June 2004 WORKSHOP SCHEDULE
How Old Is Your Universe? workshop for middle grade science teachers

On Thursday and Friday, June 3 & 4 the focus of the workshop will be the Age of the Universe.
The key to understanding **how old** is the universe is to understand **how big** is the universe.
The first two days of the workshop introduce some of the methods used to determine the distances to objects in our cosmos.

Thursday, 3 June -- The scale of our Milky Way Galaxy

7:45	TCCW 201	Check-in, continental breakfast, and pre-test
8:30	TCCW 201	introductory activity -- mystery box
8:50	TCCW 201	cosmogenesis – an explanation for where it all comes from
9:20	TCCW 201	proof that the Earth is the center of the universe
9:40	TCCW 201	surveying the heavens: parallax as an application of "depth perception"
10:00	planetarium	using parallax to measure distance
11:15	planetarium	how to increase number of stars with measurable parallax
11:30	planetarium	scale model (1-to-10 billion) of the solar system and nearest stars
11:45	planetarium	LUNCH
12:30	TCCW 201	standard candles, relationship between brightness and distance 1) use paraffin null photometer to balance equal light at equal distance 2) count illuminated squares at different distance from light 3) determine brightness for unknown source at known distance 4) find distance to balance one light against multiple lights
1:20	TCCW 201	properties of stars: location, luminosity, temperature, and apparent brightness
1:45	TCCW 201	making sense of stellar properties – the HR diagram
2:10	TCCW 201	main sequence fitting to estimate distance
2:30	TCCW 251	Curtis-Shapley debate: Are "spiral nebulae" part of our Milky Way Galaxy?
2:50	TCCW 251	Cepheid-type pulsating variable stars
4:00	TCCW 251	warp drives and interstellar travel
4:15	TCCW 251	implementation strategies
{ 8:30	rooftop obs	*optional* - opportunity for telescope observing}

Friday, 4 June -- Looking back in time and the age of the Universe

8:00	TCCW 201	continental breakfast during video presentation
8:30	TCCW 201	Color Analyzers - the spectrum of visual light
8:50	TCCW 201	construct spectroscopes, spectral analysis
9:40	TCCW 201	spectrum detective
10:45	planetarium	Doppler shift, redshift/blueshift of light
11:30	planetarium	LUNCH, followed by Dr. Patricia Whitelock: “A Woman in Astronomy”
12:40	TCCW 251	lookback time
1:00	TCCW 251	Cosmic Distance Ladder
1:15	TCCW 251	recession velocity and Hubble’s Law
2:15	TCCW 251	evidence of our beginnings
3:00	TCCW 251	history of the universe compared to passage of a year
3:30	TCCW 201	implementation strategies
4:00	TCCW 201	post-test

Monday, 7 June -- Age of the Earth

8:00	TCCW 201	Check-in and continental breakfast
8:30	TCCW 201	pre-test
9:00	TCCW 201	overview of Plate Tectonics
10:00	planetarium	materials of the Earth - rocks, minerals and the rock cycle
11:45	planetarium	LUNCH
12:30	TCCW 251	principles for dating the Earth
1:30	TCCW 251	relative time and geologic time scale
3:00	TCCW 251	absolute geologic time and radiometric dating
4:00	TCCW 201	deep time
5:30	TCCW 201	workshop dinner and guest speaker

Tuesday, 8 June -- Age of the Earth

{ 5:30	rooftop obs	optional - opportunity for observing the last hour of transit of Venus across the Sun}
8:00	TCCW 251	continental breakfast during video presentation
8:30	TCCW 251	Concepts of Relative Time and Age Dating
9:15	TCCW 251	Activity: Who's on First – Relative Dating Activity
9:45	TCCW 251	Overview of Fossils and Fossil Kit
10:15	TCCW 251	Activity: Fossils and Biostratigraphy Excercise
10:45	TCCW 251	Activity: Progression of Life Poster
10:45	TCCW 251	Discussion - Implementation
11:30	field trip	LUNCH on the bus
12:00	field trip	Sedimentary rocks and fossils in the field (Paleozoic of southcentral KY)
3:30	field trip	wrap-up
4:00	field trip	post-test and exit survey