Integrating Climate Change into the Ethiopian Curriculum

An Annotated Guideline for Curriculum Developers

This annotated guide is prepared to assist curriculum developers in their effort to integrate climate change into the Ethiopian National Curriculum. The guide contains preferences of subjects that could be the courier and some exemplars on how to integrate climate change education in all subjects. It has to be used along with its two annexes – the content flowchart and the syllabi for grades 1-12.

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1. INTRODUCTION

Climate change (CC) affects every country in the world. Preventing or slowing down CC is one of the greatest challenges we are facing this century.

CC includes the serious changes in weather and climate patterns. These changes affect rainfall, and they can cause extreme weather events such as storms, droughts and rising sea levels. CC means that temperatures rise higher and faster than can be explained by the sun's activity.

Climate change is expected to have significant impacts on the economy of Ethiopia which is highly dependent on climate-sensitive activities such as rain-fed agriculture and livestock production. National income from exports, such as coffee, pulses, flowers and animal products, is likely to be reduced if climate change continues.

Drought has many impacts on Water, Sanitation and Hygiene (WASH) in Ethiopia. Water scarcity reduces access to clean drinking water, deters people from bathing and hand washing, and restricts the use of water-flushed toilets. People are forced to use unsafe water sources, or walk long distances to collect water, otherwise they must buy it, which adds to poverty and so increases the risk of disease and also causes children to miss schooling.

Floods also have many impacts on WASH in some parts of Ethiopia. Flood water spreads pollutants and disease-causing organisms from latrines, areas of open defecation and damaged sanitation lines and waste treatment facilities.

Droughts and floods cause losses of human life and livestock, damage to homes, businesses and infrastructures, erosion of soils, grassland and farmland, and loss of productivity. Many diseases of humans and livestock are increasing because of the indirect effects of climate change.

Climate change can affect human health both positively and negatively, but the negative health impacts are expected to exceed the positive effects. Changes in temperature, precipitation and weather extremes (such as heat waves) can affect people directly, whereas indirect health impacts result from changes to natural and social systems caused by climate change.

Climate change is expected to have a greater impact in low-income countries such as Ethiopia because of low numbers of trained people, poor infrastructures and limited economic capability to respond to the challenges. Climate change is also expected to reduce biodiversity because it has impacts on the environment and climatic conditions that threaten the survival of endangered plants and animals.

Experts around the world agree that human activities contribute a great deal to CC. In the past few decades, our activities have caused greenhouse gases (GHG) to rise to their highest level in 420 000 years. Even if we control emissions of these gases now, scientists say that rising temperatures and changes in weather patterns, on a large scale, will continue throughout the 21st Century.

In 1988, the Intergovernmental Panel on Climate change (IPCC) was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide policymakers with regular scientific assessments on the current state of knowledge about climate change. Shortly after, in 1992, the United Nations Framework Convention on Climate Change was signed at the Rio Earth Summit with the ultimate objective of stabilizing greenhouse gas concentrations

at a level that would prevent dangerous anthropogenic interference with the climate system. Article 6, commonly referred to as the Action for Climate Empowerment (ACE), of the UNFCCC focuses on six priority areas, education, training, public awareness, public awareness, public participation, public access to information and international cooperation on these issues. The implementation of these areas has been identified as a key factor for everyone to understand and participate in solving the complex challenges presented by climate change. The quest for integration of CC into formal education is underpinned by several existing international frameworks including UNFCCC, Kyoto protocol, ESD, The SDGs and the 2015 Paris Agreement. UNESCO has established the Climate Change Education for Sustainable Development (CCESD) programme recognising the crucial part that education and awareness raising have to play in rolling back the threat to a sustainable future that climate change represents.

Climate change education has far reaching implications if viewed against Ethiopia's demographic and educational sector statistics. Based on CSA (2013/14), 56% of Ethiopia's total population falls under 22 years of age. Thus, strengthening Climate Change Education is vital to the success of Ethiopia's drive to build a green and resilient economy by 2030 and beyond.

The general education curriculum in Ethiopia, like in most countries, is based on a set of education priorities that reflect the macro level links between education and the economy as well as the national development policy goals. To this end it seeks to combine the broad national vision and general development goals set by the Government, with the more specific needs of other interest groups, local communities and the development aspirations and needs of learners.

To this end, a preliminary study on the status of Climate Change Learning in the Ethiopian Education Sector was conducted during the National Climate Change Education Strategy (2017) development process. The study has identified a number of priority actions which includes the integration of climate change into the national curriculum at the primary and secondary education level. The content analysis review showed that the current curricula, almost at all levels, focus on environmental protection education with limited and patchy content and knowledge on climate change.

The review identified the focal subject matters for each grade at all levels of education that would serve as entry points for the strengthening of climate change education in the formal curricula. At the primary level, the environmental science and basic science were found to be the lead subjects with foundational climate change content at early stages (Grades 1-4) as well as cause-effect content at later stages (Grades 5-6). Other subjects like Math, Civic & Ethics, English and Mother Tongue have considered climate change education as a cross-cutting issue.

At the junior secondary and secondary level, analysis identified Geography and Biology as the lead subjects that integrated climate change issues, which still have potential to include more. Social Studies, Chemistry and Physics were also able to include climate change education to a limited level. As with the primary level the other subjects treated climate change education as a cross-cutting issue.

With regard to the primary and secondary teachers' training, the following points are identified as key issues that need to be addressed to strengthen the integration of CCEE in the curricula and its effective implementation

- The need for the provision of professional development programs for primary and secondary level teachers on CCEE

- strengthen teachers' and educators' capacities to deliver accurate information, integrate local content, and take action on climate change mitigation and adaptation
- the need to increase teachers and educators understanding of climate change through the integration of CCEE in teacher education program
- the need to develop relevant materials on CCEE like manuals, teachers' resource guides, lesson models, training modules etc…
- Limited awareness to various climate change policies and initiatives by the government

Overall, the content analysis reveals that there is a moderate level of climate change integration into the formal general education system of Ethiopia with the following conclusions:

- Primary education: low
- Secondary education: moderate
- Teacher education: moderate.

The recommendations of the study included the strengthening of the integration of climate change into the formal curriculum with adequate climate change topics with the necessary depth and coverage as per children's level of understanding.

In 2016, a preliminary study on the status of Climate Change Learning in the Ethiopian Education Sector was conducted by EFCCC with support from the UNCC Learn. It is for these reasons that the Government of Ethiopia has developed and adopted the National Climate Change Education Strategy (2017-2030). One of the priorities listed in the CCE strategy is strengthening the integration of climate change education into the formal education system with special attention to primary and secondary levels of education. The content analysis review showed that the current curricula, almost at all levels, focus on environmental protection education with limited and patchy content and knowledge on climate change.

Currently, beginning with the development of the new Ethiopian education roadmap, change is being realized in the current education system. The national curriculum is also on the process of changing with participation of all stakeholders. Climate Change learning is one of the many issues have been presented on the table to be integrated into the national curriculum.

Based on the 2016 Climate Change Education Strategy of Ethiopia, serious of consultations were done to integrate climate change education into the curriculum as the most effective way to respond to the increasing threat to our sustainability locally and globally. One of the consultation workshop organized in August 2019 by the MOE and the EFCC Commission in collaboration with UNitar and UNCC Learn resulted in identifying the major contents to be included in the national curriculum as well as on how the integration shall be addressed. Acknowledging the content analysis of the existing curriculum, the participants of the consultation meeting agreed that all subjects should include the Climate Change ideas making it incremental and following a spiral approach while some particular subjects like Environmental Science, Biology, Geography and Social Studies to be carrier subjects.

Hence, this annotated guide for curriculum developers is developed to envision the integration of Climate Change Education into the National Curriculum.

2. SPECIFIC AIMS

The aims of the climate change curricula are:

- To assist learners to understand the environment.
- To prepare learners to understand and deal with environmental problems
- To promote protection of the environment
- To equip learners with the necessary skills to understand the concepts of climate change
- To equip learners with the investigating skills in relation to the causes of climate change
- To assist learners to understand the effects of climate change
- To prepare learners to implement climate action strategies.

3. FOCUS ON CARRIER SUBJECTS AND INTEGRATING ACROSS ALL SUBJECTS

The current structure of the Ethiopian curriculum is such that Environmental Science is offered from Grades 1-4 as a stand-alone subject. It comprises strands of Natural Sciences, Health, Agriculture, Social Science, Home Science and Civics Education. In grades 5-8 Environmental Sciences is no longer taught in an integrated way. The subjects that had been integrated under Environmental Science from Grades 1-4 are taught as a number of discrete subjects up to Grade 8. Environmental Science as a separate subject is not offered beyond Grade 8.

With the development of the new Ethiopian education Roadmap, the structure is changed to primary level (Grades 1-6), Junior secondary level (Grades 7-8) and Secondary level (Grades 9-12) where the curriculum will also be redesigned accordingly. Special attention should be given to integrate climate change across the curriculum.

In the light of the above, the following are recommended as courier subjects to include the climate change and related topics suggested in the flowchart:

- Grades 1-6

Climate Change should be integrated into Environmental Science (ES) and Social Science (SS). Topics like understanding the local natural environment and its surroundings as well as activities in the community shall be treated in this level. Environmental problems associated with the Earth, Air, Water, Plants should also be treated in the ES. Concept and Importance of Climate and Climate Change shall be introduced at lower level [Grades1-4] then Cause-Effect relationships at the end of the level [Grades 5-6]. The contents should at least consider two hours per week for the Climate Change topics under ES and an hour per week for SS.

