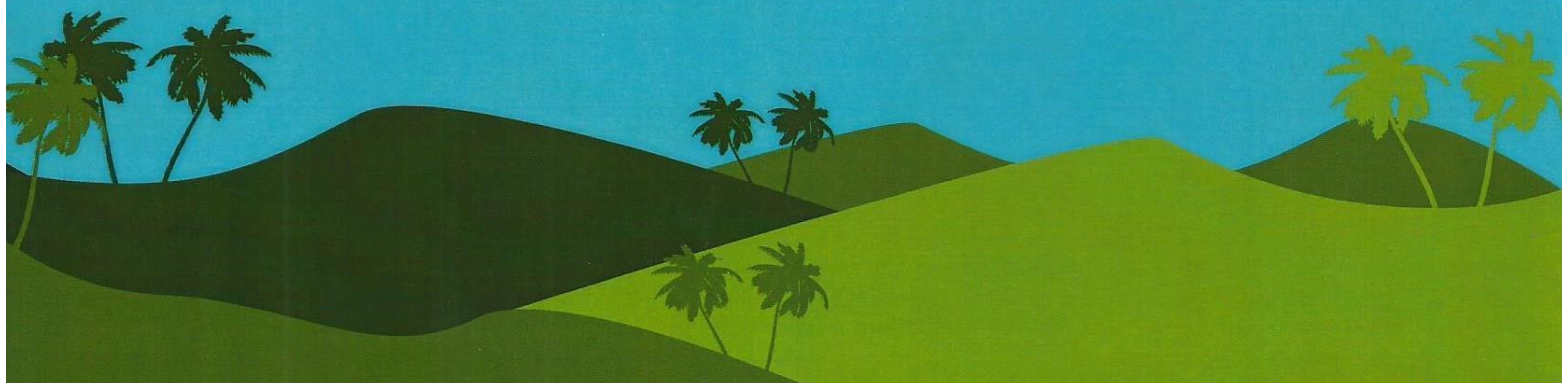




# Learning Resource Materials on **Climate Change**

**auftrag**   
Association of United Filipinos Trained in Germany, Inc.

**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH



# *CLIMATE CHANGE*

## *Learning Resource Materials*

### *Teacher's Guide*

1. There are three types of cards included in this kit, as follows:
  - 40 Knowledge Cards
    - These are question and answer types of cards that progress from simple to complex questions. The answers are integrated in selected subject disciplines and some are aligned to trivia entries.
  - 12 Do Cards
    - These are also called activity cards that allow students to conduct simple experiments, observations, play learning games, etc. with or without the supervision of the teacher.
  - 8 Project-Based Learning (PBL) Cards
    - PBL cards are a set of simple to complex problem-solving applied in real-life situations that require students to use higher order thinking skills. These are highly collaborative and student-centered cards;
2. A matrix that gives a detailed description of each card is found in the succeeding pages. The matrix outlines the type of cards, title, subject area integration and standards used (Department/Ministry of Education of the respective countries and the 21<sup>st</sup> Century Skills).
3. Do not bring the cards outside the schools premises. A teacher, preferably, the Science Coordinator or teacher should be assigned to safe-keep the kit;
4. Students are not allowed to put any marks or write their answers in the card. Answers to some questions must be written on a separate sheet of paper or Subject area notebook;
5. In the Do and PBL Cards, ensure that materials needed to conduct the activities and/or tasks are provided to the students. You may also request your students to bring the materials;

6. Rubrics are used to assess required outputs in all PBL activities. These rubrics can be downloaded at [www.auftrag.org/LRMmaterials](http://www.auftrag.org/LRMmaterials);
7. Journal taking is a very important reflection tool. Require your students to submit journals after accomplishing each PBL or Do Card;
8. Teachers are encouraged to create a separate email account for the purpose of tracking students' performance and for submission of students' outputs;
9. **DO NOT PHOTOCOPY THE CARDS.**

# INDONESIA FLASHCARDS (Lead Teachers)

## KNOWLEDGE

No	Question Side	Answer Side	Type of card	K12 Subject Area Integration	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	What is pollution?	Pollution is defined as a manmade or natural action of turning land, water, air dirty and not fit to use. Pollution affects human life activities and their ways of living (physical, cultural, and economic aspect).	Know	Science, Bahasa	LIS, KTSP-IV-IPA-K10
2	What are greenhouse gases?	Greenhouse gases are gases that do not allow extra heat in the atmosphere to be released into space.	Know	Social Studies	LIS, KTSP-IV-IPA-K10

