602.
[7] Ndesanjo, Theilade, and Nielsen, 2601.
[8] Mark J. Mwandosya, "National Adaptation Programme of Action (NAPA)," 2007, ix, https://unfccc.int/resource/docs/napa/tza01.pdf.
[9] Ndesanjo, Theilade, and Nielsen, 2607.
[10] Ronald Boniphace Ndesanjo, Ida Theilade, and Martin Reinhardt Nielsen, "Pathways to Enhance Climate Change Resilience among Pastoral Households in Northern Tanzania," in *African Handbook of Climate Change Adaptation*, ed. Nicholas Oguge et al. (Cham: Springer International Publishing, 2021), 2601, https://doi.org/10.1007/978-3-030-45106-6_128.
[11] J. Douwe Meindertsma and Jan J. Kessler, eds., 44.
[12] Ndesanjo, Theilade, and Nielsen, 2604.
[13] Ndesanjo, Theilade, and Nielsen, 2605.
[14] Ndesanjo, Theilade, and Nielsen, 2604.
[15] Ndesanjo, Theilade, and Nielsen, 2605.

- *This **Maasai traditional knowledge** list has no grey background.*

Maasai traditional knowledge

Mitigation	Adaptation
Energy efficiency ("reducing the carbon footprint") • *Traditionally:* Not cutting trees. (Live trees take out CO_2 from the air.) • *Some:* **Dig "smile" pits** that "regreen" the area with plants that take out CO_2 from the air (and also reduce soil erosion). [See picture below.] • *Some:* Use more **efficient wood burning cooking stoves** • *Some:* Increase the use of **renewable energy** such as **solar power.** • *Some:* Use **energy efficient LED or compact fluorescent lights (CFLs)** instead of old incandescent light bulbs • *Some:* **Turn off electrical lights** when not being used. • *Most:* Use **public transportation**	**Water** • *Some:* Develop water harvesting and storage mechanisms (reservoirs) • *Some:* In acute water scarcity, temporarily migrate to areas where water is accessible • *Some:* Develop water catchment areas ("smile" pits and reservoirs) and dams **Infrastructure resilience** • *Some:* More secure house and facility locations **Ecosystem and landscapes** • YES! Conservation of natural ecosystem (especially biodiversity) **Traditional environmental knowledge (TEK)** • *Some:* Gradual and medium to long-term livelihood diversification **Leadership and governance** • *Some:* Include women in decision making • *Some:* Strengthen local traditional leaders as the elders are in charge of resource control and allocation • *Some:* Strengthen the village council for how to seek government support…for infrastructural, social, legal, and financial support.

Integrating Climate Science for a Maasai Context

- Which are practices that Maasai don't traditionally do, but these are things that YOU could easily do—some of them without a lot of resources?
- Looking again at our list, let's put a double underline under things that we can do!

This is an edited list of the one above that focuses on things that can be done or encouraged by the students among their family to do in some way. Your lists, developed with students, may have more items.
This list is in GREY again.

Mitigation	Adaptation
• **Plant trees:** (Live trees take out CO_2 from the air.) Importantly, plant trees that are native to the local area. • **Dig "smile" pits** that "regreen" the area with plants that take out CO_2 from the air (and also reduce soil erosion). **Energy efficiency ("reducing the carbon footprint")**	**Water** • *More:* Develop water harvesting and storage mechanisms in the boma • *More:* Develop water catchment areas (reservoirs) boreholes, piped water, and dams **Food security** • *More:* Put in place food security enhancement strategies (food reserve) **Infrastructure resilience** • More secure house and facility locations

	• *More:* Use more **efficient wood burning cooking stoves** to reduce burning of wood • *More:* Increase the use of **renewable energy** such as **solar power.** • *More:* Use **energy efficient LED or compact fluorescent lights (CFLs)** instead of old incandescent light bulbs • *More:* **Turn off electrical lights** when not being used. • Do not idle (run the engine while waiting) automobile engines. • **Reduce the use of plastic bottles** and recycle the bottles that are used. • Use **garbage collection** instead of burning garbage.	• Preventive and precautionary measures (evacuation plans, health issues, etc.) **Traditional environmental knowledge (TEK)** • *More:* Identify and sustain indigenous/traditional Maasai knowledge with practices that are good for caring for the environment. **Agro-pastoralism/small-scale agriculture** • Use flexible and diverse cultivation • Incorporate crops that are more drought resistant than maize, such as sorghum, pigeon-pea, finger millet, sweet potato and chickpea **Leadership and governance** • *More:* Include women in decision making • *More:* Strengthen local traditional leaders as the elders are in charge of resource control • *More:* Strengthen the village council for how to seek government support

**

So, what is ONE thing YOU can do in each category?

