

Institute Objective

- To improve science instruction by providing district-level trainers with professional development resources focused on facilitating students scientific content understanding through rigorous science processes and practices
- To develop teachers' application of practices that build rigor through conceptual understanding; inquiry, discourse, and the use of symbols and tools

Time	Task and Purpose (Notes)	Materials and Equipment
8:30-9:30	VA DOE: General Session: Rigor, Blooms Taxonomy, The Case for Change	Teachers bring laptops
	BREAKOUT SESSION BEGINS	
9:30-9:45	ICE BREAKER <ul style="list-style-type: none"> • BINGO - to build comfort among participants and create a group dynamic • Stand Up, Hand Up, Pair Up for rigor articles 	BINGO card for participants to sign Candy prizes LCD Extension cord
9:45-10:00	INTRODUCTION <ul style="list-style-type: none"> • Objective(s) for the day, agenda, introductions • Wordle and a discussion about what they see in the wordle, what patterns they notice, how might the visual relate to today's work (discuss with shoulder partner) 	PPT with Wordle (Tagxedo)
10:00-10:45	ACADEMIC RIGOR <ul style="list-style-type: none"> • Notebook entry on participants ideas about rigor + discussion with partner • Read articles on rigor; Fan-N-Pick to facilitate discussion • Groups use Consensus Placemat to create a group "definition" of academic rigor • Groups share out their definition and 	Blank notebook entry sheet (back is for post discussion entry) Fan-N-Pick Questions Fan-N-Pick Directions Consensus Placemat Large adhesive post-it paper + words and tape to affix them to the chart paper [develop this ahead of time, write out a key so you know what the final should look like] 6-7 sheets of chart paper (pre-determined components that are put onto the chart paper when they are presented by groups)

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	facilitators capture the big ideas on the "Rigor Charts"	
10:45-11:15	<p>STANDARDS AND RIGOR</p> <ul style="list-style-type: none"> Make a prediction as to the degree of rigor they will find in the revised Standards, Benchmarks and Indicators (i.e., Standards and CF) documents Follow up discussion about what they have seen and learned; what are their "ah-ha" thoughts – how have the concepts and words changed? ...segue into Theory of Everything! 	Standards Curriculum Frameworks Post-its for placing on large chart paper around room Crosswalk Documents (grade specific revisions to the SOL)
11:15-11:50	<p>THEORY OF EVERYTHING</p> <ul style="list-style-type: none"> Connect SOL Concepts and Procedures with direct instruction (PPT and examples) Construct the TOE foldable (which is also a rubric) Sort released SOL items and other SOL phrases into categories from TOE 	Foldable/Rubric SOL Items and "Essential Understandings" for analysis [gather SOL items and verbiage that they can "sort" into categories of Conceptual, Inquiry, Discourse, Use of Symbols and Tools] Chart paper, markers, glue, etc. for illustrations, materials for constructing their artifact
11:50-12:00	<p>MODEL DESIGN</p> <ul style="list-style-type: none"> LINE UP based on birth date and re-form groups of 4 to reflect, discuss, and plan a model to show how rigor, the standards, and TOE are related 	Criteria for model on sheet of paper at each table List of materials available at each table Materials laid out on a supply table
12:00-12:45	LUNCH	
12:45-1:15	<p>GUIDED PRACTICE</p> Discrepant event: index card, plastic cup water air pressure vs. water pressure	TOE Foldable/Rubric Private Universe segment

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1:15-1:45	INVESTIGATION 1	TOE Foldable/Rubric 5 E handouts on tables for reference Standards and CF on tables for reference
1:45-2:00	ANALYSIS WITH RUBRIC Analysis and Adjusting the lesson using the Rubric	
2:00-2:30	INVESTIGATION 2	
2:30-2:45	ANALYSIS WITH RUBRIC	
2:45-3:15	MODEL CONSTRUCTION Build and present models of <i>their</i> conceptual understanding!	Criteria for model on sheet of paper at each table List of materials available at each table Materials laid out on a supply table
3:15-3:30	Wrap-up, next steps	

Materials Needed

	Video snippet of photosynthesis scene from a <i>Private Universe</i>	Copies of a <i>Private Universe</i>
	<p>Collecting Data: Using a lab, participants will review the labs (group participants by content) and evaluate them on a scale of 1 to 5 or A, B, C, D (1 = science not done like a scientist, 5 = science done like a scientist) look at vocabulary, directions, data collected, ad analysis that students need to do (also 5 E's).</p> <p>Question sort- Descriptive, Confirmation, or Experimental (or use Bloom's categories)</p> <p>Share- make more testable</p> <p>How do you modify to facilitate student-centered experiment?</p>	<p>Enhanced Scope and Sequence Lessons:</p> <p>Grade 6: Telling Tides; Which Elements, Where?; Modeling the Atom (also for 8th grade); The Pressure's On; Cloud Formation; Convection Currents (also for 8th grade); Blue Skies and Red Sunsets, & Wetlands</p> <p>Grade 7: (from Life Science) Modeling Mitosis; Passing Traits On; A Salt Marsh Ecosystem; Predator-Prey Simulation; Biomes of the World; Variations Within A Population</p> <p>Grade 8: UVA site: Conservation of Matter & Balancing Chemical Equations http://galileo.phys.virginia.edu/outreach/8thGradeSOL/abcActivitiesList.htm http://galileo.phys.virginia.edu/outreach/8thGradeSOL/ConservMatterFrm.htm</p> <p>5 E handout</p>
	Use Enhanced Scope and sequence activities/labs; Teachers will choose content level activity and "redo" them to reflect principles in earlier discrepant event ; increased rigor required of students	<p>Copies of 2010 standards of Learning</p> <p>5E template</p> <p>Copies of Enhanced Scope and Sequence Lessons</p> <p>Blooms Taxonomy</p> <p>Rulers</p> <p>Colored chalk</p> <p>Colored pencils</p> <p>Microscopes</p> <p>Onion root tip slides</p> <p>Diagrams of mitosis and meiosis</p> <p>Scissors</p> <p>Yarn in five different colors</p> <p>Glue</p> <p>Petri dishes</p> <p>Dried green and yellow peas (or beads)</p>

		Scotch tape Droppers Slides Cover slips Invertebrate guide book Pond water, boiled Debris from a pond Large construction paper Graph paper Water large pins Colored markers Acorns, corn seeds, or bean seeds Colored toothpicks Plastic sealable bags Stopwatch or timer 250 mL beaker 250 mL flask White vinegar Steel wool Balloon Balance, electronic Solution of NaOH Solution of CuSO ₄ Solution of NH ₄ OH Solution of Zn(NO ₃) ₂ Four 3 oz plastic cups Three 5 oz plastic cups Balance Graduated cylinder, 100 mL Periodic table of elements Modeling clay in three different colors Plastic knives Large bag of M & M's Large bag of smaller-size candy in one color
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		<p>Large, round paper plated Overhead transparency of atomic structure Large plastic syringes Hot water baths Cold water baths Pressure sensors Clear 1-liter plastic bottles with caps Beakers Matches Zip-top plastic bags Ice Small latex balloon Rubber bands Large salad dressing bottle 33 X 23 rectangular pan Barometers Compasses Anemometers Celsius thermometers Hygrometers Tall, clear glasses or bottles Whole milk Drinking straws Flashlights Two paint trays Rocks or other small objects Aluminum foil Sponges Cinnamon Powdered drink mix Spray bottle Large bowl Small bowl that fits inside large bowl Peat moss</p>
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