EDUCATORS' RUBRIC FOR EVALUATING AND/OR CREATING LESSONS THAT INCORPORATE SOLAR THERMAL COOKING

This Rubric can be adapted to a variety of age levels and educational settings. Not every characteristic is absolutely essential to every lesson or activity. Often, constraints of time and funding prevent an educator from introducing long-term, project-oriented lessons. Do not discount a lesson you find online simply because it does not fully develop each characteristic. However, be certain that what you *do* teach the children is **scientifically sound** and that you, as an educator, are informed regarding the **basics of solar thermal cooking**. If you are guiding students in construction of a solar oven, be certain that students follow instructions that will result in a **properly functioning oven**. Misinformation and misconceptions perpetuated through uninformed instruction can frustrate efforts to gain acceptance of the benefits of solar thermal cooking worldwide. Accurate information on the basics of solar thermal cooking can be found online at **solarcookers.org** and at **solarcooking.wikia.com/wiki/Classroom_resources**.

Characteristics of Effective Solar Thermal Cooking Lessons	SUPERIOR	SATISFACTORY	MINIMAL	NOT EVIDENT
SCIENTIFICALLY SOUND: Age appropriate grade level concepts are fully developed and result in a working understanding of solar thermal cooking as well as a ***properly functioning solar oven***. **EXAMPLES**: interaction of light with matter, methods of insulation, effect of color on light absorption, transformation of light energy to thermal energy, method of heat transfer, use of energy for human activity, solar geometry throughout day and season, determining angles of reflection, engineering design process, light-matter interaction, solar cooker design elements, etc.	Science concepts to be developed are clearly stated and directly incorporated into the instruction	Science concepts to be developed are clearly stated but not directly incorporated into the instruction	Minimal reference to science concepts, not directly incorporated into the instruction	No reference to science concepts
ESSENTIAL VOCABULARY: Age-appropriate, grade-level vocabulary clearly identified with multiple opportunities to use & internalize meaning. Lesson supports students' ability to think and communicate. **EXAMPLES:** Solar energy, thermal energy, temperature, reflection, absorption, energy transformation, conduction, convection, radiation, insulation, transparency, waves, latent heat, water density, calorie, joule, watt, etc. (Consult with a grade-level physical science resource for appropriate vocabulary.)	Key terms identified. Multiple opportunities incorporated directly into lesson for use of acquired vocabulary.	Key terms identified. Few opportunities incorporated directly into lesson for use of acquired vocabulary.	Few key terms identified. Little effort to incorporate directly into lesson.	No key terms identified. No opportunities incorporated directly into lesson.
MATERIALS: Complete list of materials included. Ideally, materials are easily obtainable and inexpensive. **EXAMPLES**: Cardboard, foil, other highly reflective materials such as shiny wrapping paper, inside out chip bags, glue, papier mache, glass, plexi-glass, oven bags, fabric, paint, mirrors, newspaper, etc.	Complete list of materials given that are easily obtainable and inexpensive.	List of materials given, but not complete and/ or easily obtainable and inexpensive.	Materials mentioned throughout lesson, but not clearly stated at beginning.	No list of materials given.
INSTRUCTIONAL METHODS: Instructional methods are included for educators to follow. **EXAMPLES**: Learning objectives are stated and shared with students. Lesson procedure is comprehensive and sequential. Pre and post assessment is included. Instructional process for oven making is based on methods that result in ***a properly functioning oven***. When appropriate, national and/or state standards are listed.	Instructional methods can be followed easily by instructor. Oven construction is scientifically sound.	Instructional methods given but may have gaps. Oven construction is scientifically sound.	Instructional methods given but may have gaps. Oven construction methods are unclear.	Instructional methods unclear or missing. Oven construction methods improper.
ENGAGEMENT & DIFFERENTIATION: Lesson effectively engages students with the process in a way that makes a lasting impact; includes multiple opportunities for stimulating creative thinking processes; provides variety of activities and teaching strategies appropriate to different learning styles & modalities. **EXAMPLES**: Students design and create ovens to test, students participate in cooking with a given model of oven, students team up for oven construction, older students teach younger students about solar cooking, students demonstrate solar cooking for an audience of peers and/or adults, etc.	Lesson is teacher facilitated and students of all abilities and learning styles have multiple opportunities to be fully engaged	Lesson is teacher directed but with opportunities for all students to be actively engaged.	Lesson is teacher directed with little opportunity for students to be engaged.	Lesson provides no opportunity for student engagement.
INTERDISCIPLINARY CONNECTIONS & STEM: Connections to other disciplines (subjects) are directly incorporated into the lesson. **EXAMPLES**: Instruction includes the various sciences: biology, chemistry, physics, earth & space science, and environmental science as well as other disciplines: math, reading, writing, history, geography, sociology, political science, economics, engineering, business, art, etc.	Multiple connections clearly stated by name. Subjects' relevance fully examined and explored.	One or two connections clearly stated by name. Subjects' relevance noted.	Connections and relevance are hinted at but not incorporated into the lesson directly.	No effort made to state connections to other subjects or to explore their relevance.
LIFE CONNECTIONS: Opportunities are embedded within the lesson for personal connection to topic. **EXAMPLES**: Students explore how solar thermal cooking can benefit their own and/or others' lives. Examine pros and cons of solar thermal cooking in student's geographic location, social circumstance, etc. Identify social & environmental issues that can be addressed by adoption of solar thermal cooking. Etc.	Students have multiple opportunities to explore, research and discuss life connections to solar thermal cooking.	Students have some limited opportunities to explore, research and discuss life connections to solar thermal cooking.	Some teacher directed discussion about life connections. Minimal student exploration.	No opportunity for teacher directed discussion or student exploration of life connections.