NAME:_____

SOS Explorer – Inquiry and Literacy Practice:

Watch the dataset: *CarbonTracker – 2005-2010* on SOS Explorer, rotate the sphere around and zoom in as necessary, then, fill out the first column below. Next, read the description on page 2 and fill out the second column. Using your "Still want to know" entries, plan a research investigation of a question you still have about the information in the dataset.

Before reading the description… After reading the description…

What I already KNOW	What I STILL WANT to KNOW
What I WANT to KNOW	Words I don't understand (to look up or ask the teacher)

I plan to investigate the following question:

How I plan to investigate this question:

CarbonTracker 2005-2010

"NOAA encourages science that adds benefit to society and the environment. CarbonTracker does both." said retired Navy Vice Admiral Conrad Lautenbacher, Ph.D., former undersecretary of commerce for oceans and atmosphere and NOAA administrator. CarbonTracker is a system to keep track of carbon dioxide uptake and release at the Earth's surface over time. It was developed by the Carbon Cycle Greenhouse Gases group at NOAA's Earth System Research Laboratory. As a scientific tool, CarbonTracker has helped improve the understanding of carbon uptake and release from the land and oceans, and how those sources and sinks are responding to the changing climate, increasing levels of atmospheric CO_2 (the CO_2 fertilization effect), and human management of land and oceans.

This data set shows the distribution of carbon dioxide in the "free troposphere", which is the lower atmosphere below the tropopause, but above the surface-dominated planetary boundary layer. CO_2 distributions are displayed for every day from 2005 through 2010. The large variations in CO_2 seen here are caused by surface sources and sinks of CO_2, coupled with transport of CO_2 plumes by weather systems. The resulting patterns seen here are called "carbon weather".

The data set is made thanks to NOAA ESRL and collaborators collection samples of air to analyze the contents for CO_2 and multiple other gases. These are the locations for which we know the mixing ratios of CO_2 exactly. The rest of the globe is filled in by a computer model driven by our best knowledge of the surface sources and sinks (fossil fuel and biomass burning emissions, land biosphere and ocean uptake or release) of CO_2 that are across the globe.

Plumes of CO_2 can be seen moving across the globe, illustrating the importance of monitoring CO_2 globally, not just locally. The large variations in CO_2 concentration from season to season are due to the annual cycle of summertime green-up and autumn decay of land plants. During the winter season, plants and trees respire CO_2 as they shed leaves and stop growing or decay, adding significant amounts of CO_2 to the atmosphere. This process reverses during spring and summer, when plants have access to sufficient sunlight and grow leaves and flowers, or increase their size substantially and remove CO_2 from the atmosphere. The summer green-up is quite visible in the movie: in July the northern hemisphere shows intense blue colors, especially over the mid-latitude regions where forests and crops take up CO_2 vigorously. The large change in CO_2 between the seasons caused by plant activity is sometimes referred to as the 'breathing' of the planet. In the tropics, intense red areas are visible especially during July, August and September. This is due to the burning of biomass. Some of this is natural, such as dry grasses on the savannas burning, but most of it is man-made as people burn fields to prepare them for another year of production, or burn forests to make way for new agricultural lands.