**Lesson Plan Outline (provision of teaching materials on Micro-teaching Part)**

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| **Class Level: F.4** | **Duration: 60 min** | **Lesson nature: Face-to-face** |
| **Subject: Geography** | | |
| **Name of unit/ theme: Weather and Climate (elective)** | | |
| **Issue/ Problem/ Topic: How does a tropical cyclone form and grow?** | | |

**Learning Objectives**

Upon completion of the lesson, students should be able to:

**Knowledge**

1. Define the nature of typhoons in Hong Kong.
2. Define the typhoon formation in Hong Kong.

**Skills**

3. Adopt the experiment set that can facilitate safety and smooth operation (cleanliness of surroundings, neatness with food colorings).
4. Use the improvised means (like bottles, cyclone tubes and food colorings) to conduct the experiment.
5. Cooperate and interact with classmates.
6. Develop multi-literacy and critical skills.

**Attitude**

7. Characterize typhoon nature, its formation and relation to the climate region.
8. Model typhoon formation in a classroom environment.

**Teaching resources (see appendix):**

- Lead-in activity & Introduction: Kahoot!, Worksheet (Part A: KWLH Chart), Diagrams

- Pre-task activity: Video news
- Experiment: Experiment materials (bottles, colored oil, glue gun), Worksheet (Parts B and C)
- Class activity: Nearpod, Diagrams, Description video
- Conclusion: Worksheet (Part A: KWLH Chart and Post-class activity)

**Students' Previous Knowledge:**

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| Climatic characteristics of Hong Kong and China |

**Potential Learning Difficulties and Solutions:**

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| 1. Messing up the classroom.<br>As the experiment materials included water and oil, it is possible that some pupils may spill over the liquid. **Solution:** To cover working areas with unnecessary papers like old newspapers.<br>2. Theoretical concepts.<br>Explanation on how the low-pressure centre works on tropical cyclones and how the Coriolis force driven the direction of motion may be unclear to some students. **Solution:** To show diagrams and videos so that they could visualize information gained.<br>3. Unobvious experiment result.<br>Some involuntary actions may lead to unclear experiment results and, thus, to unclear observations. **Solution:** To explain the experiment procedure well and warn them to be careful.<br>4. Problem with time-management.<br>There is always a risk of running out of time, especially when there are collaborative works during the lesson. **Solution:** To set timers and stick to the lesson plan. |