		<p>As a result, our earth becomes warmer.</p> <p>Examples of greenhouse gases are Carbon Monoxide (CO<sub>2</sub>) and Chlorofluorocarbons (CFC's).</p>			
<b>3</b>	<p>What are possible effects of pollution to human beings?</p>	<p>The possible effects are:</p> <ol style="list-style-type: none"> <li>1. Air pollution that leads to sickness (Asthma, Bronchitis, etc.)</li> <li>2. Soil Pollution that leads to less fertile lands resulting to decrease in farm production</li> <li>3. Water pollution that leads to water-borne diseases.</li> </ol>	Know	Social, Religion, English	LIS, KTSP-IV-IPA-K10
<b>4</b>	<p>What are the possible causes of pollution made by human being activities?</p>	<p>Possible man-made activities that cause pollution:</p> <ol style="list-style-type: none"> <li>1. Land &amp; water: Throwing of garbage</li> </ol>	Know	Social, English	LIS, KTSP-IV-IPA-K10

		<p>that contains methane (CH<sub>4</sub>)</p> <p>2. Air:</p> <ul style="list-style-type: none"> <li>• Using vehicles which bring out smoke containing carbon dioxide (CO<sub>2</sub>)</li> <li>• Using hair spray which contains nitrogen dioxide (NO<sub>2</sub>)</li> </ul>			
<b>5</b>	What can we do to control the increase of garbage in our community?	<p>To control the increase of the garbage, we can:</p> <ul style="list-style-type: none"> <li>• Reduce - limit the use of plastic materials;</li> <li>• Reuse - make use of an empty bottle to make a flower pot;</li> <li>• Recycle - make an organic compost from organic waste.</li> </ul>	Know	Social Studies, Math	LIS, KTSP-IV-IPA-K10
<b>6</b>	What is greenhouse effect?	Greenhouse effect is a process that traps heat from the sun in the atmosphere, enough for the environment to be warm, making life	Know	Science	KD 3.10, LIS

		exist. Without the greenhouse effect, our planet will be as cold as Pluto and no living things will survive.			
7	How do greenhouse gases affect the earth's temperature?	Greenhouse gases affect the earth's temperature when it traps the extra heat from the sun before it escapes to outer space, causing the rise of the earth's temperature.	Know	English, Bahasa	KD 3.10, LIS
8	What are some examples of greenhouse gases found in our atmosphere?	Some examples of greenhouse gases that are found in our atmosphere are:  1. Carbon dioxide – greenhouse gas contains carbon without color and smell  2. Methane – the simplest alkane and the main component of natural gas  3. Nitrogen oxide – It is	Know	Science	KD 3.10, LIS

		<p>an oxide of nitrogen.</p> <p>At room temperature, it is a colorless, non-flammable gas.</p>			
9	<p>How are human activities affecting Global Warming?</p>	<p>Human activities affect global warming when they emit greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>2</sub>).</p> <p>For example: using transportation, household appliances, producing goods and waste without decomposing the waste.</p>	Know	English, Bahasa	KD 3.10, LIS
10	<p>How will you differentiate global warming from climate change?</p>	<p>“Global warming” is continuing increase of the earth’s temperature.</p> <p>“Climate change” refers to changes in climatic conditions (e.g. precipitation, humidity, seasons) over a period of time. Climate change is</p>	Know	Science	KD 3.10, LIS



mainly brought about  
by increase of earth's  
temperature.

## Do and PBL

No	Card Title & Brief Description (game, experiment, individual, group-work, etc)	Type of Card (Activity/Do or PBL)	Instructions	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	4 PICS ONE WORD Team Game Individual	Activity	<ol style="list-style-type: none"> <li>As the 4 Pics 1 Word game suggests, study the four pictures that have something in common.</li> <li>Write the correct words in the boxes based on what you see in the pictures. Write only one letter in each box. Use the letters written on the boxes as clues.</li> </ol>	LIS, KTSP-IV-IPA-K10
2	WORD SEARCH PUZZLE	Activity	<ol style="list-style-type: none"> <li>Search all the words about energy</li> </ol>	LIS, KTSP-VI-IPA-K10

	Team Game Individual		sources. 2. Underline the words that you find. The words can be found across and downward.	
3	CROSSWORD PUZZLE Team Game	Activity	Work in pairs, read the clues and fill out the correct answer to complete the crossword puzzle.	KD 3.10, LIS
4	JAKARTA NIGHTMARE  A Project-Based Learning (PBL) Activity on making Organic Compost	PBL	1. Before doing this PBL, make sure that the students already know the basics of compost and organic waste; 2. Give the students a list of websites where they can find information on how to making compost from organic waste; 3. Give the students list of materials to prepare making compost from organic	LIS, KTSP-IV-IPA-K11

