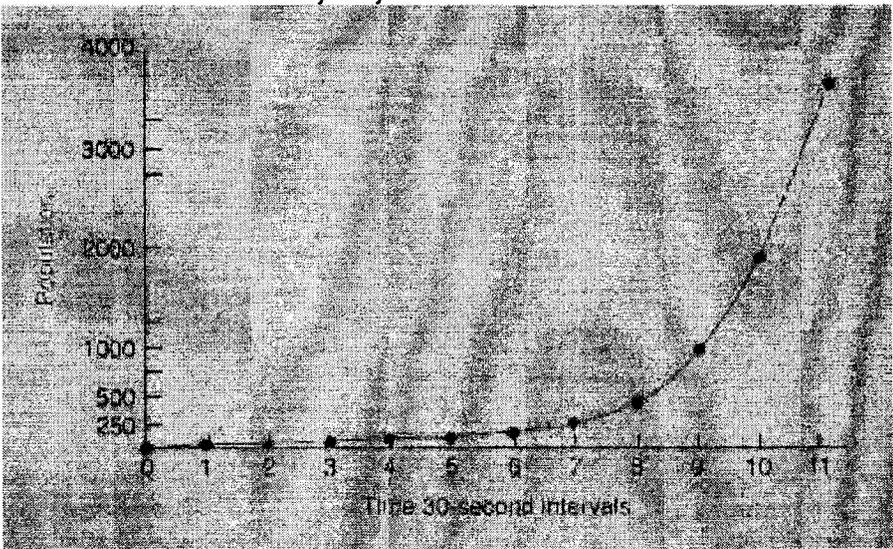


## Proposed K to 12 Lesson Plan Template

Name of Teacher	Misael G. Borgonia		Grade/Year Level	Grade 9
Learning Area:	Science	Quarter:	3	Module: 2
<b>Competency:</b> Explaining the effect of the exponential nature of population growth on the climate of an area.				
Lesson No. 1				Duration: (minutes/hours) 1 h
Key Understandings to be developed	Rapid population growth exposes people to risks due to climate change.			
Learning Objectives	Knowledge	Explain the exponential nature of population growth that affects the climate of an area.		
	Skills	Develop a model of the exponential nature of population growth.		
	Attitudes	Display awareness on the effects of rapid human population growth on climate change.		
Resources Needed	<p><b>Each group of 8 or 10 students will bring the following:</b></p> <p style="padding-left: 20px;">Approximately 100 small, uniformly shaped objects (e.g. kernels of corn, dried beans, wooden markers, plastic beads or any material)</p> <p style="padding-left: 20px;">10 paper cups or small beakers</p> <p style="padding-left: 20px;">A 250-ml or 400-ml beaker</p> <p style="padding-left: 20px;">Sample Population Growth Graph</p> <p style="padding-left: 20px;">Sample Model of the Exponential Nature of Population Growth</p> <p><b>PC &amp; Projector, Marker, Manila paper, Bond paper, White board pen/Chalk, 15 pcs. bell pepper</b></p>			
Elements of the Plan	Methodology			
<b>Preparations</b> - How will I make the learners ready? - How do I prepare the learners for the new lesson? - How will I connect my new lesson with the past lesson?	<b>Introductory Activity</b> (5 minutes)	<b>Present varied pictures of man showing the different ages of time.</b> <ul style="list-style-type: none"> <li>• Modern Man, Stone Age Man, Iron Age Man</li> </ul> <b>Say:</b> Describe each picture. <b>Ask:</b> How long have human beings been on earth? How do you compare the early rate of human population growth with the current population growth rate? Was there an increase or decrease of the population growth rate? Why did this rate change?		
	<b>Activity</b> (10 minutes)	<b>Group Activity:</b> Let each group complete the following activities. (Present this through a PPT or this will be written in a manila paper) <ol style="list-style-type: none"> <li>1. Place the glass beakers on their desk/table.</li> <li>2. Begin by placing two objects (e.g., corn or plastic beads) in it. [The beaker represents the limits of an ecosystem or ultimately the earth.]</li> <li>3. Place 10 cups in a row on their desk/table.             <ul style="list-style-type: none"> <li>o In the first cup, place two objects.</li> <li>o In the second cup, place twice as many objects as the first cup.</li> <li>o Have students record the number of objects outside of the cup.</li> </ul> </li> <li>4. Continue this procedure by placing twice as many objects as in the former cup, or doubling the number, in cups 3 through 10.</li> <li>5. At an interval of 30 seconds, add the contents of cups 1 through 10.</li> <li>6. Complete the procedure and graph the results as total population/number of objects versus time.</li> </ol>		