The other subjects like English, Mother tongue, Civic & Ethics should integrate suitable climate change concepts that could take half an hour. Mathematics topics like ratio, percentage, bar graphs and word problems should have exercises related to concepts of climate change.

- Grade 7-8

Biology and Social studies will be the carrier subjects for climate change concepts. The structure of the environment, its eco-system and its challenges can be treated in the biology lessons. Structure of the earth; changes in the surface and human intervention in the ecosystem as well as the indigenous knowledge of the community can be treated in the social science lessons. Building up on the concepts

and importance of climate and climate change and the cause- effect relationships treated in the first level (Grades 1-6) then the strategies of adaptation and mitigation can be introduced in this level.

Climate change synergizes language, social and economic issues with quantitative as well as scientific concepts. An effective methodology for integrating Climate Change across the curriculum in Grades 7-8 is problem or theme-based learning. A minimum of 10% of the contents should be devoted to climate change.

- Grade 9-12

In Grades 9-12, the carrier subjects are Geography and Biology. Majority of the contents specified in the syllabi should go to these subjects. Human population and economic activities, public & policy Related Issues shall be iterated in Geography while the physical environment, conservation of natural resources and energy transformation in Biology.

Starting with recap sessions on concepts/importance of climate and climate change; the cause-effect relationships; the strategies of adaptation and mitigation; students should be provided with comprehensive, in-depth and practice-oriented teachings about the policy/legal framework on climate change. In this level, the focus shall be introducing to the responses at global and country levels; which will be followed by details on the country's and international policy & legal frameworks as well as existing initiatives in response to climate change.

A minimum of 30 % of their contents shall include topics related to climate change. In addition to these carrier subjects, other natural science subjects like Chemistry and Physics should include those social and economic issues with quantitative as well as scientific concepts of climate change. Languages, Economics, History, and Civic and Ethics should also consider basic climate change related topics that drive students to become aware of climate change, be the guardian of environment and take actions.

4. IMPACTS OF INTEGRATING CLIMATE CHANGE INTO THE NATIONAL CURRICULUM

The impact of Climate Change Education in Ethiopia is summarised as follows:

- The general education curriculum in Ethiopia, like in most countries, is based on a set of education priorities that reflect the macro level links between education and the economy as well as the national development policy goals. To this end it seeks to combine the broad national vision and general development goals set by the Government, with the more specific needs of other interest groups, local communities and the development aspirations and needs of learners.

- Climate change is expected to have significant impacts on the economy of Ethiopia which is highly dependent on climate-sensitive activities such as rain-fed agriculture and livestock production. National income from exports, such as coffee, pulses, flowers and animal products, is likely to be reduced if climate change continues.

- Drought has many impacts on Water, Sanitation and Hygiene (WASH) in Ethiopia. Water scarcity reduces access to clean drinking water, deters people from bathing and hand washing,

and restricts the use of water-flushed toilets. People are forced to use unsafe water sources, or walk long distances to collect water, otherwise they must buy it, which adds to poverty and so increases the risk of disease and also causes children to miss schooling.

- Floods also have many impacts on WASH in some parts of Ethiopia. Flood water spreads pollutants and disease-causing organisms from latrines, areas of open defecation and damaged sanitation lines and waste treatment facilities.

- Droughts and floods cause losses of human life and livestock, damage to homes, businesses and infrastructures, erosion of soils, grassland and farmland, and loss of productivity.

- Many diseases of humans and livestock are increasing because of the indirect effects of climate change.

- The recommendations of the study included the strengthening of the integration of climate change into the formal curriculum with adequate climate change topics with the necessary depth and coverage as per children's level of understanding. Hence, the content flowchart will try to address the challenges and gaps mentioned above.

- The flowchart in Annex 1 is a document developed at the above workshop. It shows the scope and sequence of the important Climate Change learning contents. The content syllabi by grade, see Annex 2, was developed from the flowchart and show the required competencies, the contents to be addressed, suggestions for methods of delivery, the assessment strategies to be followed as well as possible sources for the specific content.

5. SUMMARY OF THE PROCESS

Towards integrating CC into the Ethiopian curriculum, the following process was embarked on:

- A preliminary study on the status of Climate Change Learning in the Ethiopian Education Sector was conducted during the National Climate Change Education Strategy (2017) development process. The study has identified a number of priority actions which includes the integration of climate change into the national curriculum at the primary and secondary education level. The content analysis review showed that the current curricula, almost at all levels, focus on environmental protection education with limited and patchy content and knowledge on climate change.
- The review identified the focal subject matters for each grades at all levels of education that would serve as entry points for the strengthening of climate change education in the formal curricula. At the primary level, the environmental science and basic science were found to be the lead subjects that tried to build-up on concepts and importance of climate and climate change at early stages (Grades 1-4) as well as the cause-effect relationships at a later stages (Grades 5-6). Other subjects have considered climate change education as a cross-cutting issue.
- At the junior secondary and secondary level, analysis identified Geography and Biology as the lead subjects that integrated climate change issues. Social Studies, Chemistry and Physics

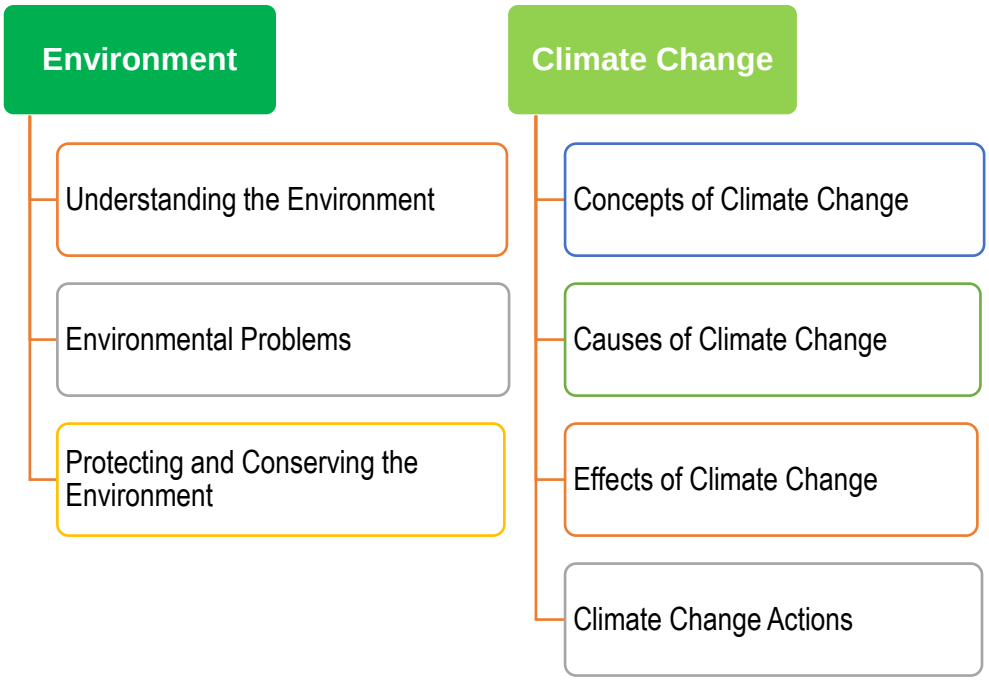
were also able to include climate change education. As in the primary level the other subjects treated climate change education as a cross-cutting issue.

- Review of the content analysis also revealed that there is a moderate level of climate change integration in the formal general education system of the country. In terms of the levels, primary education has a lower level of integration, the secondary education is relatively moderate, and the curricula of the teacher education programs as moderate.
- A workshop for the development of a national guideline on the integration of Climate Change into the Ethiopian national education was held in August 2019. At the workshop it was noted that National Ethiopian Curriculum is in the process of being changed in line with the new Ethiopian Education roadmap. Both the workshop and the development of the guideline is taking place at an opportune time.
- The recommendations of the study included the strengthening of the integration of climate change into the formal curriculum with adequate climate change topics with the necessary depth and coverage as per children's level of understanding. Hence, this content flowchart will try to address the challenges and gaps mentioned above.
- The flowchart below is a document developed at the above workshop. It shows the scope and sequence of the important Climate Change learning contents. It will guide the development of the syllabi that will show the required competencies, the contents to be addressed, suggestions for methods of delivery and the assessment strategies to be followed.

6. CONTENT FLOW CHART AND SYLLABI

Content Flowchart

The content flowchart is designed for grades 1-12 based on the two selected thematic areas - Environment and Climate Changes with carefully chosen climate change related topics. The flowchart that shows the scope and sequence of the detailed contents is provided as Annexure 1: Integrating Climate Change Education into the Ethiopian Curriculum – Content Flowchart.



Syllabi

The syllabus for each grade was prepared based on the content flowchart. It shows the expected competencies of students, the contents and sub-contents to be addressed, suggested methodologies, assessment strategies and possible sources of this content. The proposed climate change syllabi for Grades 1-12 is provided in Annexure 2: Integrating Climate Change Education into the Ethiopian Curriculum - Syllabi for Grades 1-12.