			<p>waste;</p> <p>4. You may engage the assistance of the parents in the activity;</p> <p>5. Schedule a date for the students to present their outputs in Science Fair.</p>	
5	<p><b>HYDROPONICS</b></p> <p>A Project-Based Learning (PBL) Activity on growing vegetables using Hydroponics.</p>	PBL	<p>1. Give the students a list of websites where they can find information on how to planting lettuce with Hydroponic;</p> <p>2. Give the students list of materials to prepare for the hydroponic;</p> <p>3. You may engage the assistance of the parents in the activity;</p> <p>4. Schedule a date for the students to present their outputs first in the school.</p>	<p>KD 3.10, LIS, ICT</p>

# INDONESIA FLASHCARDS (Teacher-Mentees)

## KNOWLEDGE

No	Question Side	Answer Side	Type of card	K12 Subject Area Integration	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	What is water?	Water is liquid matter for living things.	Know	Bahasa Science Math	LIS, KTSP-I-IPA-KD2
2	What are the uses of water for living things?	<p>We use water for :</p> <ul style="list-style-type: none"> <li>▪ Human - drinking, cooking, bathing, planting, cleaning and producing electric energy, such as Microhydro Power</li> <li>▪ Animals - drinking and bathing; “home” of fishes</li> <li>▪ Plants – watering the plants</li> </ul>	Know	Science Math	LIS, KTSP-II-IPA-KD4

3	What are the possible causes of water contamination?	<p>Possible answers:</p> <p>Water contamination happens when:</p> <ul style="list-style-type: none"> <li>▪ Industrial wastes are thrown in the rivers, seas or lakes;</li> <li>▪ Fertilizer wash is dumped into nearby waters or the wash leaks through ground waters;</li> <li>▪ Detergent soaps used for washing clothes are thrown in any body of water;</li> <li>▪ There is continued cutting of trees (deforestation) in our mountainside. Deforestation results to loss of quality water in the soil.</li> </ul>	Know	English Science	LIS, KTSP-III-IPA-KD 4
4	How do we know if the water we drink	Possible answers:	Know	English Science	LIS, KTSP-IV-IPA-KD 5

is contaminated?

The following are ways to know if the water we drink is contaminated:

1. Water is very cloudy, it is not clear;
2. The color may be brownish or yellowish;
3. You can smell chlorine from water coming out of the faucet;
4. There are sediments in the water
5. The water tastes bitter or metallic.

5	What are the various effects of water pollution?	Possible answers:  Some effects of water pollution are:  <ol style="list-style-type: none"><li>1. Diseases among human beings;</li><li>2. Damage in the ecosystem;</li><li>3. Death of fishes</li></ol>	Know	Science Social Studies	LIS, KTSP- IV-IPA-KD 5
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		and other aquatic animals; 4. Disturbance of food chain.			
6	What should we do to prevent water contamination?	Possible answers:  1. Make 'biopori' around the house  2. Do not flush any chemicals, medicines in the toilet  3. Check water pipes at home for any breakage  4. Do not litter or throw garbage anywhere especially in bodies of water  5. Use household products that are friendly to the environment	Know	Trivia	LIS, KTSP-IV-IPA-KD 3
7	What are the three factors that affect climate change?	The three factors that affect climate change are:	Know	Geography Science English	KD 3.2, LIS

- Climate Forcings.  
These natural or manmade factors that “forces” changes in climatic conditions.  
Examples are solar rays, greenhouse effect, aerosols.
- Climate Feedbacks.  
These are processes that enforce or inhibit the effect of climate forcings.  
Examples are clouds, precipitation, greening of forests.
- Climate Tipping Points. This is when the earth’s climate suddenly moves from one stable state to another.  
Examples of which are ocean circulation, ice



		loss and increase of methane emission.			
8	What can we do to reduce the impact of global warming?	<p>Possible answers:</p> <p>To reduce the impact of global warming, we can:</p> <ul style="list-style-type: none"> <li>• Save energy/electricity</li> <li>• Do reforestation</li> <li>• Reduce of carbon emissions</li> <li>• Use of alternative forms of energy</li> </ul>	Know	Geography Chemistry Social studies	KD 3.2, LIS
9	Why will global warming lead to the sinking of small islands?	Global warming will lead to the sinking of small islands (e.g. Kelor Island and Nusa Penida) because melting of two massive ice sheets in Antarctica and Greenland will cause the possible rise of average sea	Know	Geography English	KD 3.2, LIS

		level.			
10	How does global warming affect a storm's strength?	Global warming increases the average temperature of the earth including sea surface temperatures. Storms get their energy from the warm water. As sea surface temperatures rise, developing storms will contain more energy.	Know	Statistics English	KD 3.2, LIS

