Climate Change (Intermediate/Advanced ESOL)

Overview of Lesson - This unit introduces climate change/global warming to esol learners. The goals of this unit are:
- understanding the phenomenon of climate change/global warming, including the role of the carbon cycle
- defining key vocabulary words relating to climate change and the carbon cycle
- locating climate change in the learner’s context (weather, changes in their home country’s weather and climate)
- supporting student’s exploration of possible response to climate change and identifying personal and collective action

Awareness – Connecting with Learners’ Prior Knowledge:
In pairs, look at these picture and discuss the questions below:
Questions
1. What's happening in each of the pictures?
2. Have you heard of things like these in the news lately?
3. Have you ever been in a similar situation? Tell your partners about it.
4. Do you think extreme weather is more common now than some years ago? Why?

VOCABULARY DEVELOPMENT
Work in small groups to expand the following vocabulary chart:

As students share their ideas on the introductory discussion questions and vocabulary development chart, the teacher makes sure to introduce key vocabulary and concepts that students don't bring up.

In addition to extreme weather vocabulary (flood, drought, etc.), the following vocabulary / concepts should be introduced at this point:

PRE-READING

Vocabulary Pre-Teach:
Teacher writes vocabulary list on white board. Students work in pairs:
How many of these words do you know? Which ones don’t you know?

<table>
<thead>
<tr>
<th>Balance / Imbalance</th>
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<tbody>
<tr>
<td>To take in</td>
</tr>
<tr>
<td>To give off</td>
</tr>
<tr>
<td>Oxygen</td>
</tr>
<tr>
<td>CO2</td>
</tr>
<tr>
<td>Photosynthesis</td>
</tr>
<tr>
<td>Organism (Live / Dead)</td>
</tr>
<tr>
<td>(Plant / Animal)</td>
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<td>respiration</td>
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As a class, the teacher goes over the vocabulary words with the students, writing the words that none of the students knows in a separate list.

Use a dictionary. Work collaboratively in pairs or groups of three. Can you understand the meaning of these words using the dictionary? [Intermediate to advanced students use (ESL abridged) monolingual dictionary. Beginner to lower intermediate learners use bilingual dictionary. Depending on the specific characteristics of the class, the teacher should consider grouping students into native language groups, or across languages to facilitate interlanguage collaboration.]

At the end, the teacher goes over the vocabulary with the large group confirming or correcting, clarifying and explaining the students’ understanding of the concepts.

Pre-reading discussion:
Teacher hands out picture.

What's happening in these pictures?
Describe the pictures using the vocabulary we just introduced.
For high intermediate / advanced students with a strong formal education background only:

Students will do three readings of the article. After each reading students:
1. turn text over so they do not read;
2. get in pairs: discuss what they have understood;
3. pairs share with the large group. Teacher organizes information into chart:

<table>
<thead>
<tr>
<th>FIRST READING</th>
<th>SECOND READING</th>
<th>THIRD READING</th>
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The carbon cycle is a complex Earth system that has gone on for millions of years. Over the last 100 years human activity has created a serious imbalance in this essential Earth system.

Carbon dioxide ($\text{CO}_2$) is recycled in plants, water, and rocks – taken in and given out in a continuous cycle. Land plants and animals take in $\text{CO}_2$ and give off oxygen, while humans
and animals do the opposite. Plant life in the oceans, lakes and other waterways use photosynthesis to turn dissolved CO₂ into oxygen. At the Earth's north and south poles, cold seawater is especially accepting of CO₂ making, the substance soluble. In addition, the circulation of the ocean and surface wind currents from the Gulf Stream drive surface water to great depths and distances, circulating CO₂ throughout the oceans. The weathering of carbon-containing rocks on land that runoff into the streams and oceans also add to the carbon cycle.

CO₂ is also stored in the earth, vegetation, fossil fuels, and deep in the ocean.

The threatening parts of the natural carbon cycle are the parts that are not natural at all. The burning of fossil fuels when we use gasoline and diesel fuel to power our cars, trucks, and machinery and when we operate coal fired and natural gas fired power plants to make electricity has created an imbalance in the carbon cycle. Releasing carbon that has been stored in fossil fuels for millions of years overloads the atmosphere and throws the carbon cycle out of balance.

Besides burning fossil fuels, people have also released long-stored carbon through deforestation and industrial agriculture. When carbon builds up on the atmosphere, it traps in heat causing global warming. Since it has taken decades for the carbon cycle to become out of balance, it will also take decades for people to reverse the effects of global warming. This is assuming an earnest effort is made to reverse the effects.

Using alternative fuels and particularly those created with renewable energy such as solar, wind and water sources will help the carbon cycle to get back in sync. Without these efforts, however, the natural carbon cycle will continue to erode causing serious climate change and geographical disruption.