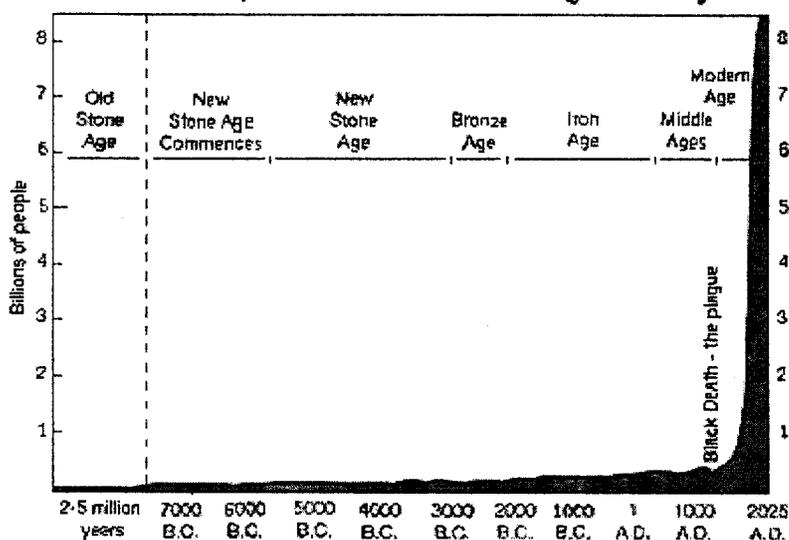
		<p><b>Note:</b> Students may question the need for the 30-second intervals. The length of the time interval is arbitrary. Any time interval will do.</p>  <p style="text-align: center;">Sample Population Growth Graph</p>
	<p><b>Analysis</b> (5 minutes)</p>	<p><b>Say:</b> Explain the results of your activity. (Call 1 or 2 students to answer each of the following questions.)</p> <ol style="list-style-type: none"> <li>1. Describe the pattern shown in the graph.</li> <li>2. What happened when the original number of objects is increased at an interval of 30 seconds?</li> <li>3. Is the pattern shown in your graph relevant to the human population growth?</li> <li>4. What will be the impact of the exponential nature or increasingly rapid rate of population growth?</li> </ol> <p><b>Note:</b> The teacher will synthesize all the responses of the students.</p>
<p><b>Presentation</b></p> <ul style="list-style-type: none"> <li>- (How will I present the new lesson?)</li> <li>- What materials will I use?</li> <li>- What generalization /concept /conclusion /abstraction should the learners arrive at?</li> </ul>	<p><b>Abstraction</b> (15 minutes)</p>	<p><b>Ask:</b> What is the effect of the exponential nature or increasingly rapid rate of population growth on climate change? (Rapid population growth exposes people to risks due to climate change.)</p> <p><b>Teacher Input:</b> Show on the screen through a PPT or manila paper the following:</p> <p><b>Exponential growth:</b> the change that occurs when an original amount is increased by a consistent rate over a period of time.</p> <p>The increase in the size of a population (such as the human population) is an example of <b>exponential growth</b>.</p> <p><b>Ask:</b> What is the impact of high human population rate on the environment? (The high population rate can affect the climate of an area or it will cause the climate to change.)</p> <p><b>Rapid population growth</b> exacerbates vulnerability to the negative consequences of climate change, and exposes growing numbers of people to climate risk. Population growth is also one of the drivers of the growth in greenhouse gases that contribute to climate change.</p> <p><b>Global Climate Change: Recent Impacts</b><sup>7</sup></p>

Phenomena	Likelihood that trend occurred in late 20th century
Cold days, cold nights and frost less frequent	Very likely
More frequent hot days and nights	Very likely
Heat waves more frequent over most land	Likely
Increased incidence of extreme high sea	Likely
Global area affected by drought has increased	Likely in some regions
Increase in intense tropical cyclone activity in	Likely in some regions

\* Excluding tsunamis, which are not due to climate change.

Source: <http://climate.nasa.gov/effects/>

### World Population Growth Through History



**Note:** The graph showing the world population growth is an example of exponential growth.

**Practice**  
- What practice exercises/application activities will I give to the learners?

**Application**  
(20 minutes)

**Group Activity:**

- Give 1 corn cob to each group.
- Let the group members remove the kernels from the corn cob.
- Let them count all the kernels and record on the given Table.

Projected Growth of Corn Plants	
Total number of corn kernels per cob	50 Kernels
Total number of projected corn plants that will be produced at year 0.	50 Corn Plants
Number of corn plants Year 1	
Number of corn plants Year 2	
Number of corn plants Year 3	
Number of corn plants Year 4	
Number of corn plants Year 5	

**Ask:** What will happen to the number of corn plants in the succeeding years? (There will be an exponential growth or big increase in the number of corn plants through the years.)

**Teacher Input:**

Using the pattern of population growth of corn plants, predict the human

population of your province in the year 2020, using the table below as basis.

Province	Capital	No. of Cities	Population (May 2010) <sup>11</sup>
Bohol	Tagbilaran	1	1,255,128
Cebu	Cebu City	9	2,619,362
Negros Oriental	Dumaguete	6	1,286,666
Siquijor	Siquijor	0	91,066

Source: [http://en.wikipedia.org/wiki/Central\\_Visayas](http://en.wikipedia.org/wiki/Central_Visayas)

- Is the current growth rate of the human population sustainable? Why?  
(No, the exponential growth cannot be sustained because resources are limited.)
- As students, how can you help minimize the consequences of climate change?  
(Meeting people's needs for family planning and reproductive health builds resilience to climate change impacts. Meeting family planning needs will also stem population growth, easing challenges associated with adapting to climate change impacts and reducing the growth of greenhouse gas emissions.)

<b>Assessment</b>  (Refer to DepED Order No. 73, s. 2012 for the examples)	Assessment Matrix			
	Levels of Assessment	What will I assess?	How will I assess?	How will I score?
	Knowledge			
	Process or Skills			
	Understanding(s)			
	<b>Products/performances (Transfer of Understanding)</b>	The effects of rapid population growth on climate change.	Write at least 2 paragraphs on the effects of rapid population growth on climate change.	<b>Criteria:</b> Organization-25 Content- 50 Relevance- <u>25</u> <b>Total</b> 100
<b>Assignment</b>	Reinforcing the day's lesson			
	Enriching the day's lesson			
	Enhancing the day's lesson			
	Preparing for the new lesson	What is climate change? Do Activity 7, LM pp.		
<b>Concluding Activity (Optional)</b>	Wrap-up			
	Finale			

Prepared by:

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Member, HRDD