## Do and PBL

No	Card Title & Brief Description ( game, experiment, individual, group-work, etc)	Type of Card (Activity/Do or PBL)	Instructions	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	MIND MAPPING (about the water source)	Activity	<ol style="list-style-type: none"> <li>1. Work in pairs.</li> <li>2. Choose the right words to fill the blank</li> </ol>	

	Work in pair		on the map.	
2	WORD SEARCH PUZZLE (understanding some common words related to WATER)	Activity	<ol style="list-style-type: none"> <li>1. Individual task.</li> <li>2. Look at the words listed.</li> <li>3. Then find the words in the grid! Words can be horizontal, vertical and diagonal in all eight directions.</li> </ol>	
3	CROSSWORD PUZZLE (on climate change) Team Game	Activity	<ol style="list-style-type: none"> <li>1. Work in pairs.</li> <li>2. Read the clues and fill out the correct answer to complete the crossword puzzle.</li> </ol>	KD. 3.2, ICT
4	PLANT N' GEL  A PBL activity on using diageles as planting materials	PBL	<ol style="list-style-type: none"> <li>1. Explore information about planting technology using gel diapers plus soil on provided website.</li> <li>2. Select proper information.</li> <li>3. Discuss and analyze the information that you are going to use as guidance.</li> <li>4. Prepare all tools and materials needed</li> <li>5. Do experiment by planting three samples</li> </ol>	

			<ol style="list-style-type: none"> <li>6. Observe your experiment <ol style="list-style-type: none"> <li>a. Watch water absorption on three samples</li> <li>b. Watch growth of plants</li> <li>c. Write your observation on observation sheet</li> </ol> </li> <li>7. Take photo and video documentation on the entire process of experiment</li> <li>8. Report the result of activities at the end of project.</li> </ol>	
5	<p>BOGOR SPORTS CENTER</p> <p>A Project-Based Learning (PBL) Activity on designing an environment friendly sports center</p>	PBL	<ol style="list-style-type: none"> <li>1. Give the students a list of websites where they can find information about environmental friendly sport center;</li> <li>2. You may engage the assistance of the parents in the activity;</li> <li>3. Schedule a date for the students to present their outputs first in the school.</li> </ol>	KD.3.2, ICT

# PHILIPPINES FLASHCARDS (Lead Teachers)

## KNOWLEDGE

No	Question Side	Answer Side	Type of card	K12 Subject Area Integration	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	How does volcanic eruption contribute to the formation of acid rain?	Volcanic eruption contributes to the formation of acid rain due to the release of sulfur dioxide during eruption. When sulfur dioxide mixes with water vapor into the atmosphere, it forms into sulfuric acid.	Know	Social Studies, History	LIS, LCS, S4MT-Ia-1, S4MT-Ig-h-6 S4MT-li-j-7, S4LT-IIg-h-14, S4LT-IIi-j-16 S4LT-IIi-j-18, S4ES-IVd-4, S5MT-Ie-g-3
		<i>Social Studies.</i> Land Forms. Mt. Bromo (Indonesia), Mt. Hallasan (South Korea), Mt. Aso			

(Japan), Mt. Fuji  
 (Japan), Mt. Hibuk-  
 hibuk and Mt.  
 Pinatubo (Philippines)  
 are some of the  
 famous active  
 volcanoes found in  
 Asia.

*History:* Mt. Mayon  
 was known for its  
 perfect cone shape  
 before its eruption last  
 August 2014.

2	Name at least three basic contents of a disaster emergency kit.	Possible Answers: <ul style="list-style-type: none"> <li>• Water and food – non-perishables goods such as an easy open canned goods, biscuits, etc.</li> <li>• First Aid Kit – disinfectants, bandage, medicines (non-prescription drugs)</li> <li>• Emergency Tools – flashlight, whistle, batteries, transistor radio with AM band,</li> </ul>	Know	English	LIS, S5FE- Ive- 5
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pocket knife,  
cellphones and  
charger

- Money/cash
- Clothing

*English vocabulary.*

Non-prescription  
drugs are called as  
such because you  
can buy them without  
bringing a prescription  
issued by a doctor.

They are sometimes  
called over-the-  
counter,  
or OTC, medicine.

Non perishable  
goods. Foods that do  
not easily get spoiled  
or decayed.

