

Solar Smart Home Challenge: High School Division (9-12)

Criteria	Novice	Proficient	Advanced
CREATIVE CONCEPT (40%)			
Purpose <ul style="list-style-type: none"> How creative & purposeful is design? Is there alignment between the design, inhabitant(s), & environment? In what ways is solar appropriate? 	<input type="checkbox"/> Project identifies inhabitants & environment <input type="checkbox"/> Purpose may be unclear <input type="checkbox"/> Solar may not be best choice	<input type="checkbox"/> Design is purposeful <input type="checkbox"/> Solar is appropriate for design <input type="checkbox"/> Good consideration of inhabitant(s) & environment	<input type="checkbox"/> Design is purposeful & creative <input type="checkbox"/> Demonstrates rich understanding of inhabitant(s) & environment <input type="checkbox"/> Solar is appropriate & integral to design
Resourcefulness/Ingenuity <ul style="list-style-type: none"> How creative is construction & materials usage? How purposeful are material & construction choices? How cost effective are the design choices? 	<input type="checkbox"/> Use of some found materials that are recycled or upcycled	<input type="checkbox"/> Creative construction & material use <input type="checkbox"/> At least 50% of materials are found objects that are recycled &/or upcycle	<input type="checkbox"/> Found/reused materials are not only upcycled, but are significantly deconstructed & redesigned <input type="checkbox"/> Creative, purposeful construction & material use <input type="checkbox"/> Comprehensive & wide-ranging materials <input type="checkbox"/> Considered cost in design choices
Aesthetics <ul style="list-style-type: none"> How well built is the device? How is craftsmanship evident? How are considerations made for technical components? 	<input type="checkbox"/> Demonstrates basic craftsmanship <input type="checkbox"/> Technical components are not easily accessible	<input type="checkbox"/> Demonstrates craftsmanship: thoughtful care put into finishes & design <input type="checkbox"/> Technical components are accessible	<input type="checkbox"/> Demonstrates significant craftsmanship: complex & thoughtful design <input type="checkbox"/> Visually appealing: Polished finishes, tidy, significant attention to appearance <input type="checkbox"/> Technical components are integrated seamlessly with attention to accessibility
World Connections <ul style="list-style-type: none"> To what extent does the project respond & demonstrate knowledge of real-world global, environmental, &/or socio-cultural conditions? 	<input type="checkbox"/> Makes mention of real-world conditions or challenges <input type="checkbox"/> Demonstrates some understanding of inhabitant(s) & environment conditions	<input type="checkbox"/> Project design & description consider real-world conditions & challenges <input type="checkbox"/> Demonstrates good understanding of inhabitant(s) & environment conditions	<input type="checkbox"/> Project design & description respond to real-world conditions & challenges <input type="checkbox"/> Demonstrates holistic understanding of inhabitant(s) & environment conditions
DESIGN & KNOWLEDGE (40%)			
Functionality <ul style="list-style-type: none"> To what extent does the project function as intended? To what extent do circuits demonstrate considerations for loads, switches, & storage? To what extent are microcontrollers 	<input type="checkbox"/> Project functions in testing environment <input type="checkbox"/> Circuitry is basic & functional <input type="checkbox"/> Load(s) & switch(es) are mostly functional <input type="checkbox"/> Microcontroller is present,	<input type="checkbox"/> Project functions as planned in testing environment <input type="checkbox"/> Circuit(s) demonstrate consideration for load(s) & switch(es) <input type="checkbox"/> Switch(es) identified, accessible, & functional	<input type="checkbox"/> Project functions well in testing environ <input type="checkbox"/> Circuits are well-designed & demonstrate good consideration of loads, switches, & storage <input type="checkbox"/> Switches are identified, accessible, functional, & integrated into design <input type="checkbox"/> Loads are purposeful, functional, & well-integrated into design

