Academic year SWAC program description & VT standards addressed

SWAC-AIR MODULE DESCRIPTION	VT STANDARD
Introduction to the electromagnetic spectrum & atmospheric physics (A)	SMT 7.4, 7.12
Cloud observation and identification (A) - outdoor observations of the 10 cloud genera followed by visible and infrared interpretation of the same clouds for identifying weather patterns	SMT 7.4, 7.15
Weather forecasting I (A) - introduction to forecasting using GOES visible and infrared imagery	SMT 7.12, 7.15
Student engagement in project-oriented inquiry-based learning (A) - students journal their observations, questions, theories about the weather either for an in-class project or severe weather event in the news	SMT 7.1, 7.2, 7.10. GK 6.7
Impacts of acid rain (B) - students will learn how acid rain forms and its effects on vegetation and soils	SMT 7.1, 7.2
Investigations of air-ocean interactions (B) - how warm and cold currents affect winter storm cyclogenesis and summer thunderstorm development - focus on energy conversion through heat and moisture transport (advection and lateral motion, thermodynamics)	SMT 7.11, 7.15 GK 6.7
Weather forecasting II (C) -use of trajectories, physical energy transport and transformation processes to predict mid-latitude cyclogenesis and tropical cyclonic development	SMT 7.15 GK 6.7

SWAC-LAND MODULE DESCRIPTION	VT STANDARD
Land surface interpretation I (A) - basics of photointerpretation, color composites from the Burlington, VT area	SMT 7.4, 7.11, 7.12 HSS 7.4
Inquiry-based remote sensing (A) -introduction to the use of radar imagery in conjunction with color composites and multispectral imagery at multiple scales	SMT 7.11, 7.12 HSS 7.4
Inquiry-based remote sensing II (B) - use of “photo chips” to introduce deductive and inductive interpretation of an unknown landscape	SMT 7.1, 7.2, 7.11, 7.12 HSS 7.4
Change detection of permafrost (C) - use of medium resolution imagery from 2 years to quantify permafrost melt at high latitudes using color composites	SMT 7.11. 7.12, 7.16 HSS 7.4

SWAC-TECHNOLOGY MODULE DESCRIPTION	VT STANDARD
Temperature variations around our school (A) - student deployment of low-cost CricketSWAC sensors for measuring temperature and light conditions around their school. Data transmission via flashing lights and beeps calibrated to temperatures in degrees Kelvin - involves student electronic assembly and customized design of the sensors - data will be graphically compared with those measured at other SWAC schools using commercial weather stations	HSS 6.7 SMT 7.1, 7.2, 7.11

Vertical profiles in the troposphere and stratosphere (A-B) - summer/early fall balloon launch with temperature, barometric pressure and humidity CricketSWAC sensors with a GPS module - plotting vertical profiles and comparing with National Weather Service radiosonde data to explain inversions, storm dynamics, wind flow and calculating true altitude	HSS 6.7 SMT 7.1, 7.2, 7.15
In-situ measurements of air and land parameters for use in science labs (B) - ongoing activity using soil, water, solar insolation, photosynthetic radiation CricketSWAC sensors designed for stationary use and mounted on hilltops or other location. Same design and transmission as balloon launch sensors above.	HSS 6.7 SMT 7.1, 7.2
Sun photometer instrument development and adaptation (C) - to investigate solar energy fluxes, atmospheric gases and aerosols - correlate field measurements with satellite data where available	SMT 7.19

SWAC Summer Program & VT State Standards addressed

ACTIVITY	STD/GE
SWAC-AIR (B-C levels) 1/ climate change - causes and effects (LSC) 2/ weather forecasting in the midlatitudes - implementing weather competitions in the classroom (LSC) 3/ Constellations, Astronomy and the Night Sky (Fairbanks Museum)	SMT 7.18, 7.15, 7.11
SWAC-LAND (B-C levels) 1/ Remote sensing field lab - ground interpretation and classification of Burlington landscape using high resolution orthophotography (could be adapted to a school environment) 2/ Tree phenology field lab -introduction to plot creation and collecting forest metrics for use in calibrating medium resolution satellite imagery and monitoring climate impacts on terrestrial systems	SMT 7.11, 7.12, 7.16,
SWAC-TECHNOLOGY (B-C levels) 1/ balloon launch in collaboration with Medgar Evers College to piggy back the previously listed CricketSWAC sensors and one for precipitable water on a NASA ozonesonde platform. Data will be compared with National Weather Service radiosonde and NASA ozonesonde data 2/ concurrent launch of the above radiosonde payload in western Vermont with a radiosonde launch at Lyndon State College. Comparison of 3-D differences in the data	SMT 7.15, 7.19

A, B & C refer to the progression through which participants should complete a given module.