

Appendix A: DOTS tools connected to external datasets and standards

DOTS tool	Related external data set	Principles of place-based education (Woodhouse and Knapp 2000) and <i>Next Generation Science Standards</i> (NGSS Lead States 2013) addressed
Handheld Weather Station: Allows students to measure air temperature, wind speed, and relative humidity.	NOAA Monthly Climate Observations: Tracks daily high and low temperatures, wind speed, and relative humidity. NOAA displays results within the context of normal conditions for that location.	PPBE 3: It is inherently experiential. In many programs, this includes a participatory action or service learning component; in fact, some advocates insist that action must be a component if ecological and cultural sustainability are to result.
		NGSS: HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth’s systems result in changes in climate.
		NGSS: HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
Infrared thermometer and thermal imager: Allow students to examine thermal gradients and details of their surroundings.	NOAA Temperature Condition Index Map	NGSS: HS-PS3-4. Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system.
Lux Meter: Allows students to measure brightness directly and provides a proxy for students to quantify differences in canopy cover.	Global Vegetation Index: Normalized Difference Vegetation Index	PPBE 2: It is inherently multidisciplinary.
		NGSS: HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
GPS: Allows students to situate themselves with geographic	All scientific datasets inherently contain geographical information about	PPBE 1: It emerges from the particular attributes of a place. The content is specific to the geography, ecology, sociology, politics, and other dynamics of that place. This fundamental characteristic establishes the foundation of the concept.

precision in the world around them.	the location of the observation	PPBE 5: It connects place with self and community. Because of the ecological lens through which place-based curricula are envisioned, these connections are pervasive. These curricula include multigenerational and multicultural dimensions as they interface with community resources.
Digital microscope and tablet: Allow students to take focused, local observations of the environment.	Project Budburst: International scale phenological survey being completed by citizen scientists.	NGSS: HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.