Features Analysis Chart—The Sun's Effect on Climate

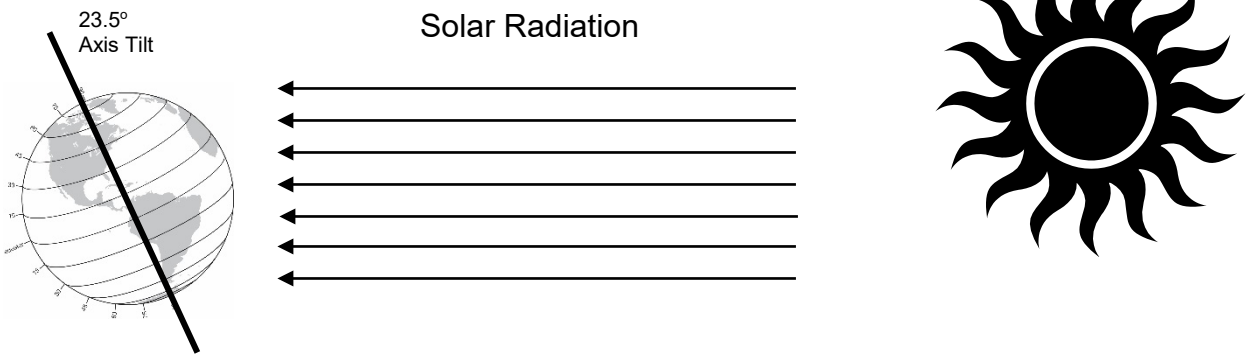
Teacher Name: _____ **Circle One: PRE POST**

Describe the assessment item: Question 4 on the pre-post assessment for this unit on the Sun's effect on climate:

Notice the location of South America in the diagram of Earth in question 3.

a. Draw a picture below that shows why it's hot (like summer) in January in South America.

b. Explain your drawing.



Describe the ideal response: The drawing should show Earth and the Sun, with Earth tilted so that the Southern Hemisphere is pointing toward the Sun and the Northern Hemisphere is pointing away from the Sun.

Explanation: It's hot (like summer) in January in South America because Earth is tilted so that the Sun is shining more directly on the Southern Hemisphere (the angle of sunlight is more direct or straight on), and the Sun's energy is more concentrated. This explains why South America is hotter in January than at other times of the year when the angle of sunlight is less direct.

Features of a Complete, Accurate Response	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1. Earth is tilted.																																				
2. Earth is tilted at the same angle all the time—toward the North Star.																																				
3. South America is in the Southern Hemisphere.																																				
4. The Southern Hemisphere is tilted toward the Sun in January.																																				

5. The tilt of Earth affects the angle of sunlight hitting the Southern Hemisphere.																																				
6. Sunlight striking Earth's surface more directly causes greater heating.																																				

Features Consistent with Misconceptions/Problems	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
1. Seasons occur because of the distance between Earth and the Sun.																																				
2. Earth doesn't always tilt toward the North Star. Either the North Pole or the South Pole tilts toward the Sun all the time.																																				
3. It's warmer in the summer when there aren't any clouds and colder in the winter when clouds form.																																				
4. The equator goes through South America and is always the warmest place on Earth.																																				
5. The Sun gives off more light and heat in the summer.																																				
6. The side of Earth that faces the Sun has summer, and the side that faces away from the Sun has winter. [This indicates confusion regarding the cause of night and day (Earth's rotation) and seasons (Earth's revolution).]																																				