7. EXEMPLARS

There are certain considerations when working on the integration process. In addition to using the information provided in the Content Flow Chart (Annex 1), the Climate Change Syllabi (Annex 2) and the curriculum developer can be further guided by the following six steps when designing the integration for teaching and learning purposes:

Step 1: For each grade and each concept described in the climate change syllabi, clarify the teaching and learning objective/s

Step 2: Identify the subjects that most lend themselves to integrating that particular concept

Step 3: Decide on the time allocation for the concept

Step 4: Identify the most appropriate teaching and learning strategies/methodologies, taking into account the grade level. Try to include a mix of learning strategies (e.g. independent, pair work, and small group work) and a variety of learning opportunities (e.g. discussion, oral presentations, research, dramatization, written work, art, etc.)

Step 5: Identify relevant resources that can be used in the execution of the lesson/s

Step 6: Describe the assessment task/s

An exemplar for each school phase (grades 1-6; grades 7-8; grades 9-12) is provided below.

Exemplar 1

Phase: Grades 1 - 6

Example: Grade 2

Key Concept: Climate Change

2.4 Climate Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain the importance of tree planting ▪ Tell the names of the trees found in their locality ▪ Participate in tree planting actions in their school	▪ Tree planting	▪ Use small group discussion on the importance of tree planting. Allow students to tell what they think trees are important. ▪ Use pictures of some trees that can be available in the locality and ask students if they know the names of the trees.	▪ Observe the students' performance during the discussion tree planting and caring actions and provide constructive feedback ▪ Check students understanding of clean

▪ Demonstrate how to care for planted trees		▪ Organize a school cleaning day and work with students in cleaning the school compound. ▪ Assist students in the techniques of caring for planted trees	school through Q&A.

Step 1: Objectives

- To appreciate the many usages of trees
- To create awareness of the value of trees
- To learn about growing trees and practically apply this knowledge

Step 2: Relevant subjects

- Social Sciences; Language; Art

Step 3: Time allocation

- 6 lessons over 2 weeks

Step 4: Teaching and Learning strategies/methodologies

- Cross-curricular theme-based learning: " Thanks for Trees"
- Individual, pair and group work
- Activities:
    - Language: Read the class an appropriate story about a tree and ask questions related to the story
    - Whole class discussion: Show students pictures of land without any trees/vegetation and then show pictures with trees and vegetation. Ask students which pictures they prefer and why?
    - Brainstorm: In pairs, students develop a list (1) of all the uses of trees that they can think of and (2) of the names of trees that grow in their community – see which pair can come up with the most uses and most names
    - Project: "Plant a Tree". Explain to students the process of planting a tree and how to care for it. Divide students into groups of 4/5. Each group is given a tree to plant as part of a "Plant a Tree" ceremony. To create awareness amongst others in the school, each group designs a poster of their tree, advertising the venue, date and time of the tree planting ceremony. Posters can be displayed around the school to create excitement amongst others. Parents can also be invited to the tree planting ceremony. Each group is given a location and the trees are planted. Groups are responsible for caring for their tree.
    - Creative writing: each student writes a poem about the tree they have planted

Step 5: Resources/materials

- Pictures of land with and without trees and vegetation
- Stories about trees e.g. https://freestoriesforkids.com/tales-for-kids/characters-and-situations/stories-about-trees
- Trees for planting

Step 6: Assessment

- Individual assessment: Assess individual pieces of creative writing
- Pair work assessment: Assess lists of usages of trees
- Group assessments: Assess group posters and tree planting

Exemplar 2

Phase: Grades 5 - 8

Example: Grade 6

Key Concept: Environment

1.2 Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the causes of environmental problems ▪ Explain how environmental problems arise	▪ Causes of environmental problems	• Let students discuss in small groups about the man-made and natural environmental problems. • Organize a Q&A session on how environmental problems arise and what students' role would be to reverse the problems. • Consolidate the discussion with concrete examples (pictures/videos if available)	• Observe the students' performance during the Q&A, discussion and demonstration sessions

Step 1: Objectives

- To identify environmental problems and their causes
- To explore solutions to environmental problems
- To plan and implement a solution to an environmental problem

Step 2: Relevant subjects

- Geography; Language; Art

Step 3: Time allocation

- 6 lessons over 2 weeks: 2 x Geography lessons; 2 x Language lessons; 2 x Art lessons

Step 4: Teaching and Learning strategies/methodologies

- Theme-based cross-curricular learning: "Solving our environment's problems"
- Individual and group work (groups of 4/5 students)
- Activities:
  - *Research:* Individually, students identify the main environmental problems (national and local) and their causes; they then describe these in a piece of descriptive writing

- *Discussion:* In groups, students share individual findings and agree on the group's top 4/5 environmental problems; they then discuss potential solutions to each problem
- *Artistic representation:* In groups, each group member takes one problem and represents it in a drawing/painting; the group creates a collage of the individual drawings, depicting the 4/5 prioritised environmental problems and their solutions
- *Oral and visual presentation:* Groups orally present their collages to the whole class before they are displayed on the classroom walls
- *Group project:* Each group selects one local environmental problem and designs a short-term plan of action that will help to solve it; groups present their plans and get feedback from their peers; groups then implement their projects

Step 5: Resources/materials

- Identify a variety of texts related to environmental problems, including media sources (newspapers, magazines, etc.) and internet sources if access to this is available.

Step 6: Assessment

- Total mark: 100
- Individual assessments: Assess individual pieces of written work describing environmental problems and causes (20 marks); assess individual pieces of art depicting one environmental problem and its solution (20 marks)
- Group assessments: Assess group collages (10 marks); oral presentations (10 marks); group projects (40 marks)

Exemplar 3

Phase: Grades 9-12

Example: Grade 9

Key Concept: Environment

1.3. Protecting the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain why we need to conserve water ▪ Demonstrate their ability to conserve water ▪ Describe how to save energy ▪ Explain how the use of wind, hydro and solar sources of energy saves the climate ▪ Understand the different forms of energy and their conversion ▪ Tabulate the diverse ways energy units can be	▪ Water conservation ▪ Saving energy ▪ Saving energy ▪ Use of wind, hydro and solar sources of energy ▪ Levels of consumption ▪ Basic formula: E=mc2 ▪ Diverse energy units related to their main use; such as vehicles,	▪ Let students discuss in small groups on why we need to conserve water. Use Q&A sessions to consolidate the discussions ▪ Consolidate the discussion mentioning climate change manifests itself primarily through changes in the water cycle. Hence, conserving water is important. ▪ Allow students to demonstrate their ability of water conservation through	▪ Observe students' performance during discussion and Q&A sessions and provide appropriate positive feedback ▪ Observe the students' performance during the discussion, asking them

expressed and converted.	food, heating, etc.	school level water resource ▪ Use small group discussion on saving energy and using renewable energy sources. Students should understand that different energy sources produce different amounts of pollutants. Wind, solar & hydroelectric systems generate electricity with no associated air pollution. ▪ Students volunteer to reveal how much energy they use at home (electricity/ gas, etc.) ▪ Develop a model to compare different energy units and purposes, e.g. driving my 30 hp car for 1 hour equals 40 hrs of boiling a 1 litre kettle or burning 0.025 barrels of oil.	some critical questions and then provide constructive feedback ▪ Calculations verified

Step 1: Objectives

- To understand what energy is
- To identify and quantify different forms of energy
- To know and monitor your own energy footprint

Step 2: Relevant subjects

- Physics, general science, mathematics

Step 3: Time allocation

- Six lessons of 30-40 mins each

Step 4: Teaching and learning strategies/methodologies

- Cross-curricular, independent and group work
- Activities:
    - Worksheet for information: Distribute worksheet/questionnaire providing information on energy; concept of $E=mc^2$; energy and mass (matter) are interchangeable; they are different forms of the same thing; basic understanding of the units of energy; etc.
    - Group work: Develop a poster that describes and defines calories, joules, BTU, Kw, etc. and facilitates conversion from one unit to another e.g. 1 calorie (cal) = 4.184 Joules. Include: their application; imperial vs metric system; relative levels of CO2 generated by different sources. Examples can include calories in food, wood , coal, etc.
    - Independent work: Each student identifies examples of different personal energy usage - a meal, a bus ride, a cup of tea – and expresses each in a different unit. For example, how many chocolate bars are equivalent to the energy used in a ride to school (by bus, car, walk, bicycle). Explain/demonstrate the 'bomb calorimeter'

that calculates calorific value of food. For example, a 100 g chocolate bar contains 2500 Kj of energy = 597 calories. Develop a model that compares different energy units and purposes, e.g. driving my 30hp car for 1 hour equals 40 hrs of boiling a 1 litre kettle or burning 0.025 barrels of oil.

- Small group discussion: Provide groups with an information questionnaire on saving energy and using renewable energy sources. Students should understand that different energy sources produce different amounts of pollutants; be able to distinguish between "clean" energy and "dirty" energy based on CO2 emissions and other factors. Wind, solar and hydroelectric systems generate electricity with no associated air pollution.
- Research and oral presentation: Each student identifies and researches a personal situation where dirty energy can be replaced by clean energy and then presents how this can be achieved.

Step 5: Resources/materials

Physics text book; schedule of energy conversions

Step 6: Assessment

- Individual assessments: Model that compares different energy units and purposes; Oral presentations; test
- Group assessment: Poster presentation

8. INFORMAL ACTIVITIES

It is important that informal learning experiences in and outside of the classroom be provided such as excursions, talks by visiting speakers from the Ministry of Environment, Forestry and Climate Change and other experiences be used as an opportunity to broaden the understanding and awareness of climate change by the learners. It is also important that the community be involved in these informal learning experiences.

