Section 3 Introduction Recording and Tracking Earth's Weather

"The sky too belongs to the Landscape. The ocean of air in which we live and move, in which the bolt of heaven is forged and the fructifying rain condensed, can never be to the zealous Naturalist a subject of tame and unfeeling contemplation."
Luke Howard, 19th century natural scientist who "named" the clouds

The Activities offered in the first two sections of the Guide allow students to explore some of the basic processes that create Earth's weather and climate and to model some of the most interesting and extreme weather phenomena. Section 3 provides a set of Activities designed to help students "read" the natural and primary language of weather, the changing shape of clouds or the rising and falling of temperature and pressure, and the secondary and symbolic language we humans have created in order to make universally comprehensible weather forecasts. We can read the clouds with the unaided human eye (Activity 3.2) but we need instruments to record, for example, pressure and temperature accurately. "Making Simple Weather Instruments" (Activity 3.1) won't result in tools to rival those of professional meteorologists. But understanding how a barometer works, and helping students to appreciate that air is a *real* substance that has weight which translates into pressure is even more important than absolute precision. Activities 3.3 and 3.4 familiarize students with the symbols that meteorologists use and show them how to decipher the impressive array of weather information to be found both in the general media and on the Internet. Understanding something of the language of weather symbols and isotherms and isobars, students can go online to check out real-time data. This section also helps students to begin building a bridge between *understanding* weather and climate (research) and *applying* that new knowledge to benefit society (Section 4.) As yet scientists and forecasters can't read the fine print of supercell thunderstorms and tornadogenesis. They still need to decode the physical processes at work and determine a clear signature in those roiling clouds on which to base authoritative tornado warnings. One of the tools that's proven most effective in taming the microbursts that threaten planes as they take off and land is Doppler radar. It's also become the #1 weapon in the battle to understand supercell thunderstorms and other kinds of severe weather. Activity 3.5, "Doppler Radar in a Shoebox," helps student both understand the physics of the Doppler effect—used extensively in astronomy as well as meteorology—and also to appreciate how this has been put to work by NOAA's researchers as a tool to analyze severe storms.

With this diverse set of hands-on Activities and the actuality footage of tornado research in LFSTORM program 2, "Research to the Rescue" and the JOURNALS of tornado chasing to be found online, students will see that while we've come a long way in our understanding of the language of weather, we still have some way to go.