- On your paper, circle one thing in each category that YOU can do with your family and friends to make a difference in caring for God's creation?
- Remember that our creation care is motivated by being called by God to care for the creation (Genesis 2:15). As we are reconciled (in a right relationship) with God, the nature of our faith is lived out 1) in peace with others (social justice) and 2) peace with creation (creation care/environmental ethics).
- Let's have two or three students share with the class just one of the things they want to do to make a difference.

Hope

- Knowing that we have a trustworthy and loving God, we can face the challenges of climate change with **hope**.
- First, we know that our Creator, the God of Hope, loves the world, and **God will never abandon it.**
- Second, as followers of Jesus Christ, **we are empowered by the Holy Spirit** to be a blessing to others (social justice) and the creation (environment).
- Finally, even some **scientists and environmentalists are hopeful** that we can all do something little and together it adds up to make a big difference.

  - **Wangarī Maathai**—the Kenyan Nobel Prize winner we talked about at the beginning of the lesson.
    - "The 30 million trees planted by Green Belt Movement volunteers—mostly rural women—throughout Kenya over the past 30 years are

	a testament to the individuals' ability to change the course of environmental history. ▪ "Working together, we have proven that sustainable development is possible; the reforestation of degraded land is possible; and the exemplary governance is possible when ordinary citizens are informed, sensitized, mobilized and involved in direct action for their environment."[11] ○ **Jane Goodall** did research with chimpanzees in Tanzania's Gombe National Park for 30 years (1960–1990s). [See page below.] ▪ "Hope is what enables us to keep going in the face of adversity" *The Book of Hope,* (2022). ▪ "I truly believe, and I'm not alone as a scientist, that we have a window of time when if we get together and take action, we can at lease slow down climate change and loss of biodiversity…**I can't save the world, but what can I do locally?…Whatever it is you care about, get together with some friends and take action. Do what you can do to solve what you are passionate about and you will find you make a difference.**" https://www.youtube.com/watch?v=LXXb5MjPbPI
**	 • Identify 3 appropriate ways that one can make a difference in climate change mitigation (reduction) in a traditional Maasai context. • Identify 3 appropriate ways that one can make a difference in climate change adaptation (resilience) in a traditional Maasai context. • Draw a table with two columns and fill the best practices of climate change mitigation on one column and of Adaptation on the second column. (Practices that fit in Maasai context.)
**	Prayer
**	**End of Class**

➢ BEE: Information about the follow-up survey is required by Beth.

Follow-up survey

- Anonymous surveys were taken at the beginning of lesson 1. After this lesson, the same survey will be taken—anonymously. This follow-up survey is NOT to evaluate you students, but rather the survey will help us teachers know how to improve the effectiveness of the lessons for the future.
- As we lay out the surveys on the table, you will see your animal sticker on the paper. It is the same sticker attached to your first survey with the extra sticker. That sticker is for you!
- This animal sticker system is so that now, when you take the survey again, you can find your animal. We can keep the surveys anonymous but also study individual learning over time (before, after, and a few months later)—not just one large group.
- When you are done with the survey, turn the survey over, so the animal sticker is face down on your desk.
- Let's take the survey. Do not write your name on the survey.

TEACHING NOTES:

Climate Change Mitigation and Adaptation

Mitigation: Focus on greenhouse gases

Mitigation centers on the root cause of climate change: the heat-trapping greenhouse gases humans are adding to the atmosphere faster than our planet can absorb them. These can be addressed by reducing the sources of greenhouse gas emissions, or enhancing "sinks" of greenhouse gases that remove them from the atmosphere.

Reducing sources: Almost three-quarters of humans' greenhouse gas emissions come from burning fossil fuels like coal, oil and natural gas,[2] so mitigation often focuses on replacing those fuels with other sources of energy, like renewables and nuclear power. Mitigation can also tackle other sources of greenhouse gases: protecting forests from being cut down, for instance, or collecting methane from landfills.