3	How can climate change cause soil erosion?	Climate change causes irregularity of rain patterns which can lead to excessive rain fall that brings about soil erosion.  <i>Did you know?</i> Soil erosion causes	Know	Science	LIS, LCS, S5FE-IVb-2
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		<p>siltation which destroys aquatic life. The eroded soil particles called silt prevents the sun from penetrating into the water hence, preventing the aquatic plants to do photosynthesis and produce food for the aquatic animals.</p>			
4	<p>Why are mangroves, seagrass beds and coral reefs important to the coastal and marine ecosystem?</p>	<p>Mangroves, seagrasses and corals are important to the coastal and marine ecosystem because they absorb carbon dioxide to help them produce their own food; thereby producing organic materials and Oxygen as by-products which all living things need to survive.</p> <p><i>Geography. Tourist destination.</i> The Tubbataha Reef, a</p>	Know	Geography	LIS, LCM, S6MT-III-j-5, S6MT-III-k-l-6



		UNESCO world heritage site, is the largest coral formation in the Philippines. It is found in the eastern part of Sulu Island.			
5	Why does global warming contribute to climate change?	Global warming contributes to climate change because of the increase of temperature caused by greenhouse gases that prevent the light of the sun from bouncing back from the Earth's surface; thereby trapping the heat in the atmosphere.	Know	Chemistry	LIS, LCM, S7ES-IVd-5
		<i>Did you know?</i> Methane, Sulfur Dioxide and Nitrogen Oxide are some of the greenhouse gasses that also contribute to global warming. They are commonly produced by factories			

		and cars that burned fossil fuels.			
6	Name simple ways that help curb down the emission of carbon dioxide in the environment.	<p>There are more than a hundred ways of curbing down the emission of CO<sub>2</sub> in the environment. Some of these are:</p> <ol style="list-style-type: none"> <li>1. Turning off the lights and appliances when not in use;</li> <li>2. Unplugging appliance wires when not being used;</li> <li>3. Fanning oneself instead of using the air conditioning unit when feeling warm;</li> <li>4. Walking or riding on a bicycle instead of riding in a car;</li> <li>5. Planting trees and mangroves.</li> </ol> <p><i>Did you know?</i></p> <p>E-trikes are now being used in Boracay Island to ferry guests and tourists from one</p>	Know	Social Studies	LIS, LCM, S6MT, S8LT-IVj-25

		location to another; making this famous tourist destination as one of the very first islands in the world to use green transportation.			
7	What will happen if there is too much Carbon dioxide in the atmosphere?	Greenhouse effect occurs.  Too much carbon dioxide trap the heat that should bounce back to space. On the other hand, a certain amount of CO <sub>2</sub> is vital for plant growth which emits Oxygen that we, humans need to survive.  <i>TLE.</i> Greenhouse refers to generating plants in a controlled environment.	Know	Chemistry, Biology	S9ES-IIIe-30
8	Which of the following would	B. Increased rainfall in the Southeastern	Know	English	S9ES-IIIe-31

<p>most likely to occur in a La Niña event?</p> <p>A. Increased rainfall in the Northwestern part of Asia</p> <p>B. Increased rainfall in the Southeastern part of Asia</p> <p>C. Increased sea surface temperature in Southeastern part of Asia</p> <p>D. Increased sea surface temperature in the Northwestern part of Asia</p>	<p>part of Asia</p> <p>La Niña is brought about by the pushing of the warm waters west by the Easterly Trade winds in the Central Pacific and Eastern Tropical Pacific Coast. As this happens, the cooler waters underneath is pushed to the top causing a decrease of temperature in sea surface temperature (3-5 degrees Celsius). This decrease in sea surface temperature brings more rains in the southeastern parts of the world like the Philippines, Indonesia and Malaysia. Usually, La Niña occurs every 2-7 years and sometimes follows an El Nido event.</p>
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*Did you know?*

While increase rainfall is thought to affect severely the fishing industry, the opposite happens in Peru. Due to changes in temperature, the Peruvian seawaters near its coasts become warmer, plus the winds bring a lot of fish food, attracting variety of fishes to the sea surface. This results to a very lucrative fishing industry during these conditions.

9	What are some impacts of climate change to people and animals?	Some of the impacts of climate change are the following: <ul style="list-style-type: none"><li>• Stronger typhoons that may lead to loss of lives;</li><li>• Disruption of economic activities;</li><li>• Deterioration of health;</li></ul>	Know	Araling Panlipunan	S9ES-IIIE-31, LIS, LCS
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- Extinction of some animals; and,
- Destruction of agricultural crops.

*Araling Panlipunan*

*(Ekonomiks)* The Philippines is rich in natural resources but some of these resources were destroyed by the occurrence of strong typhoons like Sendong. (Washi, Dec 2011) and Yolanda (Haiyan, Nov 2013). TS Sendong left a death toll of 1,263 while Typhoon Yolanda resulted to a devastating loss of 6,300 lives.

<p><b>10</b> What are some socio-economic factors that negatively affect the environment?</p>	<p>Some of the following socio-economic factors that negatively affect the environment are:</p>	<p>Know</p>	<p>English, Math</p>	<p>S10LT-III-42, LIS, LCS</p>
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1. Population explosion
2. Excessive  
Commercialization
3. Industrialization

*English. Population Explosion.* A large increase in population size.