ANNEXURES

1. Annex 1: Flowchart (Grades 1-12)

BACKGROUND

A preliminary study, on the status of Climate Change Learning in the Ethiopian Education Sector, was conducted during the National Climate Change Education Strategy (2017) development process. The study has identified a number of priority actions which includes the integration of climate change into the national curriculum at the primary and secondary education level. The content analysis review showed that the current curricula, almost at all levels, focus on environmental protection education with limited and patchy content and knowledge on climate change.

The review identified the focal subject matters for each grade at all levels of education that would serve as entry points for the strengthening of climate change education in the formal curricula. At the primary level, the environmental science and basic science were found to be the lead subjects with foundational climate change content at early stages (Grades 1-4) as well as cause-effect content at later stages (Grades 5-6). Other subjects like Math, Civic & Ethics, English and Mother Tongue have considered climate change education as a cross-cutting issue.

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The recommendations of the study included the strengthening of the integration of climate change into the formal curriculum with adequate climate change topics with the necessary depth and coverage as per children's level of understanding.

Based on the 2016 Climate Change Education Strategy of Ethiopia, serious of consultations among experts were done to integrate climate change education into the curriculum as the most effective way to respond to the increasing threat to our sustainability locally and globally. One of the consultation workshop organized in August 2019 by the MOE and the EFCC Commission in collaboration with UNitar and UNCC Learn resulted in identifying the major contents to be included in the national curriculum as well as on how the integration shall be addressed. Acknowledging the content analysis of the existing curriculum, the experts agreed that all subjects should include the Climate Change ideas making it incremental and following a spiral approach while some particular subjects like Environmental Science, Biology, Geography and Social Studies to be carrier subjects.

Currently, beginning with the development of the new Ethiopian education roadmap, change is being realized in the current education system. The national curriculum is also on the process of changing with participation of all stakeholders. Climate Change learning is one of the many issues have been presented on the table to be integrated into the national curriculum.

Hence, this content flowchart is designed to address the challenges and gaps mentioned above and meet the expectations stated in the 2016 Climate Change Education Strategy. The flowchart is a document that shows the scope and sequencing of the important climate change related topics to be integrated in the national curriculum. This flowchart is prepared based on the two key concepts: (1) Environment and (2) Climate Change as shown in the tables below. It followed the new structure of the grade levels. Primary level Grades 1-6 (highlighted orange), Grades 7-8 and Grades 9-12 (highlighted blue).

Climate Change Education Integration into National Curriculum

CONTENT FLOW CHART (Grades 1-12)

KEY CONCEPT 1: Environment

1.1 Understanding the Environment

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr9	Gr10	Gr11	Gr12
Our Environment	Components of our Environment	Living component of Environment	Non-living component of Environment	Environment and its importance	Interaction among living things & non-living things	Balance of nature	Structure of environment	Food chain and recycling	Population and environment	Economics, Politics and Environment	Sustainable development
Living things	Domestic and Wild animals	Plants	Mammals	Birds and reptiles	Insects	Amphibians and fish	Forests	Water cycle	Micro organisms	Protozoa	Bacteria
Non-living things	Home and School	Transportation	Water	Soil & Rocks	Air	Rainfall	Temperature	Wind	Land	Earth	Biodiversity

1.2 Environmental problems

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr-9	Gr10	Gr11	Gr12
Personal hygiene	Environmental hygiene	Factors that affect environmental hygiene	Environmental problems around us	Environmental problems types	environmental problems cause	environmental problems (consequences)	Environmental management and indigenous knowledge	Environmental hazards	Major Environmental problem in Ethiopia	Emerging problems	Environmental impact assessment

1.3 Protecting and Conserving the Environment

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr9	Gr10	Gr11	Gr12
Clean home	Clean school	Clean water	Clean air	Tree planting	Wildlife conservation	Conservation of natural resources	Recycling	Water conservation, Saving energy & alternative energy sources	Reducing greenhouse gases	Environmental stewardship and environment activism	National environment policies

KEY CONCEPT 2: Climate Change

2.1 Concepts of Climate

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr9	Gr10	Gr11	Gr12
Importance of environment	Change in the environment	Environmental resources	Seasons	Weather and Climate	Understanding Climate change	Climate change indicators	Climate change and agriculture	Climate change and natural resources	Climate change and social impacts	Climate change and the economy	Climate change - local and world view

2.2 Causes of Climate Change

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr9	Gr10	Gr11	Gr12
Domestic waste	Construction	Cutting trees	Bush burning	Fuel wood	Overgrazing	Agricultural expansion	Unwise use of natural resources	Emission of Greenhouse gases	Urbanization	Burning fossil fuels	Poverty
			Forest fire	Deforestation	Population growth	Increased refuse/waste dumps;	CO_2 from industrial and steam engines	Ocean current process	Industrial waste	Gas flaring	Migration

2.3 Effects of Climate Change

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr9	Gr10	Gr11	Gr12
Diseases	Changes in Environment	Shortage of rain and Heavy rainfall	Rising of Temperature	Flooding	Drought	Soil erosion Land slide	Pollution (water, soil, air)	Desertification Drought	Ozone layer depletion	Global warming	Loss of Biodiversity

2.4 Climate Action

Gr 1	Gr2	Gr3	Gr4	Gr5	Gr6	Gr 7	Gr8	Gr9	Gr10	Gr11	Gr12
Saving water	Tree planting	Caring for environment	Animal Husbandry	Managing home wastes	Reusing, Recycling	Saving energy	Afforestation and Reforestation	Wetland Conservation	Environmental stewardship	CRGE Strategy & its initiatives	Encouraging green economy
					Burying of wastes	Use of wind, hydro and solar sources of energy;	Reducing greenhouse gases	Bio-engineering of microbes to eliminate GHG	Environmental activism	International responses for climate change	Climate financing

2. Annex 2: Syllabi for Grades 1- 12

GRADE 1

1. Environment

1.4 Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell what environment is ▪ Identify living things ▪ Identify non-living things	▪ Our Environment ▪ Living things ▪ Non-living things	• Let students practice to sing a song about environment. For example, the trees, the spider, the rain, the river, the animals... • Provide examples using pictures (or live plants, insects and animals) of living things and let students identify them. • Use examples to let the students pick and show living from non-living.	• Observing students while they sing and observing the level of performance when they identify living from non-living things

1.5 Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell what personal hygiene is	▪ Personal hygiene ○ Personal hygiene and the environment	• Let students practice songs about hygiene and environmental problems that affect personal hygiene. • Provide examples of factors that affect personal hygiene. • Use story telling reading/telling about a child affected by a polluted environment on his/her hygiene • Show pictures of people whose hygiene being affected by a polluted environment.	• Observing students while singing a song • Question and answer on personal hygiene being affected by a polluted environment

1.6 Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Listen and respond to a story about clean home	▪ Clean home ○ Importance of cleaning home ○ Ways of cleaning home	• Let students practice songs about cleaning home • Ask students to discuss about the advantages of a clean home. • Allow students to tell about or to demonstrate on some ways of cleaning home.	• Observation while singing and demonstrating on cleaning home

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell importance of their immediate environment	▪ Importance of environment ○ Water ○ Air ○ Animals ○ plants	• Provide examples of the immediate environment and their importance • Show/draw pictures of the immediate environment and allow students to try to draw • Read a story about an immediate environment in students locality and use question and answer to probe students to speak about their immediate environment	▪ Observe students' performance while they draw pictures ▪ Ask students speak about their immediate environment and provide them constructive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell what a domestic waste can do to the environment	▪ Domestic waste ○ What it is ○ The source ○ Its effects on the environment	• Use examples of domestic wastes and explain how they can affect the environment • Read a story about an environment affected by domestic waste and allow students to answer question from the reading • Allow students to speak what they know about domestic waste	▪ Observe their participation in the Q & A session of the story telling and provide constructive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell about diseases caused by environment pollution	▪ Diseases Environmental pollution E.g common cold,	• Use examples of diseases that arise from a polluted environment • Read a story about of diseases that arise from a polluted environment and allow students to answer question from the reading • Allow students to speak what they know about of diseases that arise from a polluted environment	▪ Observe their participation in the Q & A session of the story telling and provide constructive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Demonstrate how water can be saved	▪ Utilization of water ○ The source ○ Its utilization	• Let the students practice to sing a song about water • Provide examples on why we need to save water • Provide examples on how water can be saved • Allow students to demonstrate how water can be saved	▪ Observing students while they sing ▪ Observing the level of performance when they answer questions and demonstrate actions then provide constructive feedback

GRADE 2

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe major components of their immediate environment ▪ Differentiate domestic and wild animals ▪ Listen and respond to a story about home and school	▪ Components of our Environment o Living things o Non-living things ▪ Domestic and Wild animals ▪ Home and School	▪ Allow students to ask their parents/elders about what their immediate environment constitutes. Let them report in the class and have a discussion. ▪ Ask students to mention domestic and wild animals they know. You may ask students about benefits of/ dangers from these animals. Use pictures and photos of domestic and wild animals to consolidate the discussion. ▪ Let students listen to a story about home and school environment and conduct Q&A session	▪ Observe students' presentations and provide constructive feedback ▪ Ask critical questions from the story and check students' performance

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Identify the problems associated with lack of environmental hygiene	▪ Environmental hygiene o Diseases from lack of environmental hygiene o Health	▪ Allow students to interview their elders/parents and report back to their peers on major problems the community face due to lack of environmental hygiene ▪ Prepare a story on problems people may face due to lack of environmental hygiene, read to the class and conduct Q&A session	▪ Observe students' presentations and provide constructive feedback ▪ Ask critical questions from the story and check students' performance

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the materials/equipment that can be used to clean school compound ▪ Participate in the cleaning of their school compound	▪ Clean school o Importance of cleaning o Materials for cleaning a school	▪ Use small group discussion on the importance of a clean school. Allow students to tell what they think makes a clean school. ▪ Use pictures of materials/equipment that can be used to clean school compound and ask students if they know how to use them. ▪ Organize a school cleaning day and work with students in cleaning the school compound.	▪ Observe the students' performance during the discussion and cleaning actions and provide constructive feedback ▪ Check students understanding of clean school through Q&A.

