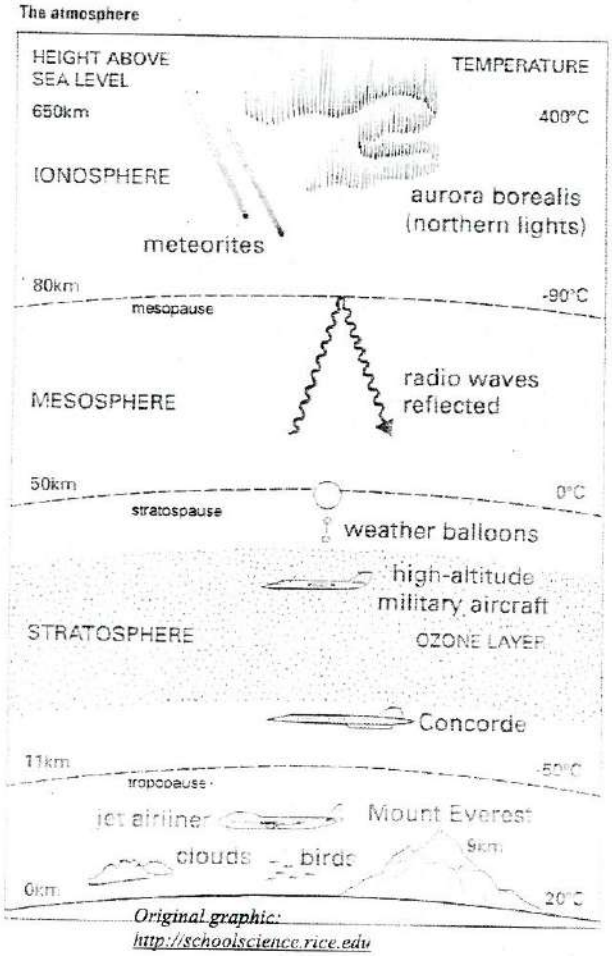
Atmosphere & Weather Name Key

Graphing the Atmosphere

Purpose: To visualize how the atmosphere can be divided into layers based on temperature changes at different heights by making a graph.

Background Information: The atmosphere can be divided into four layers based on temperature differences. The layer closest to the Earth is called the **troposphere**. Above this layer is the **stratosphere**, followed by the **mesosphere**, then the **thermosphere**. The upper boundaries between these layers are known as the **tropopause**, the **stratopause**, and the **menopause**, in that order. The final layer is called the **exosphere**.

Temperature differences in the four layers are caused by the way solar energy (energy from the Sun) is absorbed as it moves downward through the atmosphere. The Earth's surface absorbs most of the Sun's energy. Some of this energy is bounced back out by the Earth as heat, which warms the troposphere.



At the mesopause, the temperature begins to increase with altitude, and this trend continues in the thermosphere. Solar energy hits the Earth's atmosphere and heats it.

The mesosphere does not absorb solar heat, so the temperature decreases with altitude.

The temperature begins to increase with altitude in the stratosphere. This warming is caused by a form of oxygen called ozone (O_3) absorbing ultraviolet radiation from the sun.

The average temperature in the troposphere rapidly decreases with altitude – it colder the higher you go.

Procedure:

1. Given this data:

Average Temperature Readings at Various Altitudes

Altitude (km)	Temperature (°C)
0	15
5	-18
10	-49
12	-56
20	-56
25	-51
30	-46
35	-37
40	-22
45	-8
48	-2
52	-2
55	-7
60	-17
65	-33
70	-54
75	-65
80	-79
84	-86
92	-86
95	-81
100	-72

~~scatter plot~~

You will make a ~~line~~ graph of this data.

Why is a line graph the proper choice? Both variables are numbers and we are looking at a continuum

Be careful to plot the negative temperatures correctly!

