Class: Grade 5 Science

Lesson Title: Weather Instruments Kinulation

Class Size: **24**
Time: **60 mins**

Curriculum Outcomes:

205-4 select and use tools for measuring
205-6 estimate Measurements
205-10 construct and use devices for a specific purpose
207-4 ask others for advice or opinions
300-13 describe weather in terms of temperature, wind speed and direction, precipitation and cloud cover.

Learning Objectives:

1. Students will understand how to use various weather-related measuring devices.
2. Students will develop a concrete understanding of how we measure temperature, wind direction and pressure.

Materials:

- Duct Tape (or painter's tape)
- Sticky notes (approximately 100)
- 6-7 hand-held fans (or balloons)
- North, East, South, and West posters/labels
- (optional) Class set of pinnies
- (optional) Music - Hot n' Cold, Under Pressure, The Wind to go with each activity

Preparation beforehand:

- Have the North, East, South, and West posters hung on each wall of the classroom
- Create a space in the room where a "thermometer" can be traced out in tape on the floor (large enough to fit 15+ students)

Introduction:

1. Introduce the topic. Possible prompt questions include:
    a. What do we measure in Weather? What do we use? Why do we measure?
2. Explain what a kinulation is (broken up into kinesthetic and simulation). Ask the students if they'd like to try one out!

Activity #1 - Thermometer:

1. Designate each student as 1 degree Celsius (one unit of temperature).
2. Designate 1-2 students as the "thermometer readers" – these students will be in charge of determining whether the temperature "reading" (number of students) makes sense according to the instruction. These people can also have the role of calling out a temperature for their classmates to model. This task can be rotated if desired (if the temperature they choose is too high for students to model, or is a negative temperature, this opens up discussion for model limitations).
3. If a student steps within the "thermometer" space, then they will be counted as 1˚C in the temperature reading.
4. Run through various scenarios that the students will model:
    a. Model today's temperature (an exact number): 15˚C, 12˚C (around 5 less than the # of students).
    b. Model increasing temperature; decreasing temperature; constant temperature.
    c. Model middle of the night; morning, afternoon (they should be increasing from a low number).
5. (optional) Debrief with some discussion on whether the students represented actual heat, or just a measure of heat. Can discuss limitations of the model (can't show negative temperatures, or temperatures greater than the number of students).

Activity #2 – Barometer:

1. Let students know that we will represent units of pressure with sticky notes and air molecules as students. One sticky note will represent one unit of pressure.
2. Have four students designated as "barometers," which measure the pressure (they will wear pinnies and

the number of sticky notes attached to them, after the activity is run, will denote how much "pressure" they are reading). Two of these students should be at one end of the class, and two at the other.
3. Send 4-5 students to one end of the class with only 2-3 sticky notes each (with two of the "barometers").
4. Send the rest of the students to the other end of the class with 4-5 sticky notes each (with the other two "barometers"). This will simulate a difference in low pressure (with the few students/sticky notes) and high pressure (with the majority of students/sticky notes).
5. Instruct them to place their sticky notes amongst the two barometers at their end. Have them observe the difference between the ends of the room (one end will have barometers with a lot of sticky notes because of the distribution; the other end with 4-5 students + 2 barometers will not have many sticky notes, i.e. low pressure).
6. Think Critically: Ask the students what they think might in terms of weather (wind, moving air, precipitation) what might happen if the high pressure students collided with the low pressure students (collision is synonymous to weather events like rain, snow, tornadoes, etc.). Have students act out the possible scenario (if it's a hurricane make sure they tell you about movement of the air particles). Talk about where typically does our weather come from in Canada (from North East – "Nor Easter," or along the Eastern Coast – "South-West." **Extension**: do you think Low pressure moves to High Pressure, or vice a versa? Why? (Makes more sense to even it out, than try to take from the small amount – low pressure – and push into the large amount – high pressure.)

Activity # 3 – Wind Vane:

1. Tell the students that they will be measuring the direction of the wind, not speed (anemometer measures speed). There will be students who are the wind, and other students who are wind vanes.
2. Have 6-7 students come to the front of the class to be a group. Instruct the remaining students to move throughout the class and close their eyes. The 6-7 students will then pick a wall to start from, form a line, and walk to the other end of the classroom while blowing their "wind" (fans) on their classmates.
3. As the "wind" is walking, they will blow air on the other students. Students must turn their bodies until they feel the wind on the back of their necks. Once a student is certain the "wind" is on the back of their necks, they simply point with their arms in the forward direction from where they are standing. This will indicate the direction the wind is blowing TO.
4. After the "wind" has gone through, each student should have determined the direction the wind was coming from and blowing to (using the posters on the wall).
5. Discussion: Talk about where the wind came from, and what direction it is going. Are these the same? How do we label the direction of the wind in weather? Is it labeled by direction it's headed, or direction of source? (Answer: Wind is labeled as direction it came from, the source. For example: a 20km/h SE wind is a wind that came from the South East, and heads toward the North West direction).
6. Repeat the activity if time permits (can switch up the roles).
7. Since all of these simulations will consist of only N, E, S, W directions, you may want to ask students what the name of a wind would be called if it was blowing in the NE direction (i.e. a SW wind), just to ensure concrete understanding (can throw in real-world examples, "The weatherman says there will be a strong NE wind today. If you threw a balloon in the air, where would you expect it to travel?").

Conclusion – Possible wrap-up questions:

1. Ask students what other devices might they use to measure parts of weather (for precipitation, wind speed, UV, etc.).
2. Ask what each device had in common (measuring some aspect of weather).
3. What do we use weather patterns for? (making weather predictions, monitoring global warming effects, used to predict animal behavior or migration, etc.)