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Acknowledge the visible changes in the environment	▪ Change in the environment ○ Meaning of change ○ Visible changes	• Let students ask their parents about the changes in the environment and come with a report. • Use Q&A sessions to consolidate what it means "change in the environment • Allow students to go for a visit and observe the environment. Let them report what they have observed.	▪ Observe the reporting and the responses of students during the Q&A sessions and provide necessary feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how cutting trees can change the environment	▪ Cutting trees	• Ask students to talk to parents/elders on how cutting trees can change the environment and in class allow students to work in small groups to indicate how construction can change the environment	▪ Observe the students' performance during the reporting and discussion sessions and provide constructive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the effects of climate change on the environment	▪ Changes in the Environment ○ Temperature increase ○ Shortage of water	• Ask students to talk to parents/elders on the visible changes of the environment and in class allow students to report to the class. • Allow students to work in small groups to list out the conditions that can change the environment • Allow the students to do a project work on the effects of the shortage of water	▪ Observe the students' performance during the reporting and discussion sessions and provide constructive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell the importance of tree planting ▪ Demonstrate how to care for planted trees	▪ Tree planting ○ Planting trees and its importance ○ Care for planted trees	▪ Use small group discussion on the importance of tree planting. Allow students to tell what they think trees are important. ▪ Use pictures of some trees that can be available in the locality and ask students if they know the names of the trees. ▪ Organize a school tree caring day and work with students in cleaning the school compound. ▪ Assist students in the techniques of caring for planted trees	▪ Observe the students' performance during the discussion tree planting and caring actions and provide constructive feedback ▪ Check students understanding of clean school through Q&A.

GRADE 3

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the names of the plants in their locality ▪ Tell the names of animals that are found in their surrounding	▪ Living component of Environment o Plants o Animals	▪ Use a brainstorming session on identifying the living components of the environment ▪ Let students talk to their elders/parents about the names of different types of plants and report to their peers ▪ Allow students to work in small groups to tell the names of animals that are found in the community	▪ Observe students' presentations and provide constructive feedback ▪ Ask critical questions during discussion and brainstorming session

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the factors that affect environmental hygiene	▪ Factors that affect environmental hygiene o Flooding o Transport cars o Domestic waste o Animal excretion	▪ Allow students to interview their elders/parents about the factors that affect and report back to their peers on major problems the community face due to lack of environmental hygiene ▪ Ask questions like "who is responsible for environmental hygiene at home? In the school? In the community?" ▪ Prepare a story on problems people may face due to lack of environmental hygiene, read to the class and conduct Q&A session	▪ Observe students' presentations and provide constructive feedback ▪ Ask critical questions from the story and check students' performance

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the proper use of a clean water	▪ Clean water	▪ Use small group discussion on the importance of clean water. Allow students to tell what they think makes water clean. ▪ Use pictures of materials/equipment that can be used to clean water and ask students if they have used them at home.	▪ Observe the students' performance during the discussion and actions and provide constructive feedback ▪ Check students understanding of clean water through Q&A.

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the environmental resources in their locality	▪ Environmental resources ○ Water ○ Air ○ Wildlife ○ Forest	▪ Allow students to interview their elders/parents about the environmental hazards that could happen in their locality and report back to their peers ▪ Prepare a story about a common environmental hazard that happens in the locality and read to the class ▪ Use Q&A sessions to consolidate the discussions	▪ Observe students' performance during presentation and discussion ▪ Provide appropriate positive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Talk about the causes of cutting trees to the environment of the local people	▪ Cutting trees ○ Impacts of cutting trees	• Use a brainstorming session with questions like: "Why do people cut trees?", "What do you think is the impact of cutting trees in the environment?"…to initiate discussions. • Allow students to discuss in groups about the impact of cutting trees on the environment and alternatives for peoples' livelihood	▪ Observe students' performance during the brainstorming and discussion sessions ▪ Provide appropriate positive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell the impact of shortage of rain ▪ List the impacts of heavy rainfall	▪ Shortage of rain ○ Causes and impacts ▪ Heavy rainfall ○ Causes and impacts	• Let students talk about the impacts of rain shortage • Provide appropriate examples of heavy rainfall and its impacts • Allow students to discuss the reasons of heavy rainfall • Let students bring stories about the impacts of heavy rainfall and tell to the class. Then ask critical questions to consolidate the ideas	▪ Observe students' performance during the brainstorming, Q&A and discussion sessions ▪ Provide appropriate positive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the methods people use to care for the environment	▪ Caring for environment ○ Planting trees ○ Proper disposal of wastes	▪ Use small group discussion on the methods of caring the environment. Allow students to tell what they can do to protect the environment. ▪ Organize a "caring for the school environment" campaign and work with students to take care of the school compound.	▪ Observe the students' performance during the discussion and actions and provide constructive feedback ▪ Check students ability and willingness of caring for the environment through Q&A.

GRADE 4

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Identify non-living components of the environment ▪ List the names of mammals that exist in their locality ▪ Explain the importance of water to the environment	▪ Non-living component of Environment ▪ Mammals ▪ Water o Sources o importance	▪ Use a brainstorming session about the characteristics of non-living components of the environment and allow students to identify as many non-living things they know. ▪ Use pictures/drawings of mammals that exist in their locality and beyond to help students understand who mammals are. ▪ Read a story about the sources and importance of water and allow students to discuss on the necessity of water to the environment providing them some critical questions	▪ Observe students' performance during the brainstorming, story reading and discussion sessions then provide constructive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the environmental problems their community could face	▪ Environmental problems around us	▪ Allow students to interview a community elder/ govt. agency representatives about the type of environmental problems their community could face and report to the class. ▪ Let students discuss in small groups on the issues raised during the reports. ▪ Ask students critical questions on how the community can be affected from the environmental problems and what they can do to reverse the problems.	▪ Observe students' performance during the reporting, Q&A and group discussion sessions then provide constructive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the importance of a clean air	▪ Clean air o importance	▪ Use small group discussion on the importance of clean air. Allow students to tell what they think makes the air clean. ▪ Let them discuss on actions that can be taken to get clean air and what their role could be. ▪ Organize a school level clean air day and work with students.	▪ Observe the students' performance during the discussions and provide constructive feedback ▪ Check students' understanding of clean air through Q&A.

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment

▪ List the names of the major seasons of the community
▪ Explain the major characteristics of each season
	▪ Seasons
	  ○ Spring
	  ○ Autumn
	  ○ Winter
	  ○ Summer
	▪ Major characteristics of each of the seasons
		• Invite a local environment/agriculture/admin office representative to speak to the class about the seasons in their locality. Allow students to ask the guest speaker clarifying questions.
		• Allow students to talk about the major characteristics of each of the seasons
		• Let students discuss in small groups with focus on the economic and environmental activities the community will be involved during each season.
			▪ Observe students' performance during the discussion, ask them basic questions and provide them with appropriate feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment

▪ Describe how bush burning and forest fire can cause climate change	▪ Bush burning
	▪ Forest fire
	  ○ Reasons
	  ○ impacts
		• Use pictures/videos showing bush burning and forest fire and simulate discussion on how bush burning and forest fire can cause climate change.
		• Let students read stories about bush burning and forest fires and ask questions about the consequences
			▪ Observe students' performance during the discussion, ask them basic questions and provide them with appropriate feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment

▪ Tell the possible causes of the rising of temperature	▪ Rising of Temperature
	  ○ Causes
	  ○ Effects
		• Allow students to discuss in small groups about what causes the rising of temperature across the world and what can be done to solve it.
		• Let a guest speaker use examples to explain how the increase in air temperature affects the oceans, weather patterns, snow and ice, and plants and animals. Conduct Q&A session after the presentation.
			▪ Observe students' performance during the discussion, ask them basic questions and provide them with appropriate feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the methods people use to care for animals	▪ Animal husbandry ○ Methods of caring/ protecting for animals	▪ Use small group discussion on the methods of caring animals. Allow students to tell what they can do to protect the animals at home and also wild animals. ▪ Let students read stories about "protecting the wild animals" and conduct Q&A session.	▪ Observe the students' performance during the discussion and provide constructive feedback ▪ Check students ability and willingness of caring for animals through Q&A.

