

Where is the Ozone Layer?

Name _____ Class _____

The **ozone layer** is a part of the stratosphere where 90% of ozone in the atmosphere is located. But where exactly is the ozone layer? You are going to find out by using data from an ozonesonde, attached to a weather balloon and released into the atmosphere at the South Pole.



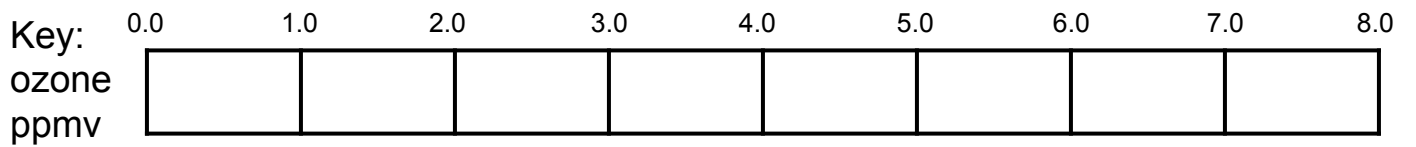
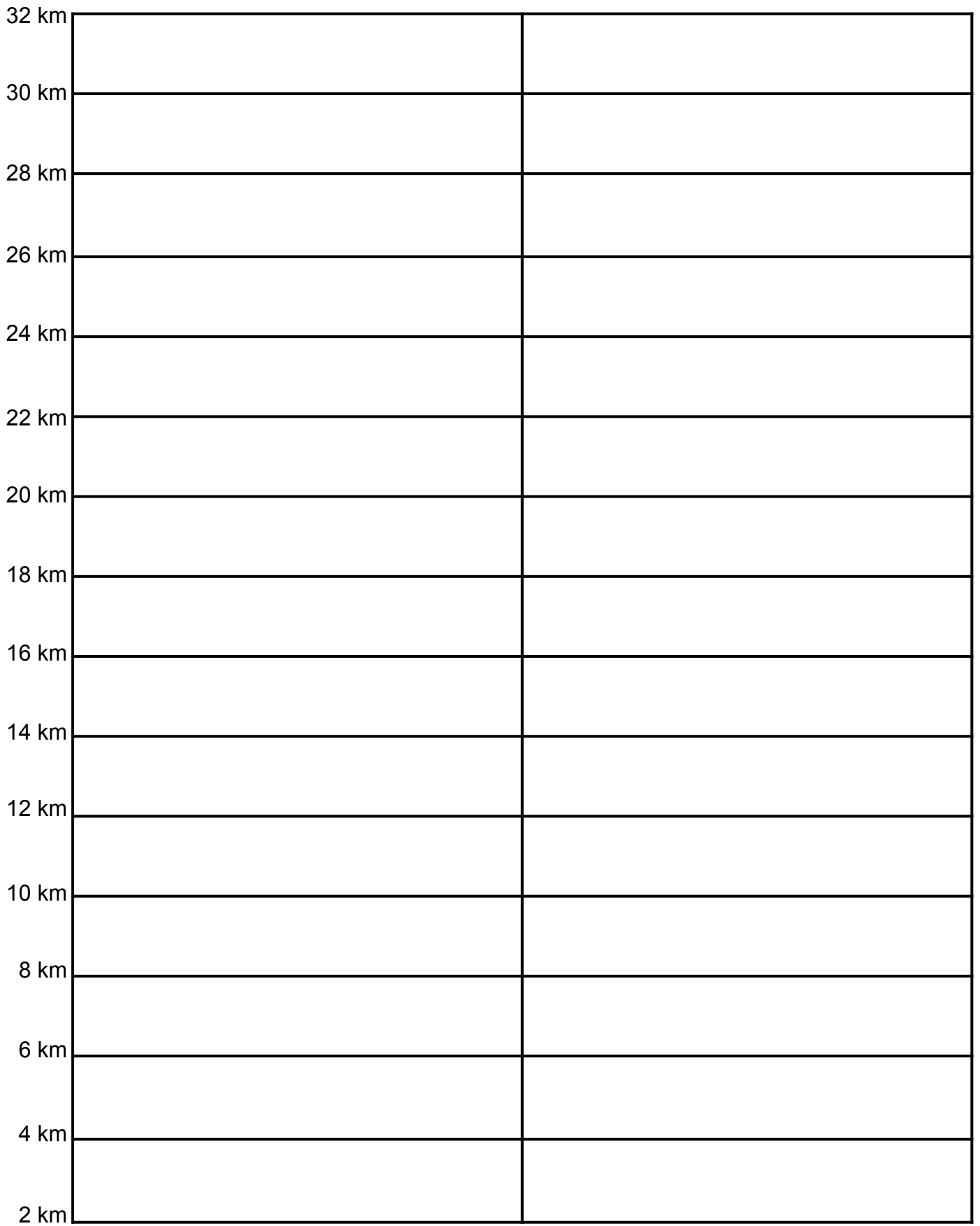
Ozonesonde release at the South Pole