**Micro-teaching URL Link:**
https://drive.google.com/file/d/1_5TZgUsp-3dnZz6KlcOH_XMDnjRdvbzI/view?usp=sharing

| Purpose/Teaching Stage/time | Teaching Sequences and Activities | Resources/Materials (refer to appendices for the details) |
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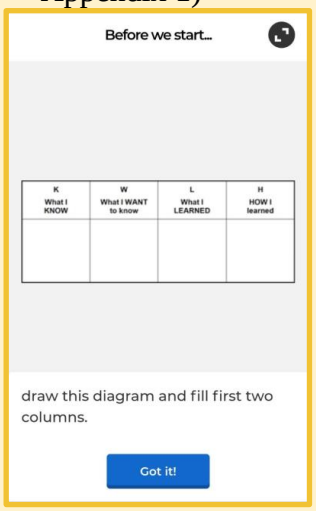
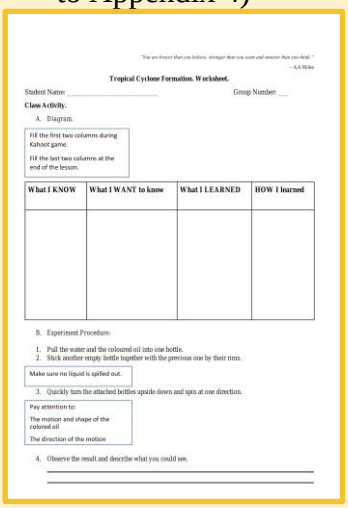
| <u>Lead-in activity & Introduction (10 mins):</u><br><br>❖ To stimulate students' previous knowledge by linking earlier topics' content (Climatic Characteristics of Hong Kong and China) to the new topic and to arouse students' interest. | ➢ Teacher starts with a question: Why does Hong Kong get typhoons?<br>Students have already covered climatic characteristics of Hong Kong, so they may answer: "due to the climatic characteristics of Hong Kong". This is a question of high cognitive level, since critical thinking is involved while looking for a linkage of one phenomena to another (climate -> typhoons).<br>➢ Teacher-Students Discussion starts.<br>Students would express their points of views. In this stage Teacher would not correct the answers, but would allow students to have a brainstorm and have a warm-up by carefully listening and navigating them to prior lessons content (e.g., Do you remember what we discussed last lesson?). At the end of the discussion no "true" or "false" answer is identified, the teacher just thanks students for their participation.<br>➢ The teacher distributes lesson worksheets to the students.<br>➢ Teacher starts a Kahoot game.<br>First Kahoot slide asks students to fill the first two columns of the Diagram.<br>Other three questions are about Hong Kong geography and its impact.<br>Last Kahoot slide summarizes all the facts learned from previous questions.<br>A deductive approach is used during this gamified learning process: Students are given, at first sight, random facts that altogether lead to the conclusion.<br>➢ Teacher introduces the climate region of HK to students by using a | ➢ Kahoot (Refer to Appendix 1)<br>  <br><br>➢ Worksheet (Class Activity: Part A) (Refer to Appendix 4)<br>  <br>Tropical Cyclone Formation. Worksheet.<br>Student Name: Group Number:<br>Class Activity:<br>A. Diagram.<br>Fill the first two columns during Kahoot game.<br>Fill the last two columns at the end of the lesson.<br>What I KNOW \| What I WANT to know \| What I LEARNED \| HOW I learned<br>B. Experiment Procedure:<br>1. Pull the water and the coloured oil into one bottle.<br>2. Stick another empty bottle together with the previous one by their rims.<br>Make sure no liquid is spilled out.<br>3. Quickly turn the attached bottles upside down and spin at one direction.<br>Pay attention to:<br>The motion and shape of the colored oil<br>The direction of the motion<br>4. Observe the result and describe what you could see. |

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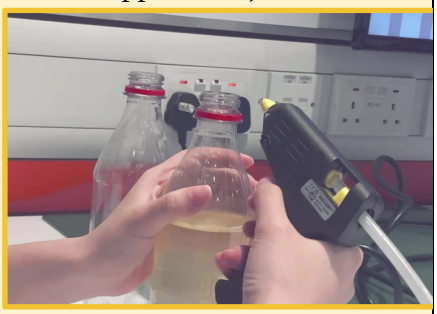
| | temperature-precipitation diagram and a map of climatic zones. | ➢ Diagrams (Refer to Appendix 2)<br>  |
| <u>Pre-task activity (10 mins):</u><br><br>❖ To provide basic understanding about the association of a climate region to typhoons and provide students with daily-life examples to enhance students' interest in the lesson. | ➢ Teacher explains how the climate region of Hong Kong associates with the typhoons.<br>➢ Teacher shows a video news about a typhoon event in Hong Kong.<br>➢ Teacher asks students to observe the impacts of the typhoon event.<br>➢ Teacher elaborates on the example shown in the video.<br>Use of IT (here video) may help students to see the impact typhoons have on the city and citizens. This is supposed to help the teacher to intrigue students to learn the reasons behind typhoon formation. | ➢ Video news: <u>https://www.scmp.com/video/hong-kong/2164446/worlds-most-powerful-storm-2018-rips-through-hong-kong</u><br>  |
| <u>Experiment (25 mins):</u><br><br>❖ To conduct an experiment to demonstrate how a low-pressure centre works during tropical cyclone formation.<br><br>*Even though at this stage students are not familiar with definitions of "Low-pressure centre" and "Coriolis force", at the* | Teacher divides students into 6 groups with 5 members.<br>Students are divided into groups according to their sitting places.<br>Students set the tables for the experiment.<br>To avoid messing up students are given unnecessary papers (e.g., old newspapers) to cover the working area.<br>Teacher makes an introduction to the experiment.<br>Teacher explains the experiment procedure:<br>1. Attach cyclone tubes to bottles.<br>2. Add colored oil to water.<br>3. Give it a spin.<br>4. Watch a typhoon.<br>Teacher reminds students that there are some | ➢ Experiment set (bottles, colored oil, water, glue gun) x6 (Refer to Appendix 3)<br>  <br>➢ Worksheet (Class activity: Parts B and C) (Refer to Appendix 4) |