GRADE 5

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how environment plays a role in the healthy living of human beings ▪ Describe how birds live ▪ Identify reptiles	▪ Environment and its importance ▪ Birds ▪ Reptiles	• Create a group discussion on the importance of environment in the healthy living of human beings. Let students understand humanity's entire life support system depends on the well-being of all the environmental factors • Use pictures/videos that show environment is the only home that humans, birds and reptiles have, and it provides air, food, and other needs and conduct discussion	• Observe the students' performance during presentation of samples, Q&A and discussion sessions and provide constructive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the environmental problems in their locality ▪ Describe how environmental problems affect livelihood	▪ Environmental problems types o Natural o Manmade o Effects of the problems in livelihood	• Through Q&A session, assist students to list the environmental problems like global warming, acid rain, air pollution, urban sprawl, waste disposal, ozone layer depletion, water pollution, climate change and many more • Use different examples to show how these problems affect every human, animal and nation on this planet.	• Observe the students' performance during the Q&A, discussion and presentation sessions then provide appropriate positive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain the importance of tree planting ▪ Participate in tree planting actions in their school ▪ Demonstrate how to care for planted trees	▪ Tree planting o Afforestation o Re-afforestation	• Use small group discussion on the importance of tree planting. Allow students to tell what they think trees are important. • Organize a school tree planting day and work with students in cleaning the school compound. • Assist students in the techniques of caring for planted trees	▪ Observe the students' performance during the discussion, tree planting and caring actions and provide constructive feedback ▪ Check students understanding of clean school through Q&A.

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Tell the difference between weather and climate ▪ Describe what climate change is	▪ Weather and Climate	• Use a brainstorming session on defining each of the terms "weather" and "climate" • Let students discuss in small groups about how weather changes during a particular day • Allow them to measure the temperature of the day at intervals and let them see the changes • Let them explain what climate change means and how it is visible.	▪ Observe the students' performance during the Q&A, discussion and presentation sessions then provide appropriate positive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how use of fuel wood can be the cause of climate change ▪ Explain how deforestation causes climate change	▪ Fuel wood ▪ Deforestation	• Organize a debate session where students debate the use of fuel wood as a means of life on one hand and a cause for climate change on the other • Allow students to discuss in groups regarding deforestation, how it happens and how it causes climate change due to the decreasing number of trees available to capture the increasing carbon dioxide levels in the atmosphere. • At the end of the discussion ask students what they can do about it.	▪ Observe the students' performance during the Q&A, discussion and presentation sessions ▪ Analyze the responses of students regarding their role and then provide appropriate positive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how flooding can be considered as an effect of climate change	▪ Flooding ○ Its causes and consequences	• Prepare a story about flooding and let students read it. Then, organize a Q&A session how flooding can be considered as an effect of climate change	▪ Observe the students' performance during the Q&A, discussion and presentation sessions

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how to manage and dispose home wastes effectively ▪ Demonstrate the ability to manage wastes	▪ Managing home wastes	• Let students bring and share to the class their own reports on the ways their family/community manages home waste and garbage. • Let students discuss on the best and smartest ways of managing home wastes. Then, allow them to practice it using the garbage at school.	▪ Observe the students' performance during the reporting, Q&A, discussion and actions sessions

GRADE 6

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how the interaction between living things & non-living things ▪ Describe the roles of insects in the ecosystem ▪ Demonstrate how air can be polluted	▪ Interaction between living things & non-living things ▪ Insects ▪ Air	• Let students discuss in small groups about the interactions they observe between living things & non-living things (Ecosystem). Consolidate the discussion using some examples of challenges in the ecosystem affects life of humans. • Allow students to provide examples of insects they know. Then, let students discuss about benefits of insects to our environment. • Use experiments to demonstrate show how air can be polluted and the polluted air also affects life.	▪ Observe the students' performance during the Q&A, discussion and demonstration sessions

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the causes of environmental problems ▪ Explain the effects of environmental problems	▪ Environmental problems o Causes and Effects	• Let students discuss in small groups about the man-made and natural environmental problems. • Allow students to use concept mapping to show cause and effects • Organize a Q&A session on how environmental problems arise and what students' role would be to reverse the problems. • Consolidate the discussion with concrete examples (pictures/videos if available)	• Observe the students' performance during the Q&A, discussion and demonstration sessions

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain why we need to conserve wildlife ▪ List the wildlife conservation places of Ethiopia ▪ Identify major threats of wildlife	▪ Wildlife conservation	• Allow an expert to speak about why we need to conserve wildlife and the efforts of the govt. and the society in conserving wildlife providing examples of wildlife reserves of the country. • Then, conduct Q&A session about Ethiopia's wildlife conservation centers. • Let students discuss in small groups about the threats to wildlife like habitat destruction, poaching, pollution including industrial wastewater and pesticides….	• Observe the students' performance during the Q&A, discussion and demonstration sessions

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the difference and relationship between weather and climate	▪ Weather and Climate ○ Rainfall ○ Temperature	• Using brainstorming session ask leading questions to let students understand the difference and relationship between weather and climate • Consolidate the discussion providing students with an assignment focused on collecting the weakly weather report from the media and asking them to report it to the class.	▪ Observe the performance of students during the brainstorming and discussion sessions ▪ Observe their reporting and provide constructive feedback.

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Clarify how overgrazing affects climate ▪ Explain why population growth is a cause for climate change	▪ Overgrazing ○ Causes of overgrazing ○ Effects of overgrazing ▪ Population growth ○ Changes in lifestyle	• Let students read texts /see pictures about overgrazing. Then ask them critical questions on how it affects climate. • Allow an expert on population speak to students on population growth as a cause for climate change. • Conduct Q&A session on what students' role could be to control population growth.	▪ Observe the students' performance during the Q&A, discussion and presentation sessions ▪ Analyze the responses of students regarding their role and provide appropriate positive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how climate change leads to draught ▪ Explain how drought affects life	▪ Drought ○ Causes of drought ○ Effects of drought	• Show pictures of draught affected areas and create discussion among students on what leads to such a situation. • Let students work in small groups to produce a report on how life is endangered in draught affected areas. • Consolidate the discussion with examples that show how climate change leads to draught and what students can do to reverse the problem.	▪ Observe the students' performance during the discussion and reporting sessions ▪ Analyze the responses of students regarding their role and then provide appropriate positive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Identify recyclable materials ▪ Separate recyclable materials from those non-recyclable ▪ Show how wastes can be buried	▪ Recycling ▪ Burying of wastes	• Let students produce report about materials that can be recycled. Use school level wastes and ask students to practice separating recyclable materials from those non-recyclable ones. • Let students practice how to separate recyclable materials from non-recyclable ones as well as how to bury wastes	▪ Observe the students' performance during the separation and burying actions and provide constructive feedback

GRADE 7

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the balance of nature ▪ Identify amphibians and fish ▪ Describe how amphibians and fish live	▪ Balance of nature ▪ Amphibians and fish	• Prepare a story about the balance of nature and let students read. Use Q&A session and more examples to help students understand the balance of nature. • Using pictures/videos show characteristics of amphibians & fish, demonstrate how amphibians live and interact with nature. Consolidate the discussion asking questions like: why do we need amphibians?	• Observe the students' performance during the Q&A, demonstration and discussion sessions and provide constructive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ List the consequences of environmental problems ▪ Describe what can be done to those affected by environmental problems	▪ Environmental problems (consequences) o Desertification o Shortage of water o Draught o Pollution (air water, soil)	• Let students discuss in small groups about the consequences of environmental problems they know/heard. Consolidate the discussion using some examples of consequences of environmental problems that affects us and others. • Allow students to provide examples of what can be done to those affected by environmental problems.	• Observe the students' performance during the group discussion and reporting sessions and provide constructive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how we conserve our natural resources ▪ Demonstrate their ability to conserve natural resources	▪ Conservation of natural resources	• Allow an expert to speak about the efforts of the govt. and the society in conserving natural resources providing examples of conservation actions being done in the country. • Then, conduct Q&A session about Ethiopia's natural resources conservation centers. • Let students demonstrate their ability how they can conserve natural resources through arts.	• Observe the students' performance during the reporting, Q&A, discussion and demonstration sessions and provide constructive feedback

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Define climate change ▪ Describe the trends in climate change	▪ Understanding Climate change o Definition o Trends in climate change	• Allow a guest speaker that can provide basic information about climate change (what it means, its causes, its effects and the actions that can be taken) using clear examples. Conduct Q&A sessions to clarify the ideas. • Let students describe their role in the trends of the climate change adaptation and mitigation actions	▪ Observe the students' performance during the presentation, Q&A, and discussion sessions and provide constructive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how agricultural expansion contributes to climate change ▪ Explain how increased refute/waste dumps affect climate change	▪ Agricultural expansion ▪ Increased waste dumps;	• Organize a debate session where students debate over agricultural expansion as a production increment on one hand and as a cause for climate change on the other. • Let students understand how agriculture contributes to climate change both by emissions of greenhouse gases and by the conversion of non-agricultural land into agricultural land. • Let students discuss in small groups about increased refute/waste dumps affect climate change	▪ Observe the students' performance during the debate, Q&A, and discussion sessions and provide constructive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how climate change brings about soil erosion ▪ Describe how landslide occur	▪ Flooding ▪ Soil erosion ▪ Draught ▪ Land slide o Their causes and effects	• Let students interview a local environmentalist and produce a report on how climate change results in soil erosion and landslide. • Let students understand the increases in the frequency of landslides and the rate of erosion and sediment transport as a result of continued increases in the frequency and intensity of heavy rainfall.	• Observe the students' performance during the reporting, Q&A, and discussion sessions and provide constructive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain the importance of saving energy ▪ Describe why we need to use renewable sources of energy	▪ Saving energy ▪ Use of renewable energy sources (wind, hydro and solar sources of energy;)	• Use small group discussion on saving energy and using renewable *energy sources. Let students understand* different *energy sources* produce different amounts of pollutants. *Wind*, *solar*, and hydroelectric systems generate electricity with no associated air pollution.	• Observe the students' performance during the discussion asking them some critical questions and then provide constructive feedback