After the third reading, teacher collects texts so students cannot refer to them any more and students work in groups of three:

Re-tell the article by answering the questions:
1. What is the Carbon Cycle?
2. What does the article say about the Carbon Cycle?
3. What do the pictures show us about the Carbon Cycle?
4. How have people affected the Carbon Cycle over the last 100 years?
5. What can we do to correct the imbalance?

Use markers and large sheets of paper to write your report of the article, so the other students can read it.

The teacher encourages students to use vocabulary from the list introduced at the beginning (Vocabulary Pre-teach). Demonstration may be necessary for this. Once all the groups have posted their sheets, students circulate around the classroom and read the other groups' reports. The teacher encourages the students to point out any errors / incorrect concepts.
The teacher makes sure to read all reports. At the end, the teacher clarifies/corrects, as inductively and “learner-centeredly” as possible, any concepts that may not be clear. Language Error Correction would be a great idea at this point, too.

**POST-READING:**

**Class debate:**
(Solid intermediate to advanced students with strong formal education background only)

Ask groups to take one of these positions and prepare to debate the other teams:

**Position 1: THERE IS NO PROBLEM:**
Your team believes there is no global warming or climate change. Carbon levels and temperatures have gone up at other times in history. The oil companies and politicians just want to get more money from us.

**Position 2: THERE IS A PROBLEM, BUT IT IS NOT URGENT:**
Your team believes there is a problem, but it’s not as serious as some people think. Scientists will produce the technology we need to solve the problem. We have to wait and see what the government and scientists think of. It is ridiculous to try to change our lives. It’s just not possible for people to stop driving their cars or use less energy.

**Position 3: THERE IS A PROBLEM AND WE NEED TO DO SOMETHING RIGHT NOW:**
Your team believes there is a big problem, and this is probably one of the most serious moments in the history of people. You have evidence that climate change is already happening, and is more serious in the poorer communities. We must reduce energy use, reduce fossil fuel use, and build clean energy that will help everyone including the poorer communities.

**PLUG IN: READING / LISTENING ACTIVITY:**
Teacher selects a current newspaper article/newscast related to extreme weather events.

**Before reading / listening:**
Vocabulary Pre-Teach:

Materials needed: markers, colored index cards (2 colors, e.g. green and red))

Teacher identifies vocabulary in the text that is key for comprehension at the different stages of reading/listening and that the teacher anticipates the students will have difficulty with. In addition, the teacher lists words and expressions that the students might need in order to discuss the text.
Teacher writes vocabulary words on red index cards (these will be called “vocab cards”), and their corresponding definitions on green index cards (these will be called “definition cards”). Each student receives an equal number of vocabulary cards and definition cards (the exact number will depend on the total number of vocab words as well as the number of students in the class).

Task: Students walk around the classroom mingling with other students in order to find the matching word cards for their definition cards, and the matching definition cards for their word cards.

Once students have finished circulating, the teacher has each student present her / his words to the class. As students present, the teacher makes sure to write each word on a poster-size “new vocabulary chart” that includes meaning, pronunciation, use (i.e. collocations, etc.) and example sentences.

Prediction:

Based on the title of the article / newscast and, if possible a visual, the teacher asks students to make a prediction as to what the article / newscast might be about.

**During Reading:**
**First Reading:**
Students read / listen for gist. Task: students read / listen in order to confirm / correct their prediction.

**Second Reading:**
Students read / listen for main ideas.

The teacher prepares index cards with sentences summarizing the main ideas of the text. The teacher then gives each pair / small group a set of cards.

Task:
- If reading: as students read, they work in groups to match the cards to the paragraphs.
- If listening: as students listen, they work together to put the cards (=main ideas) in order.

**Third reading:**
Scanning for specific ideas. Activities for this stage include questions, true or false statements, cloze exercises, etc.
Attitude – Exploring Learners’ Interpretations of Information:

PLUG IN: AFTER READING DISCUSSION:
Once awareness of the worldwide problem of extreme weather has been raised, the teacher has the students discuss in pairs:
- weather they have had a specific experience related to extreme weather events, here in the U.S. or in their native countries;
- what they believe the causes are of this problem.

After the pair / small group discussions, the different pairs / groups share with the class. On a large piece of paper, the teacher writes down all the ideas and vocabulary that students come up:

EXPERIENCES
RELATED VOCABULARY
CAUSES OF EXTREME WEATHER

All ideas / concepts brainstormed in the previous stage remain on piece of paper / board. Students discuss the following questions:
1. How do you feel about this situation?
2. What can we do about this?
3. What should the government do about this?

Action – Learners Taking Action/Integrating Information:
In pairs / small groups, students discuss the following questions:
1. What do governments and people need to do in order to stop contributing to global warming / climate change?
2. What job opportunities are there / will there be in connection with the change of lifestyle / structures required to stop contributing to global warming / climate change?