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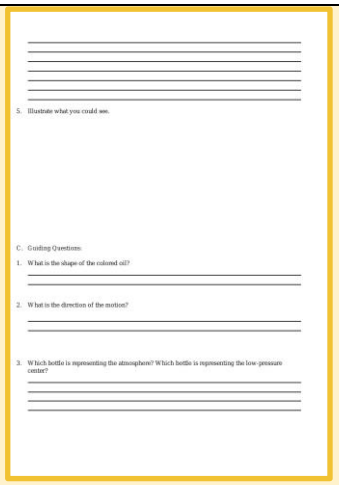
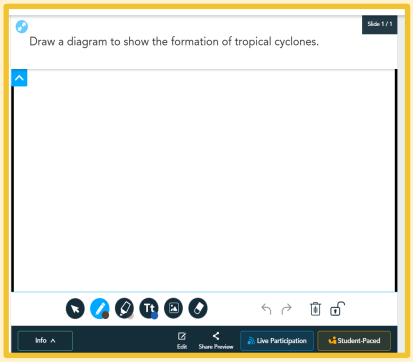
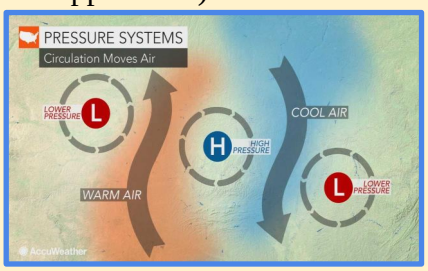
| *moment of defining these principles they would already naturally observe the principles. Inductive approach of teaching is used here and after.* | guiding questions in the worksheet they need to answer.<br>○ What is the shape of the colored oil?<br>○ What is the direction of the motion?<br>○ Which bottle is representing the atmosphere? Which bottle is representing the low-pressure center?<br>- Teacher distributes the experiment materials.<br>- Students conduct the experiment as in a mentioned above procedure in a group.<br>- Teacher monitors students' experiments and the use of glue guns.<br>In this stage the teacher does not interfere into students' perception of the experiment. Teacher may only help with the experiment procedure, if asked so. |  |
| <u>Class activity (25 mins):</u><br>❖ To facilitate experiential learning and build up knowledge on students' findings and stimulate high order thinking/critical thinking. | ➢ Teacher asks students to draw a typhoon formation diagram based on their findings and upload it to Nearpod.<br>➢ Teacher invites students to present their findings group by group.<br>➢ Students present their findings with their diagram (3 mins per group).<br>○ shape of coloured oil<br>○ direction of the motion<br>○ identify atmosphere and low pressure centre<br>➢ Teacher shows correct answers and provides feedback.<br>➢ Teacher explains the formation of typhoons step by step (with diagrams inserted in ppt and a short video) to echo with students' findings.<br>○ explain how low-pressure centre works on tropical cyclone<br>○ explain the direction of the motion with Coriolis force<br>➢ Description video: https://youtu.be/UKL9NIxLIIE | ➢ Nearpod (Refer to Appendix 5)<br>https://share.nearpod.com/ds2KzQk1Leb<br>  <br>➢ Diagrams from Microteaching PPT (Refer to Appendix 7)<br>  |