For this activity you will be using ozonesonde data from October 18, 2022 and December 6, 2022. For updated information, you can go to <https://gml.noaa.gov/dv/data/> and choose “ozone”, “balloon”, “vertical profile” and “SPO” for the South Pole.

Overview of the Data

- 1) The datasets are arranged in rows and columns. You see labels in the very top row:

Alt (km)	ppmv
km = kilometers	ppmv = parts per million by volume
	This measures the amount of ozone molecules for every million molecules of any kind.
- 2) Notice one dataset is from October 18, 2022 and one dataset is from December 6, 2022. **On your chart label one of your columns “October 18, 2022” and label the other column “December 6, 2022”.**
- 3) Make a color key for charting your data. You can choose your color scheme. One suggestion is to have darker colors for higher ppmv. **In the key on your chart color each box a different color.**
- 4) The first two layers of the atmosphere are the **troposphere** and the **stratosphere**. In the troposphere air cools with increasing height. In the stratosphere air warms with increasing height, largely because of the ozone layer. The boundary between these layers varies around the world. Above the poles, the stratosphere starts around 9 km. **Label the troposphere and stratosphere on your chart.**
- 5) **Color the amount of ozone in your chart using the color scheme in your key.** Make sure you are using data from both the Oct 18 dataset and Dec 6 dataset.
- 6) Calculate the height in feet. **Write the altitude in feet next to each height in kilometers.** There are 3,280.84 feet in each kilometer.
- 7) **Answer the questions found after the datasets.**



Station : South Pole
Station Height : 2834 meters
Launch Date : 18 October 2022
Launch Time : 21:40:06 GMT

Alt (km)	ppmv
3.000	0.027
4.000	0.032
5.000	0.032
6.000	0.026
7.000	0.030
8.000	0.031
9.000	0.033
10.000	0.029
11.000	0.049
12.000	0.140
13.000	0.161
14.000	0.242
15.000	0.083
16.000	0.043
17.000	0.081
18.000	0.235
19.000	0.420
20.000	0.801
21.000	1.074
22.000	2.391
23.000	2.929
24.000	3.121
25.000	3.446
26.000	3.443
27.000	3.303
28.000	4.034
29.000	4.427
30.000	4.748
31.000	4.970
32.000	4.789

Station : South Pole
Station Height : 2834 meters
Launch Date : 06 December 2022
Launch Time : 21:33:12 GMT

Alt (km)	ppmv
3.000	0.027
4.000	0.016
5.000	0.025
6.000	0.031
7.000	0.028
8.000	0.045
9.000	0.091
10.000	0.182
11.000	0.217
12.000	0.199
13.000	0.175
14.000	0.136
15.000	0.189
16.000	0.358
17.000	0.653
18.000	1.169
19.000	1.442
20.000	2.582
21.000	3.329
22.000	4.499
23.000	6.382
24.000	6.797
25.000	7.022
26.000	6.850
27.000	6.023
28.000	5.858
29.000	5.562
30.000	5.469
31.000	5.400
32.000	5.138

Questions

1) Where do you think the ozone layer is? Why?

2) Describe the differences between October 18, 2022 and December 6, 2022.

3) Which date shows you evidence of the ozone hole? Why?

4) The ozone layer helps warm the air in the stratosphere. How do you think this happens?

5) What more do you want to know about ozone? Write 3 questions you think would be interesting to hear answers for.

6) What data would be necessary to answer your questions in #5?