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<p>utilized & programmed?</p>	<p>(not purposeful or integral)</p> <p><input type="checkbox"/> Programming utilizes pre-written code with no changes</p>	<p><input type="checkbox"/> Load(s) purposeful & functional</p> <p><input type="checkbox"/> Microcontroller adds to functionality, but is not integral to design</p> <p><input type="checkbox"/> Programming utilizes pre-written code with some modifications, demonstrating basic coding knowledge.</p>	<p><input type="checkbox"/> Microcontroller use is purposeful, functional, & well-integrated into the design.</p> <p><input type="checkbox"/> Students programmed microcontrollers with team written code, demonstrating good coding knowledge & understanding.</p> <p><input type="checkbox"/> Storage streamlines circuitry creatively</p>
<p>Knowledge</p> <ul style="list-style-type: none"> To what extent is understanding of solar energy demonstrated utilizing appropriate concepts & terminology? To what extent do descriptions & explanations of circuitry include accurate rationales for choices? 	<p><input type="checkbox"/> Basic solar energy knowledge</p> <p><input type="checkbox"/> Basic vocabulary</p>	<p><input type="checkbox"/> Knowledge of solar energy, circuits, & grid systems</p> <p><input type="checkbox"/> Vocabulary is appropriate & related to the context of their project</p> <p><input type="checkbox"/> Rationale for design choices is provided</p>	<p><input type="checkbox"/> Demonstrates rich understanding of solar energy & larger clean energy landscape</p> <p><input type="checkbox"/> Demonstrates rich knowledge of solar components (panels, circuits, capacitors, microcontrollers, etc.) with sophisticated & appropriate terminology & concepts</p> <p><input type="checkbox"/> Strong & well-supported rationale for design choices</p>
<p>Research & Documentation</p> <ul style="list-style-type: none"> How robust is the team's research? In what ways did they organize & present documentation of their design process? How evident is their design process? How systematic were they in their design process? 	<p><input type="checkbox"/> Documentation details the systematic design process</p> <p><input type="checkbox"/> Documentation includes:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Smart Home Narrative <input type="checkbox"/> Solar Panel Schematic <input type="checkbox"/> Wiring Diagram(s) <input type="checkbox"/> Programming Code <input type="checkbox"/> Materials List 	<p><input type="checkbox"/> Documentation show the design process including imagery, iterations, & variables</p> <p><input type="checkbox"/> Narrative is clear & informative</p> <p><input type="checkbox"/> Solar Panel Schematic & Wiring Diagram(s) & Programming Code are clear</p> <p><input type="checkbox"/> Materials List is clear & includes costs</p>	<p><input type="checkbox"/> Documentation shows a thorough & detailed design process including sources imagery, iterations, variables, & research</p> <p><input type="checkbox"/> Smart Home Narrative is compelling, engaging, & robust</p> <p><input type="checkbox"/> Solar Panel Schematic & Wiring Diagram(s) are clear, thorough, & reproducible</p> <p><input type="checkbox"/> Programming Code is clear, thorough, reproducible AND written by team</p> <p><input type="checkbox"/> Materials List is clear, thorough, & costs are evident</p>
<p>COLLABORATION & COMMUNICATION (20%)</p>			
<p>Teamwork</p> <ul style="list-style-type: none"> How did they work together & collaborate on the project? 	<p><input type="checkbox"/> Emerging understanding of what it means to work on a team.</p>	<p><input type="checkbox"/> Balanced participation & contributions.</p> <p><input type="checkbox"/> Identified each teammate's role</p>	<p><input type="checkbox"/> Balanced participation & contributions</p> <p><input type="checkbox"/> Identified & discussed each teammate's role in the project</p>
<p>Delivery</p> <ul style="list-style-type: none"> In what ways was the presentation engaging & interesting? How was preparation & planning demonstrated in the presentation? 	<p><input type="checkbox"/> Project was presented</p> <p><input type="checkbox"/> Could have used more practice</p>	<p><input type="checkbox"/> Well presented</p> <p><input type="checkbox"/> Evidence of prior practice</p> <p><input type="checkbox"/> Within time limits</p> <p><input type="checkbox"/> Responded to questions appropriately</p>	<p><input type="checkbox"/> Dynamic & engaging presentation</p> <p><input type="checkbox"/> Evidence of significant planning & practice</p> <p><input type="checkbox"/> Well paced & within time limit</p> <p><input type="checkbox"/> Responds with confidence to questions & elaborates on response</p>