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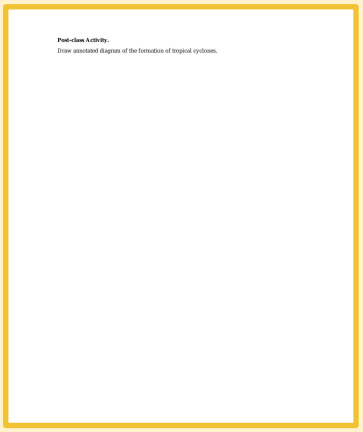
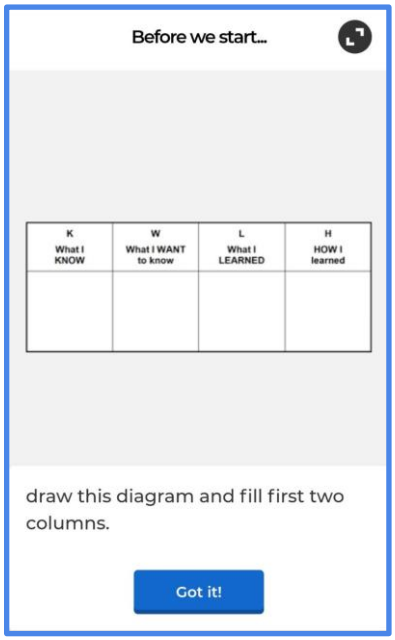
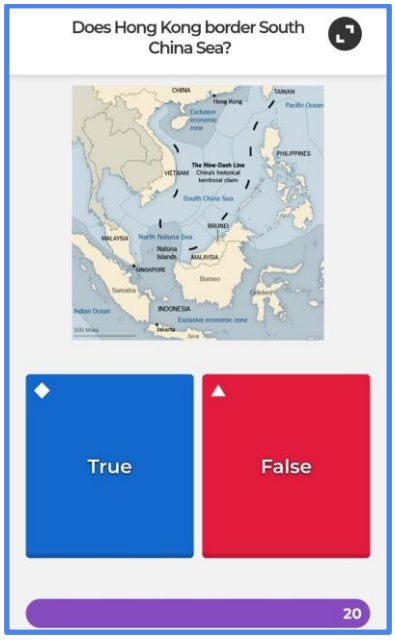
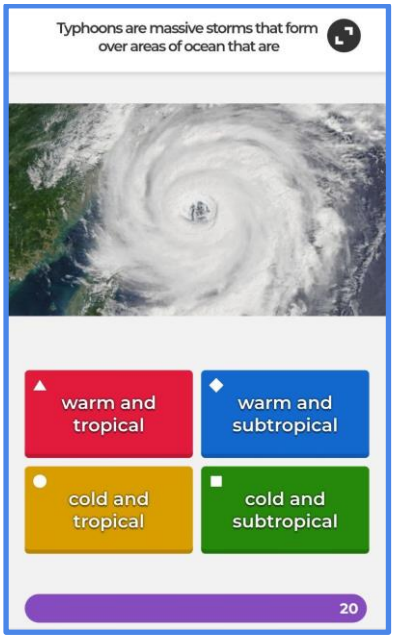
| <u>Conclusion (5 mins):</u><br><br>❖ To give some time for students to self-evaluate their learning outcomes on the formation of tropical cyclones.<br><br>*KWLH Chart also will help students to detect and eliminate any misconceptions they might have at the beginning of the lesson.* | ➢ Teacher concludes the class: 'Today we learnt the formation of tropical cyclones through an interesting experiment.'<br>➢ Teacher assigns post-class activity: 'Please finish the post-class activity before the next lesson. Draw a series of annotated diagrams of the formation of tropical cyclones at the last page of your worksheets.'<br>➢ Teacher reminds students to reflect on what they have learnt in the Part 1 of the worksheet to consolidate their knowledge. | ➢ Worksheet (Part A and Post-class activity) (Refer to Appendix 4)<br>  <br>Post-class Activity.<br>Draw annotated diagram of the formation of tropical cyclones. |

# Appendices

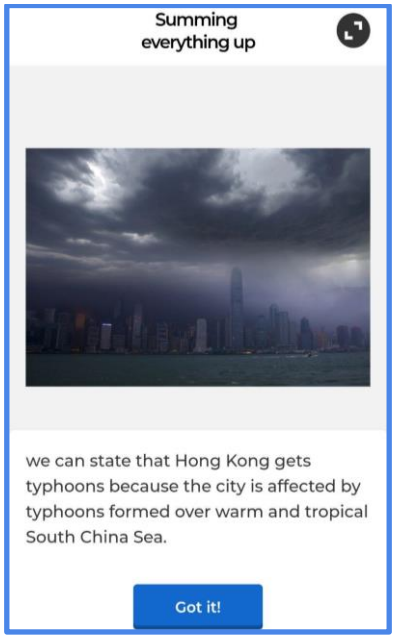
## Appendix 1 (Game for the Lead-in activity & Introduction)