Enhancing sinks: Other forms of mitigation, like growing new forests and designing and building "direct air capture" systems, work by taking greenhouse gases out of the atmosphere—sometimes called "carbon removal." These approaches are challenging to do at a very large scale, and they do not eliminate the need to drastically lower our emissions. Still, authorities like the Intergovernmental Panel on Climate Change agree that some carbon removal will be needed to head off the worst climate change scenarios.[3]

Adaptation: Focus on climate impacts

If mitigation is successful worldwide, then one day greenhouse gases will stop building up in the atmosphere, and the planet will slowly stop warming. Even so, we will already have created a hotter world, changed the Earth's weather patterns, and "locked in" some future changes—like sea level rise, which may continue for hundreds of years after the Earth's temperature stabilizes.

Adaptation to these changes will vary from place to place. Often, it involves building or retrofitting infrastructure, like a better storm drain system to manage increased flooding. But adaptation can also include natural solutions, like restoring wetlands to buffer hurricanes, or behavior and policy changes, like growing new food crops that can better handle warmer seasons and droughts.

Ideally, adaptation is proactive, building systems to withstand not only current but future climate change. In Bangladesh, one of the most vulnerable countries in the world to sea level rise and saltwater intrusion, the port city of Mongla is investing in embankments, drainage, flood-control gates and water treatment to get ahead of rising waters, and economic development to provide refuge and work opportunities for thousands of people displaced from nearby towns. Areas that don't take early steps like these will find themselves adapting reactively: rebuilding after climate change has already destroyed buildings, forced people from their homes, and taken livelihoods and lives.

Mitigation and adaptation today

The final aim of mitigation is to stop the buildup of greenhouse gases in the atmosphere altogether and begin drawing them down.

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[1] "Climate Change Mitigation and Adaptation: Simple Guide to Schools in Africa" (UNESCO, United Nations Educational, Scientific and Cultural Organization, 2019), 4, https://unesdoc.unesco.org/ark:/48223/pf0000372168.
[2] "Climate Change Mitigation and Adaptation," 3–4.
[3] "Climate Change Mitigation and Adaptation," 4.
[4] "Climate Change Mitigation and Adaptation," 3.
[5] "Climate Change Mitigation and Adaptation," 4.
[6] "Climate Change Mitigation and Adaptation," 5–6.
[7] "Climate Change Mitigation and Adaptation," 8–12.
[8] "Climate Change Mitigation and Adaptation," 13.
[9] Gunther Bensch, Marc Jeuland, and Jörg Peters, "Efficient Biomass Cooking in Africa for Climate Change Mitigation and Development," *One Earth* 4, no. 6 (June 18, 2021): 879–90, https://doi.org/10.1016/j.oneear.2021.05.015; "Maasai Stoves & Solar Project Supported by International Collaborative," International Collaborative, accessed July 3, 2024, https://internationalcollaborative.org/; "Maasai Stoves," *For Stoves* (blog), 2016, https://www.forstoves.com/what-we-do/maasai-stove/; "Stoves in Action," Maasai Partners, 2024, https://www.maasaipartners.org/stoves-in-action/.
[10] Rinku Verma et al., "Toxic Pollutants from Plastic Waste- A Review," *Procedia Environmental Sciences*, Waste Management for Resource Utilisation, 35 (January 1, 2016): 701–8, https://doi.org/10.1016/j.proenv.2016.07.069. "…plastics is burnt, releasing **toxic gases** like Dioxins, Furans, Mercury and Polychlorinated Biphenyls into the atmosphere. Further, burning of Poly Vinyl Chloride liberates *hazardous halogens and pollutes air*, the **impact of which is climate change.** The toxic substances thus released are posing a **threat to vegetation, human and animal health and environment as a whole**. Polystyrene is harmful to Central Nervous System. The hazardous brominated compounds act as **carcinogens** and **mutagens**. Dioxins settle on the crops and in our waterways where they eventually enter into our food and hence the body system. These Dioxins are the lethal persistent organic pollutants (POPs) and its worst component, 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD), commonly known as agentorange is a **toxic compound which causes cancer and neurological damage, disrupts reproductive thyroid and respiratory systems**. Thus, **burning of plastic wastes increase the risk of heart disease, aggravates respiratory ailments such as asthma and emphysema and cause rashes, nausea or headaches, and damages the nervous system.** Hence, a sustainable step towards tomorrow's cleaner and healthier environment needs immediate attention of the environmentalists and scientists. This review presents the hazards of incineration; open burning of plastics and effects of plastic in water and also a possibility of working out strategies to develop alternate procedures of plastic waste management."

Thus, burning of plastic wastes increase the risk of heart disease, aggravates respiratory ailments such as asthma and emphysema and cause rashes, nausea or headaches, and damages the nervous system.

[11] Maathai, *The Green Belt Movement*, xi.