*Math.* Thomas Robert Maltus, a population expert said, that the world's population is doubling in Geometric sequence which increases by multiplication (1,2,4,8,16...), while food production doubles in Arithmetic sequence which increases by addition (1,3,5,7,9). This means that there will come a time that our food supply cannot anymore feed the ever rising population.

## Do and PBL

No	Card Title & Brief Description (game, experiment, individual, group-work, etc)	Type of Card (Activity/Do or PBL)	Instructions	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	WORD SEARCH PUZZLE Team Game Individual	Activity	<ol style="list-style-type: none"> <li>1. Find all the words related to climate change that are hidden within the puzzle.</li> <li>2. To make the game more interesting, you can try to solve the puzzle in the shortest time possible. The word list will show you all the words that are hidden in the puzzle.</li> </ol>	4-IVD-S5FE,LIS
2	Grove It! Team Game	Activity	<ol style="list-style-type: none"> <li>1. Prepare all the needed materials.</li> <li>2. Follow the instructions as indicated in the cards.</li> <li>3. Write down the</li> </ol>	S5FE-IVB-2, S6MT-IIK-L-j-5, S6MT-Iik-I-6, S8LT-IVj-25, LIS, LCS



			observations based on the guide questions given.	
<b>3</b>	A Glass House, Anyone? Team Game	Activity	<ol style="list-style-type: none"> <li>1. Prepare all the needed materials.</li> <li>2. Follow the instructions as indicated in the cards.</li> <li>3. Write down all readings in a piece of paper, based on the questions provided.</li> </ol>	S7ES-IVD-6, LIS
<b>4</b>	IT'S NOW OR NEVER  A Project-Based Learning (PBL) Activity on a production of a BIG BOOK about human activities that may lead to Climate Change	PBL	<ol style="list-style-type: none"> <li>1. Before doing this PBL, make sure that the students already know the human activities that may lead to climate change;</li> <li>2. Give the students a list of websites where they can find information related to climate change;</li> <li>3. Give the students list of materials to prepare making compost from organic waste;</li> <li>4. You may engage the</li> </ol>	S6MT-1ii-J-5, S6MT-1Ik-I-6, S8LT, IV-j25, LIS, LCS

			<p>assistance of other experts in the activity;</p> <p>5. Schedule a date for the students to present their outputs in Science Fair.</p>
5	<p>PROJECT READY</p> <p>A Project-Based Learning (PBL) Activity on creating community awareness about climate change through brochure production</p>	PBL	<p>1. Give the students a list of websites where they can find information on how to create awareness in the community about climate change;</p> <p>2. Allow the students to meet with the local disaster preparedness team to help them provide inputs in relation to community awareness;</p> <p>3. You may engage the assistance of other experts and parents in the activity;</p> <p>4. Schedule a date for the students to present their outputs first in the school.</p>

S6MT-1ii-J-5,  
S6MT-1Ik-I-  
6,S8LT,IV-  
j25,LIS, LCS

# PHILIPPINES FLASHCARDS (Teacher-Mentees)

## KNOWLEDGE

No	Question Side	Answer Side	Type of card	K12 Subject Area Integration	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	How do human activities affect the human ecosystem?	<p>Possible Answers:</p> <p>The destructive practices of people destroy the balance of the ecosystem. It includes the following:</p> <ul style="list-style-type: none"> <li>• <b>Illegal and logging</b> that can lead to deforestation or loss of trees. This results to soil erosion, flash floods, destruction of homes of the animals, disturbance in the cycles in nature, and rise in surface temperatures. Soil erosion can lessen the fertility of the soil.</li> <li>• <b>Muro Ami</b> is a way of catching fish by pounding the coral reefs</li> </ul>	Know	English	S4LT-IIIJ-16, S4LT-IIIJ-18

to let the fishes come out. This can damage/destroy the coral reefs which takes a whole lifetime to form. Coral reefs serve as food and at the same time, shelter and breeding ground of marine organisms.

- **Use of cyanide** can kill small fishes.
- **Dynamite fishing** can kill small fishes and damage coral reefs.
- **Improper waste disposal** causes pollution of land, water and air. It can clog drainage systems which can cause flashfloods during heavy rains.

*English. Definition.* Ecosystem is a community in which living and non-living interact.

2	Why do we need to protect and conserve estuaries (river mouth) and seashore zones?	<p>Answer:</p> <p>There is a need to protect and conserve estuaries and coastal zones because these are the habitat and breeding grounds of some aquatic animals.</p>	Know	Filipino Geography	S5LT-IIJ-10, LIS, LCS
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*Filipino. Definition.* Estuary – wawa. Ayon sa isang

manunulat, ang mga wawa sa Pilipinas ay hindi masyadong binibigyan ng kahalagahan ng ating pamahalaan.