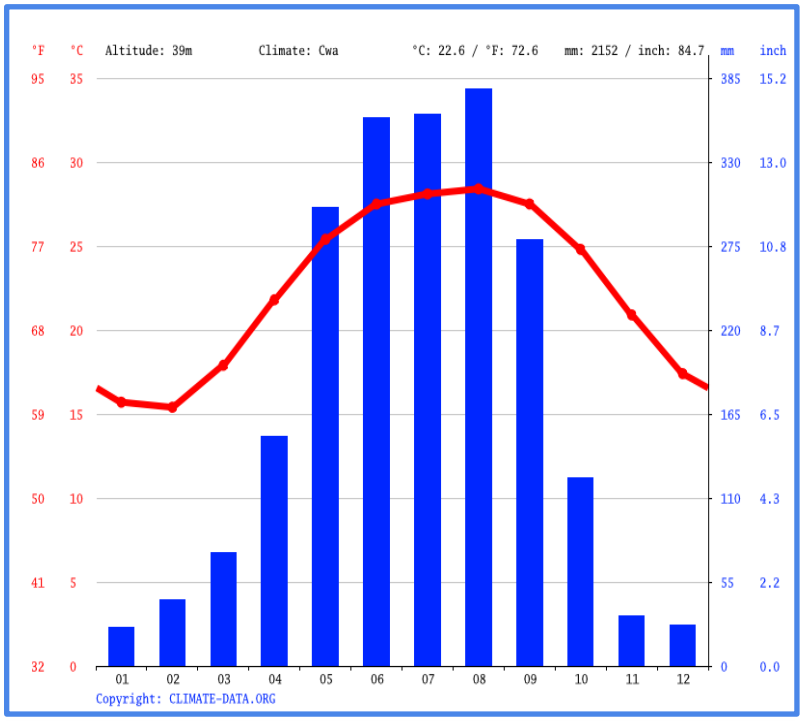







# Appendix 2 (HK Climate Region Diagrams for the Lead-in activity & Introduction)




## Appendix 3 (Experiment set for the Experiment part)

## Appendix 4 (Worksheet for the Lead-in activity & Introduction, Experiment and Post-lesson activity)

*"You are braver than you believe, stronger than you seem and smarter than you think."*
— A.A Milne

**Tropical Cyclone Formation. Worksheet.**

Student Name: _____ Group Number: ___

**Class Activity.**

A. Diagram.

Fill the first two columns during Kahoot game.

Fill the last two columns at the end of the lesson.

| What I KNOW | What I WANT to know | What I LEARNED | HOW I learned |
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| | | | |

B. Experiment Procedure:

1. Pull the water and the coloured oil into one bottle.
2. Stick another empty bottle together with the previous one by their rims.

Make sure no liquid is spilled out.

3. Quickly turn the attached bottles upside down and spin at one direction.

Pay attention to:

The motion and shape of the colored oil

The direction of the motion

4. Observe the result and describe what you could see.

_____

_____

5. Illustrate what you could see.

C. Guiding Questions:

1. What is the shape of the colored oil?

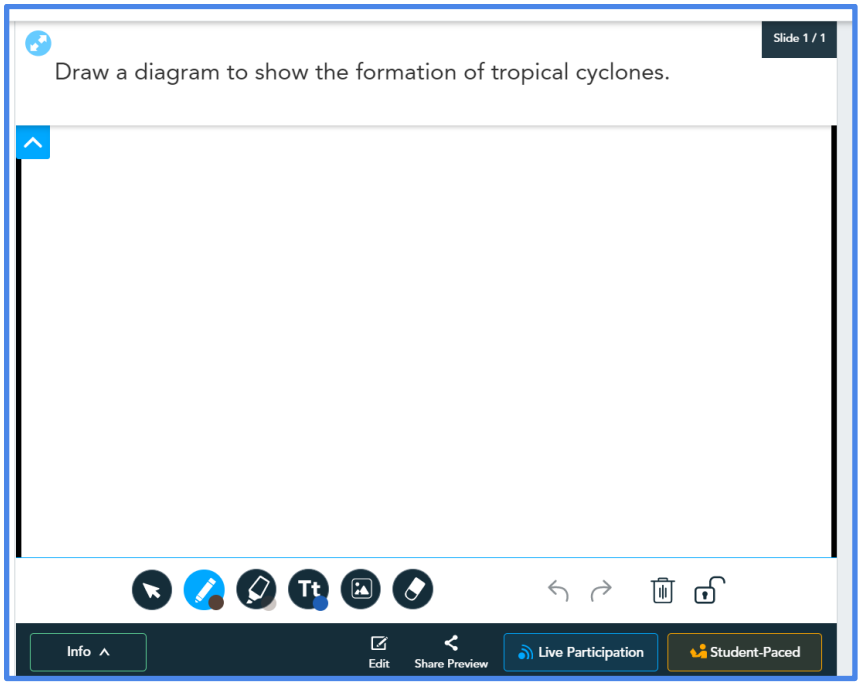
2. What is the direction of the motion?