GRADE 8

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how the environment is structured ▪ Explain the role of forests in climate change ▪ Recognize the rise of temperature affects the environment	▪ Components of environment o Water -Hydrosphere o Air - Atmosphere o Land-- Lithosphere o biosphere o Astrosphere ▪ Forests ▪ Temperature and pressure	▪ Use small group discussion to help students understand the structure of the environment and that the components of structure of the environment are interlinked. ▪ Organize an art event where students write or draw about the role of forests in the climate change. Let students understand that forests are stabilizing forces for the climate regulating the ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods, and supply goods and services that can drive sustainable growth. ▪ Prepare a story text about how increasing/decreasing temperature affects the oceans, weather patterns, ice, plants and animals. Then, conduct a Q&A session.	▪ Observe students' performance during discussion and Q&A session and provide appropriate feedback

1.2. Environmental Problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain the details of environmental problems	▪ Environmental problems o air pollution o sound pollution o soil pollution o water pollution	▪ Let students discuss about the environmental problems related to air, sound, soil and water ▪ Consolidate the discussion with concrete examples. Let students understand that it is the description and monitoring of environmental changes, with predicting future changes and with attempts to maximize human benefit and to minimize environmental degradation due to human activities.	▪ Observe students' performance during discussion and Q&A session and provide appropriate feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Demonstrate the ability to manage the environment Explain the benefits of recycling to save the environment	▪ Environmental management, indigenous knowledge and Recycling ▪ Reduce and Reuse	▪ Let students brainstorm about Environmental management. ▪ Let students discuss about how recycling can decrease the generation of greenhouse gases, such as carbon dioxide and methane and help save energy. ▪ Allow students to demonstrate their ability to reduce wastes and reuse materials that are reusable so as to manage the environment.	▪ Observe students' performance during discussion and Q&A session and provide appropriate feedback

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe the relationship between climate change and agriculture	▪ Climate change and agriculture	• Organize a debate session where a group of students argue climate change affects agriculture and the other group of students can argue agricultural activities can contribute to climate change. • Conduct discussion using Q &A sessions.	▪ Observe students' performance during debate, Q&A and discussion sessions

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Realize unwise use of natural resources have negative impacts ▪ Explain how the carbon dioxide from industries and steam engines affect the climate	▪ Unwise use of natural resources ▪ CO_2 from industrial, steam Engines and Greenhouse effects	• Let students brainstorm and list down all the consequences that occur from the exploitation of resources. • Allow students to discuss on how natural resources be used sustainably. • Let students have a drawing competition to show how the carbon dioxide from industries and steam engines affect the climate. • Consolidate the discussion asking students what they can do to decrease the emission of the CO_2	▪ Observe students' performance during brainstorming, Q&A and discussion sessions

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how migration and displacement affect climate ▪ Recognize the health related risks associated with climate change.	▪ Migration ▪ Displacement ▪ Health related risks	• Let students prepare a report on how migration and displacement affect climate • Let them discuss also on health related risks associated with climate including chemical, physical and biological processes affecting water, air and soil in relation to environmental pollution.	▪ Observe students' performance during reporting, Q&A and discussion sessions

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how afforestation mitigate climate change ▪ Participate in the afforestation & reforestation activities ▪ Acknowledge that reducing greenhouse gases maintains the climate	▪ Afforestation & reforestation ▪ Reducing greenhouse gases	• Let a guest speaker/an expert speak to the class about the need for afforestation to mitigate climate change. • Allow students to participate in a campaign that focuses on afforestation/reforestation. • Prepare a story text that describes an activity aimed at reducing greenhouse gases saves the climate. Then conduct Q&A session.	▪ Observe students' performance during presentation, reading, Q&A, discussion and campaign sessions

GRADE 9

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how recycling helps stabilization of the ecosystem ▪ Clarify how climate change intensifies water cycle	▪ Food chain and recycling ▪ Water cycle	▪ Use examples and drawings to show how food chain exists symbolizing the path of energy within an ecosystem. Also explain how plastic impacts the food chain and how recycling can reduces that impact. Let students have their own drawings and analysis. ▪ Prepare a reading text on how water cycle occur and clarify building climate change resilience can happen through water management and ecosystems	▪ Observe students' performance during debate, Q&A and discussion sessions and provide appropriate positive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Recognize environmental hazards	▪ Environmental hazards o Types of environmental hazards----physical, chemical, biological, cultural o Man-made (wastes, fertilizers) o Natural (water hyacinth)	▪ Let students prepare a story about a common environmental hazard that was reported in the news and read to the class ▪ Consolidate the discussion using examples as climate changes, droughts, floods, melting glaciers, sea-level rise and storms intensify or alter, often with severe consequences ▪ Use Q&A sessions to consolidate the discussions	▪ Observe students' performance during report presentation and discussion sessions and provide appropriate positive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain why we need to conserve water ▪ Demonstrate their ability to conserve water	▪ Water conservation	▪ Let students discuss in small groups on why we need to conserve water. Use Q&A sessions to consolidate the discussions ▪ Consolidate the discussion mentioning climate change manifests itself primarily through changes in the water cycle. Hence, conserving water is important. ▪ Allow students to demonstrate their ability of water conservation through school level water resource	▪ Observe students' performance during discussion and Q&A sessions and provide appropriate positive feedback

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how conserving natural resources saves the climate ▪ Demonstrate their ability to conserve natural resources ▪ Explain how changes in *wind* speeds occur due to global warming	▪ Climate change and natural resources ○ Afforestation ○ Soil and water conservation ○ Utilization of renewable energy ▪ Wind	• Allow students to speak to an expert about the efforts of the govt. and the society in conserving natural resources to save the climate providing examples of conservation actions being done in the country. • Then, conduct Q&A session about Ethiopia's natural resources conservation activities. • Let students debate on how wind speed affects the climate but wind power would still help the world stop pumping carbon dioxide into the atmosphere, which would fight climate change and global warming.	▪ Observe students' performance during interview, Q&A ,discussion and demonstration sessions and provide appropriate positive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how emission of greenhouse gases negatively affect the climate ▪ Analyze how ocean currents affect climate	▪ Emission of greenhouse gases ○ Co_2 ○ Ch_4 ○ N_2o ○ Chloro-floro carbon ▪ Ocean current process	• Let students discuss on emissions of greenhouse gases • Consolidate the discussion helping students understand that these gases negatively affect the climate and hence threaten life • Use drawings/pictures/videos to let students understand how the horizontal currents carry with them cool or warm water over an extended distance and end up in warming up or cooling the air.	▪ Observe students' performance during Q&A and discussion sessions and provide appropriate positive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how climate change intensifies desertification ▪ Describe how climate change leads to draughts	▪ Desertification ▪ Drought	• Show pictures of deserts and explain how climate changes leads to the expansion of deserts. • Let students work in small groups to produce a report on how climate change leads to draught and what students can do to reverse the problem. Consolidate the discussion with examples that show how life is endangered in draught affected areas.	▪ Observe students' performance during Q&A and discussion sessions and provide appropriate positive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Illustrate how wetlands store large amounts of carbon ▪ Explain how industrial bio-technology save the climate	▪ Wetland conservation ▪ Bio-engineering of microbes to reduce greenhouse gases	• Provide examples on how conserving wetlands is a viable way of maintaining existing carbon stores and avoiding CO_2 and other emissions. • Invite a guest speaker to talk about industrial biotechnology as part of the solution to climate change. Use Q&A to clarify the idea.	▪ Observe students' performance during presentation, Q&A and discussion sessions and provide appropriate positive feedback

GRADE 10

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Analyse how population dynamics is a cause of biodiversity loss ▪ Explain how microorganisms interact positively and negatively with the environment ▪ Describe how improper land use can affect the environment	▪ Population and environment ▪ Microorganisms ▪ Land	• Facilitate a brainstorming session on the relationship between population and environment. Consolidate the discussion helping students understand that population dynamics, including population growth, density, urbanization and migration affect the environment placing the ecosystems under increasing stress. • Using an experiment demonstrate how microorganisms help to increase the amount of air and water that gets into the soil • Let students read a story/text about better urban land use and its role to reduce greenhouse gas emissions from cars and limit the human and financial costs caused by developing environmentally risky land.	• Observe students' performance during brainstorming, Q&A, reading and discussion sessions and provide appropriate positive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Analyse the major environmental issues affecting Ethiopia ▪ Illustrate what they can do to mitigate the environmental problems	▪ Major Environmental problem in Ethiopia o Overpopulation o Deforestation o land degradation o desertification o drought, flood & pollution	• Allow students to produce a group report on major environmental issues affecting Ethiopia (the groups could be reporting on soil erosion and land degradation (encompassing impacts on forests, agricultural and pastoral land), on deforestation and forest degradation, on water scarcity, biodiversity loss and on various types of pollution issue. • Then, allow students to reflect on what they can do to mitigate the environmental problems	• Observe students' performance during reporting, Q&A and discussion sessions and provide appropriate positive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Investigate the mechanisms of reducing greenhouse gases	▪ Reducing greenhouse gases	• Let students discuss in small groups on how to reduce GHGs. Consolidate the discussion helping students understand that climate change mitigation generally involves reductions in human emissions of GHGs and mitigation may also be achieved by increasing the capacity of carbon sinks like through reforestation.	• Observe students' performance during the discussion and provide appropriate positive feedback