*Geography.* St. Lawrence River of Canada is the world's largest estuary.

- 3** What are the categories of a tropical cyclone (typhoon)?
- According to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (Pag-asa), Tropical cyclone (typhoon) categories in the Philippines include the following:
- Know Science Social Studies English S8ES-IID-18, LIS

Type of tropical cyclone	Initial	Wind velocity
Tropical depression	TD	Maximum sustained wind of up to 61 km per hour
Tropical storm	TS	Maximum wind of 62 km to

		88 km per hour
Severe Tropical Storm	STS	Maximum wind of 89km to 117 km per hour
Typhoon	TY	Maximum wind of 118 km to 220 km per hour
Super Typhoon	STY	Wind of more than 220 km per hour

The word Depression is a homograph. A homograph is a word spelled and pronounced the same way but may take on several meanings:

**Psychology.** It is the state of extreme sadness

**English.** It is an area which is lower than the rest of the areas.

**Ekonomiks.** It is a period where

business activities are so low.

4	<b>When can a cyclone be called a hurricane or typhoon?</b>	Typhoon and hurricane are synonyms. Their difference lies on which part of the Pacific the term is used. Typhoon is used in the northwestern part of the Pacific Ocean, while hurricane is used in the northeastern part of the Pacific Ocean.	Know	Geography English	S8ES-IID- 18, LIS
<p><i>Trivia:</i></p> <p>Typhoon Yolanda, (international code name: Haiyan) that hit Tacloban, Philippine on November 8, 2013 is yet the world's biggest tropical storm that made landfall. It caused major damages in agricultural crops, telecommunication systems and infrastructures, not to mention, loss of thousands of lives and homes.</p>					
5	<b>Why is the melting of the ice bergs in the arctic region an</b>	Climate change causes an increased temperature in the atmosphere which results to the melting of ice bergs in the Arctic	Know	Chemistry	S9ES-IIIF- 31, LIS, LCS

evidence of climate change?

Region.

*Did you know?*

According to the Environmental Protection Agency, the melting of the icebergs brought about by climate change in about 100 years caused the sea level to rise to six to eight inches.

6	In what ways are humans changing the composition of the atmosphere?	<p>Possible Answers:</p> <ul style="list-style-type: none"><li>• Increased use of coal, natural gas and oil called “fossil fuels” that are used primarily to run our cars and make our factories work , are the top contributing factors by which human beings add more CO<sub>2</sub> in our atmosphere.</li><li>• The slash and burn method in clearing our forests to be used for agricultural lands are also significant factors.</li></ul>	Know	Science	S9ES-IIIIE-30
		<p><i>Did you know?</i></p> <p>Fossil fuels come from dead organisms that formed over time. They are non-renewable, which means, the continued use</p>			



of these resources will lead to its depletion.

7	<b>In relation to climate change, what is the vital role of carbon dioxide in the atmosphere.</b>	<p>Answer:</p> <p>Carbon Dioxide is the main contributor of the greenhouse effect. If maintained in average levels, they are useful because they trap heat in the atmosphere that we need to sustain life. However, any change in its content could change temperatures in the atmosphere. For example, too much CO<sub>2</sub> will mean more heat will be trapped, thus leading to global warming.</p> <p><i>Science.</i> Land, plants and the ocean have taken up about 55% of the extra carbon people have put into the atmosphere while about 45% has stayed in the atmosphere. Most likely, the land and oceans will take up most of the extra carbon dioxide, but as much as 20% may remain in the atmosphere</p>	Know	Science, TLE	S9ES-IIIF- 31, LIS
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for many thousands of years.

*TLE.* Aside from being a main contributor of the greenhouse effect, carbon dioxide is also used in refrigeration, carbonated drinks and fire extinguishers.

8	How can we increase the capacity of the earth to absorb carbon?	<p>Answer:</p> <p>We can increase the capacity of earth to absorb carbon through biological carbon sequestration or biosequestration. Examples of this are:</p> <ol style="list-style-type: none"><li>1. Reforestation;</li><li>2. Forest Protection;</li><li>3. Use of biochar to make soil more productive;</li><li>4. Protection and/or propagation of seagrasses – known to be examples of plants that absorb carbon dioxide.</li></ol> <p><i>English.</i> Definition.</p> <p>Sequestration. To remove or isolate. The sequestration of squatters' land led to a civil protest.</p>	Know	English Science	S9ES-IIIIE- 31, LIS
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*Science.* Chemistry. The removal of a chemical in the atmosphere and isolating it in a temporary storage area.