3. Which bottle is representing the atmosphere? Which bottle is representing the low-pressure center?

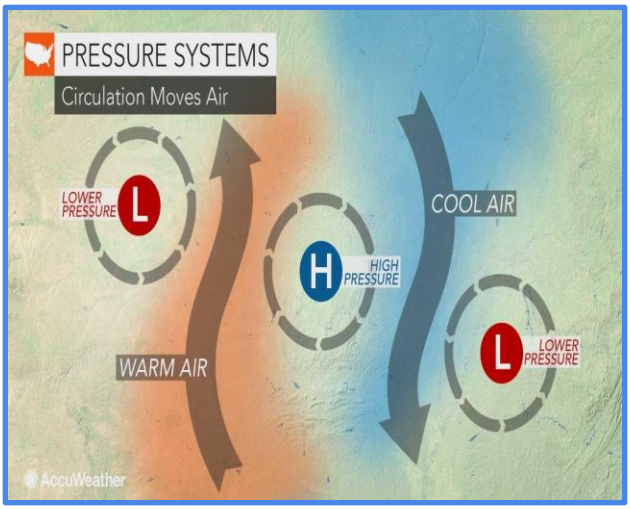
**Post-class Activity.**

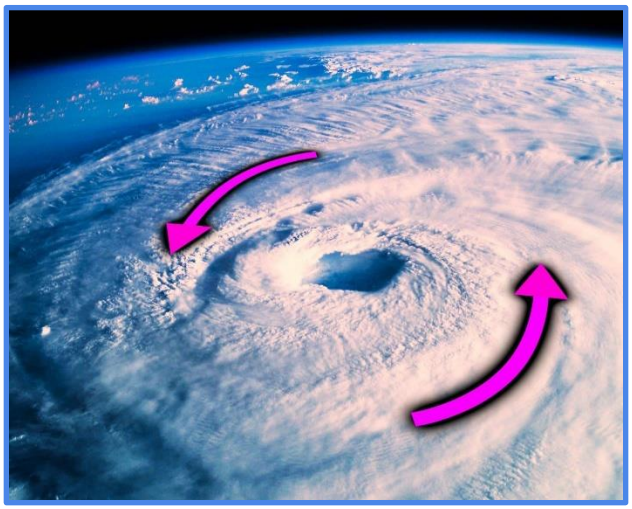
Draw annotated diagram of the formation of tropical cyclones.

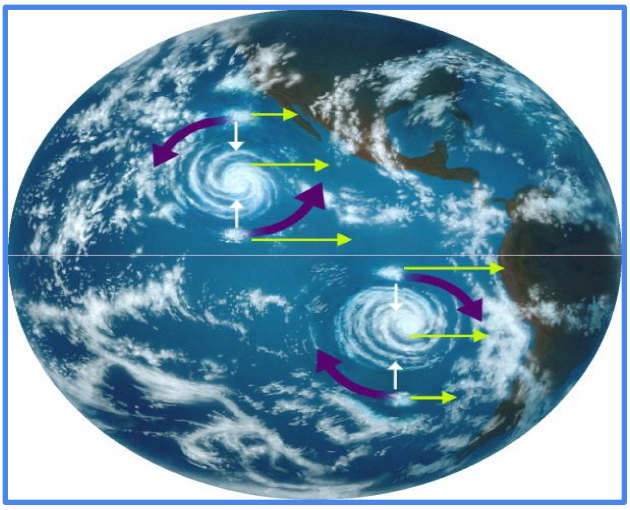
# Appendix 5 (Nearpod drawing for the Class Activity)



## Appendix 6 (Diagrams from Microteaching PPT for the Class Activity)





## Appendix 7 (Microteaching PPT link)

https://docs.google.com/presentation/d/10V_P-1IUNUbF5jOrO4v-A0of_sEXo29tP4dwfeO1KX4/edit?usp=sharing