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Analyse the social impacts of climate change ▪ Illustrate role of humans in adapting to the social impacts of climate change	▪ Climate change and social impacts	• Facilitate a brainstorming session on the Social impacts of the climate change. Let students understand socially climate effects such as hunger, poverty and diseases like diarrhea and malaria disproportionately impact children. • Allow students to express their thought on what they can do adapting to the social impacts of climate change	▪ Observe students' performance during the brainstorming and discussion sessions and provide constructive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how urbanization affects the climate ▪ Explain the impact of industrial waste on the climate	▪ Urbanization ▪ Industrial waste	• Let students discuss in small groups on how urbanization affects the climate, Consolidate the discussion with proper examples of the impact of climate change and urban growth on future urban temperatures and the potential for increased heat stress on urban residents. • Allow students to understand the impact of industrial waste on the climate and let them express their thought on solving the issue.	▪ Observe students' performance during the discussion and provide constructive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Visualize how the ozone layer can be depleted ▪ Analyse ozone layer depletion contributes to global warming	▪ Ozone layer depletion ▪ CFC	• Let students understand that ozone depletion and climate change are linked in a number of ways, but ozone depletion is not a major cause of climate change. The ozone hole is not causing global warming, but it is affecting atmospheric circulation. • Allow students to express what can be done to reverse the depletion	▪ Observe students' performance during the discussion and provide constructive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Stand for the environment and save the climate ▪ Voice for the environment to save the climate	▪ Environmental stewardship ▪ Environmental activism ○ Rights and responsibilities	• Allow students to express their views of responsible use and protection of the environment through sustainable practices. • Ask them to write and present about how to become a steward of the environment dealing with man's relation to land and to the animals and plants which grow upon it and collaborate with others in social, scientific, political, and conservational fields with the main purpose of addressing environmental concerns.	▪ Observe students' performance during the discussion and provide constructive feedback

GRADE 11

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how policies affect the environment ▪ Describe how legal frameworks help us save the environment ▪ Outline how protozoa live and interact with the environment ▪ Explain the dynamics of the earth in its resources	▪ Economics and environment policies ▪ Legal frameworks and guidelines for environment ▪ Protozoa ▪ Earth and its resources	▪ Let students understand that policy changes (political & economic) affect the environment interactively with both public concerns. The interaction with policy changes causes a disruption in the continuously evolving balance between the social factors that damage the environment and the ability of the environment to recover. ▪ Let students understand what protozoa are, their shapes and sizes as well as how they live and interact with the environment. ▪ Help students understand about the earth processes, surface and atmospheric dynamics, Earth system history, climate and climate change, marine and freshwater systems, and ecology.	▪ Observe students' performance during the discussion and provide constructive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Identify major emerging problems	▪ Emerging problems o Climate change o Pollution o Environmental degradation o Diseases o Dam siltation o Invasive species	▪ Allow students to discuss in small groups about the major current environmental issues may include climate change, pollution, environmental degradation, and resource depletion etc. ▪ Let students use concept mapping to show the interrelationship between major problems.	▪ Observe students' performance during the discussion and provide constructive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Stand for the environment and save the climate ▪ Voice for the environment to save the climate	▪ Environmental stewardship and Environmental activism	• Allow students to express their views of responsible use and protection of the environment through sustainable practices. • Ask them to write and present about how to become a steward of the environment dealing with man's relation to land and to the animals and plants which grow upon it and collaborate with others in social, scientific, political, and conservational fields with the main purpose of addressing environmental concerns.	▪ Observe students' performance during the discussion and provide constructive feedback

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how climate change affects the economy	▪ Climate change and the economy	• Let students brainstorm on how the climate change affects the economy. Consolidate the discussion with more examples like: shrinking productivity, rise of prices, poverty & diseases affecting the working force, shortage of fresh water and war to access the limited resources as climate change impacts.	▪ Observe students' performance during the discussion and provide constructive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how burning of fossil fuels cause climate change ▪ Acknowledge that gas flaring has local environmental impacts	▪ Burning fossil fuels ▪ Gas flaring	• Let students understand that when oil, coal, and gas are burnt, the process drives the current global warming crisis as well. Fossil fuels produce large quantities of carbon dioxide when burned that trap heat in the atmosphere and lead to climate change. • Allow students to read about gas flaring. Let them understand that flaring can have local environmental impacts, as well as producing emissions, which have the potential to contribute to global warming.	▪ Observe students' performance during the discussion and provide constructive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Analyse how climate change results in global warming	▪ Global warming	• Let students discuss on global warming. Consolidate the discussion explain that the global warming trend observed to the human expansion of the "greenhouse effect" - warming that result when the atmosphere traps heat radiating from Earth toward space is the effect of climate change.	▪ Observe students' performance during the discussion and provide constructive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Recognize Ethiopia's policy level effort in saving the climate ▪ Recognize the international responses to climate change	▪ Ethiopia's CRGE Strategy & its initiatives ▪ International responses for climate change	• Invite a guest who can speak about the Climate Resilient Green Economy (CRGE) strategy that addresses both climate change adaptation and mitigation objectives. • Let students compare CRGE strategy with those of international responses to climate change. • Conduct Q&A session to clarify the major points.	▪ Observe students' performance during the discussion and Q&A sessions then provide constructive feedback

GRADE 12

1. Environment

1.1. Understanding the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Recognize the UN sustainable development goals ▪ Describe how bacteria live and interact with the environment ▪ Explain why we need to protect the biodiversity ▪ Mentions the characteristics of bio- geographical regions	▪ Sustainable Development Goals ▪ Bacteria ▪ Biodiversity (in terms of living things) ▪ Bio- geographical regions	▪ Initiate discussion on defining sustainable development and the 2030 Agenda for sustainable development (the SDGs). Consolidate the discussion with the definition "Sustainable development that meets the needs of the present without compromising the ability of future generations to meet their own needs." ▪ Allow students to discuss in groups on how bacteria live and interact with the environment, especially their relationship with humans and the dependency of the ecosystem on the activity of bacteria ▪ Let students understand that biodiversity is the key indicator of the health of an ecosystem and hence must be protected. ▪ Allow the students to discuss about the different bio-geographic regions and write report.	▪ Observe students' performance during the discussion and Q&A sessions then provide constructive feedback

1.2. Environmental problems

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain why we need environmental impact assessment ▪ Recognize the components of environmental impact assessment	▪ Lack of proper environmental impact assessment	• Let students write reports about why we need environmental impact assessment (EIA) and present to the class. Consolidate the discussion raising the fact that EIA helps to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. Then, remind them about the fundamental components of an EIA.	• Observe students' performance during the reporting, discussion and Q&A sessions then provide constructive feedback

1.3. Protecting and Conserving the Environment

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Acknowledge Ethiopia's environment policy ▪ Identify sectoral and cross-sectoral environmental issues and their responses	▪ National environment policies ▪ Mainstreaming environment (Roles of sector offices)	• Let a guest speaker speak about Ethiopia's Environment Policy as well as the sectoral and cross-sectoral environmental issues. Let students understand the aim of the policy is to maintain the health and quality of life of all Ethiopians and to promote sustainable social and economic development.	• Observe students' performance during the presentation, discussion and Q&A sessions then provide constructive feedback

2. Climate Change

2.1. Concepts of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Recognize the different views of climate change	▪ Climate change - local and world view	• Let students discuss about the different views of people on climate change. Students should be aware that people with more education tend to be more concerned about climate change and in some places women and younger people are also more concerned.	▪ Observe students' performance during the discussion and Q&A sessions then provide constructive feedback

2.2. Causes of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how poverty exacerbates the negative effects of climate change ▪ Acknowledge migration occurs due to the effects of climate change	▪ Poverty ▪ Migration (Their causes and impacts)	• Allow students to debate over the issues of poverty and migration (whether they are causes or effects of climate change). Let students understand that the cycle of poverty exacerbates the potential negative impacts of climate change and environmental migrants who were forced to flee "due to sudden or gradual alterations in the natural environment related to impacts of climate change like sea-level rise, extreme weather events, and drought and water scarcity."	▪ Observe students' performance during the debate, discussion and Q&A sessions then provide constructive feedback

2.3. Effects of Climate Change

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Describe how climate change impacts on the loss of biodiversity	▪ Loss of Biodiversity	• Let students discuss in groups on how climate change impacts on the loss of biodiversity. Consolidate the discussion helping students to know that climate change is affecting the habitats of several species, which must either adapt or migrate to areas with more favourable conditions. Even small changes in average temperatures can have a significant effect upon ecosystems.	▪ Observe students' performance during the discussion and Q&A sessions then provide constructive feedback

2.4. Climate Change Action

Competencies	Contents	Learning Strategies and resources	Assessment
▪ Explain how the green economy saves the climate ▪ Comprehend the nature of climate financing ▪ Recognize international agreements regarding climate financing	▪ Encouraging green economy ▪ Climate financing ▪ Carbon Trading	• Allow students to read texts that show how the green economy saves the climate. Let students be aware that by securing livelihoods and promoting sustainable jobs, the green economy can eradicate poverty and reduce vulnerability across a range of sectors. • Let students read about the Kyoto Protocol and the Paris Agreement and recognize that financing is to support mitigation and adaptation actions that will address climate change.	• Observe students' performance during the reading, discussion and Q&A sessions then provide constructive feedback