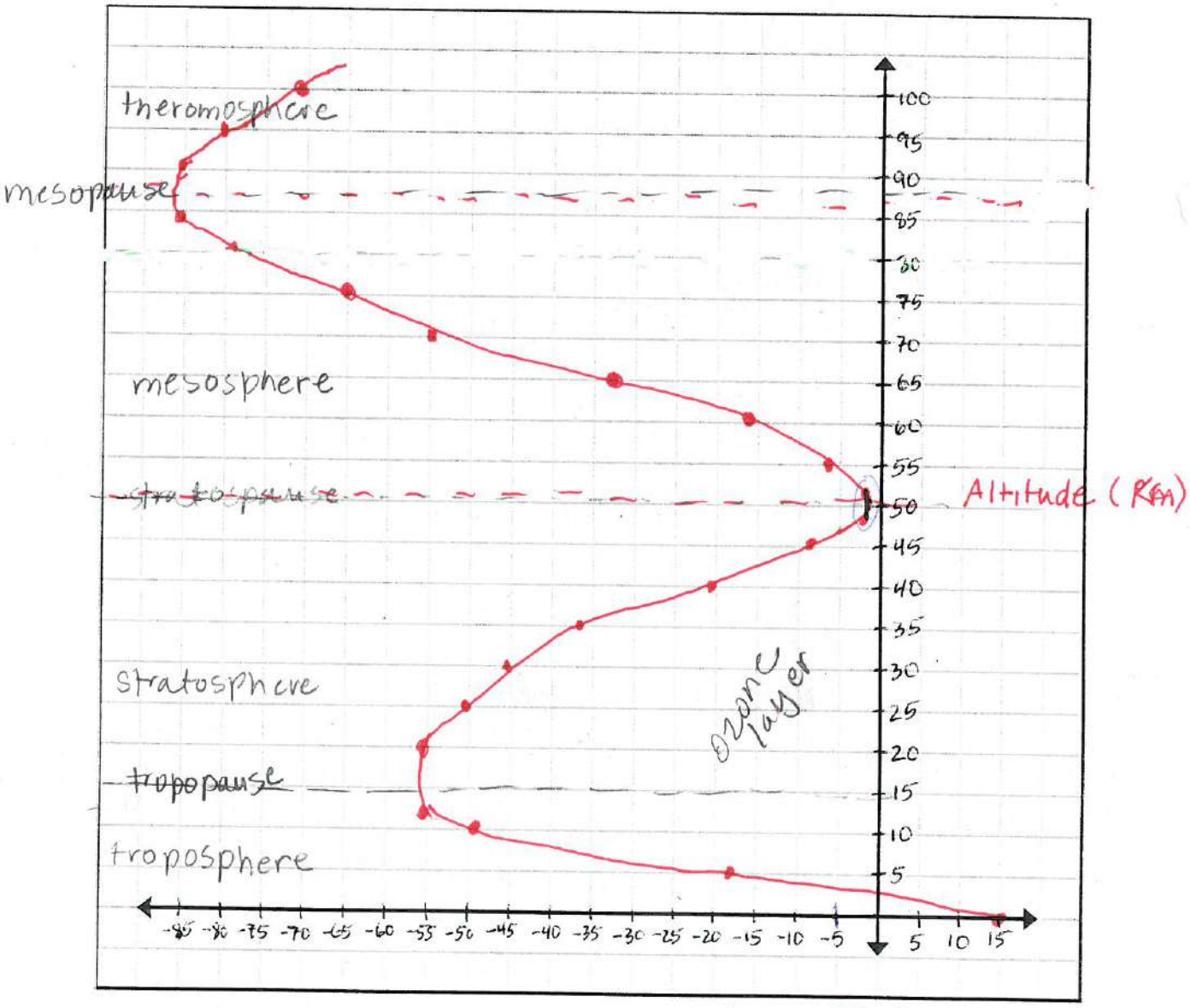
Remember TAILS!
Check your Graphing Golden Ticket if you need to!

2. On your graph, label the different layers (spheres) of the atmosphere and the separating boundaries (pauses) between each layer.

- ❑ Troposphere
- ❑ Tropopause
- ❑ Stratosphere
- ❑ Stratopause
- ❑ Mesosphere
- ❑ Mesopause
- ❑ Thermosphere

3. Label the general location of the ozone layer.

Average Temperatures of the Atmosphere at Various Altitudes



Questions & Conclusions:

1. Why do you think scientists divide the atmosphere into four layers?
I think it is divided into four layers based on temperature variation within the layers

2. Does the temperature increase or decrease with altitude in the:

troposphere? decrease
stratosphere? increase
mesosphere? decrease
thermosphere? increase

3. What is the approximate height and temperature of the:

	Height	Temperature
tropopause:	15 Km	-55°C
stratopause:	50 Km	-2°C
mesopause:	85 Km	-86°C

4. What do you think causes the temperature to increase with altitude through the stratosphere?
The ozone layer absorbs the solar heat, so the temperature increases.

5. What do you think causes the temperature to decrease with altitude through the mesosphere?
The temperature decreases because the mesosphere doesn't ~~observe~~ absorb solar heat.

6. What do you think causes the temperature to decrease with altitude in the troposphere?
You are further from the land, so the temperature decreases.