9	Aside from carbon dioxide, what other trace gases contribute in the changing of atmospheric conditions?	Answer:  The trace gases that contribute in the changing of the atmospheric conditions are: methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), and certain types of chlorofluorocarbons (CFCs). These gases, aside from CO <sub>2</sub> also trap the sun's heat in the earth's atmosphere.	Know	Science	S9ES-IIIF-31
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*Did you know?*

There are other trace gases that come from natural phenomena such as forest fires, volcanic eruptions and lightning strikes. Nitric oxide and sulfur dioxide comes from these sources. Sulfur dioxide which is emitted from erupting volcanoes is also known to have cooling effect on the earth's atmosphere.

10	How can aerosols influence global climate change?	Answer:	Know	English TLE Science	S9ES-IIIIE- 30, LIS
		<p>Aerosols can influence climate change when they reflect the sun's rays back to space. This happens when Sulfur Dioxide (SO<sub>2</sub>) comes in contact with water. The contact results to the formation of Aerosols (H<sub>2</sub>SO<sub>4</sub>). The aerosols make the clouds brighter through the formation of tiny cloud droplets that create the reflection effect. The more small droplets are formed, the more the clouds' brightness increases. Thus, more sunlight is reflected back to space.</p>			
		<p><i>English.</i> Definition. Aerosols – are solid particles and liquid droplets suspended in the atmosphere like air pollutants, fog, smoke, etc.</p>			
		<p><i>TLE.</i> It is best not to use aerosols or sprays at home when somebody is pregnant. Aerosols contain volatile substances which maybe harmful to the baby.</p>			

*Science.* Scientists agree that aerosols have masked 50% of the warming effects of greenhouse gases in the atmosphere.

## Do and PBL

No	Card Title & Brief Description (game, experiment, individual, group-work, etc)	Type of Card (Activity/Do or PBL)	Instructions	Standards Integration based on Deped Curriculum & 21 <sup>st</sup> Century Skills
1	Who's Who? Team Game Individual	Activity	1. Discover who will be greatly affected by climate change 2. Answer the puzzle given.	S4MT-Ia-1, S4MT-Ig-h-6 S4MT-li-j-7, S4LTIIg-h-14 , S4LT-Ili-j-16 S4LT-Ili-j-18, S4ES-IVd-4, S5MT-Ie-g-3, LIS, LCS
2	Which house should I live?	Activity	1. You are divided into 3 groups. Each group is assigned one disaster	S5FE-IVB-2, S6MT-IIK-L-j-5,

<p>Team Game</p>		<p>area. The areas are: a coastline village that is usually hit by water surges /tsunamis, a village always hit by flashfloods, a mountain barangay that always experiences landslide.</p> <ol style="list-style-type: none"> <li>2. Each group should research in the internet about what types of houses should one build in these areas.</li> <li>3. Design your houses and show the designs of each house in class with a brief description.</li> <li>4. Vote the best designed house.</li> <li>5. 5. Winners will be given prizes</li> </ol>	<p>S6MT-IIk-I-6, S8LT-IVj-25, LIS, LCS</p>
<p>3 4 PICS ONE WORD Team Game Individual</p>	<p>Activity</p>	<ol style="list-style-type: none"> <li>1. As the 4 Pics 1 Word game suggests, study the four pictures that have something in common.</li> </ol>	<p>S7ES-IVD-6, LIS</p>

			<p>2. Write the correct words in the boxes based on what you see in the pictures. Write only one letter in each box. Use the letters written on the boxes as clues.</p>	
4	<p>FASHION JUNK SWANK</p> <p>A Project-Based Learning (PBL) Activity on community awareness for climate change adaptation</p>	PBL	<p>1. Before doing this PBL, make sure that the students already know the human activities that may lead to climate change;</p> <p>2. Give the students a list of websites where they can find information related to climate change;</p> <p>3. Give the students list of materials to prepare making compost from organic waste;</p> <p>4. You may engage the assistance of other experts in the activity;</p> <p>5. Schedule a date for the students to present their outputs in</p>	<p>S6MT-III-j-5, S6MT-IIk-l-6, S8LT-IVj-25, S7ES-lvd-5,</p>

Science Fair.				
5	Amazing Us!  A Project-Based Learning (PBL) Activity for creating community awareness on climate change.	PBL	<ol style="list-style-type: none"> <li>1. Give the students a list of websites where they can find information on how to create awareness in the community about climate change;</li> <li>2. Allow the students to meet with the local disaster preparedness team to help them provide inputs in relation to community awareness;</li> <li>3. You may engage the assistance of other experts and parents in the activity;</li> <li>4. Schedule a date for the students to present their outputs first in the school.</li> </ol>	S6MT-III-j-5, S6MT-III-k-l-6, S8LT-IVj-25,S7ES-lvd-5, Science, TLE, Math