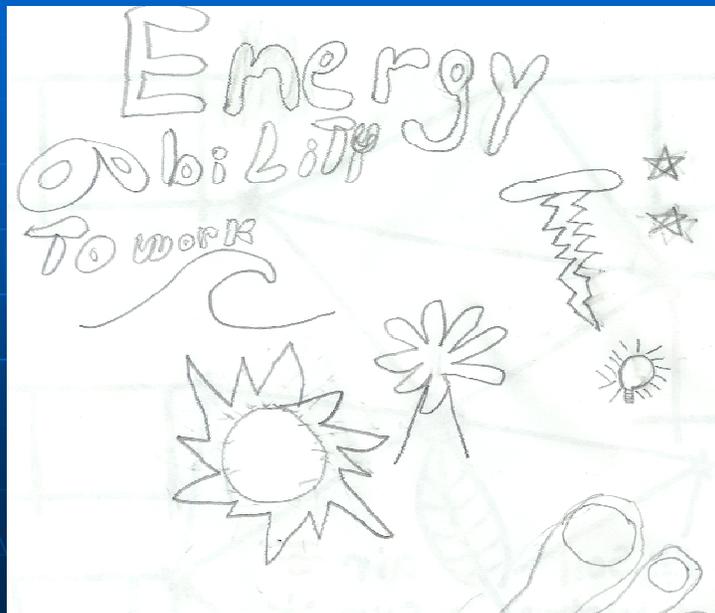


ENERGY in the ENVIRONMENT

Montessori School of Maui
Sustainable Design Guidelines
Integrated Curriculum

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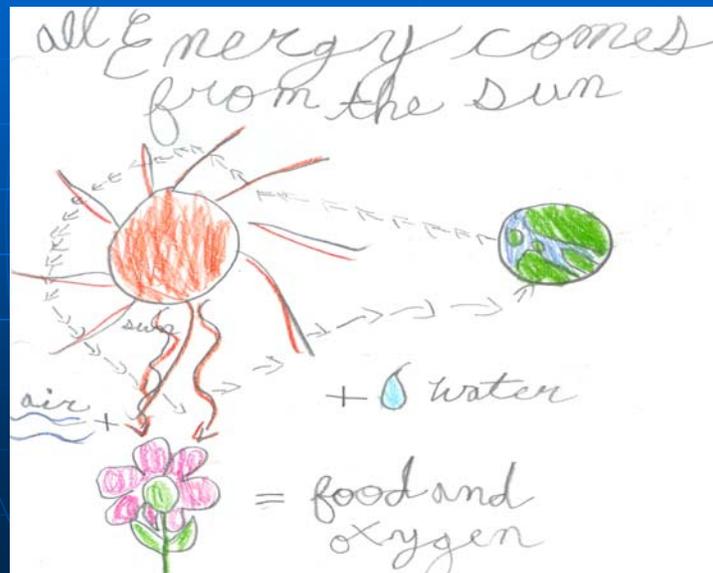
What is ENERGY?



The ENERGY Questions

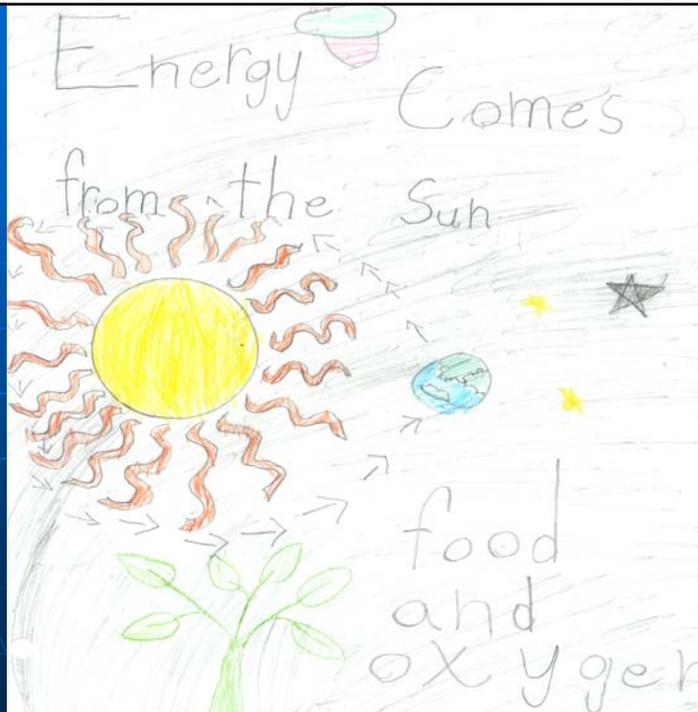
- Where do we get ENERGY?
- Can we 'create' ENERGY?
- How is ENERGY stored?
- Is there an unlimited supply of ENERGY?
- How do Humans fit in to the ENERGY cycle? Are we net consumers or producers? Can we go on as usual?

Where does ENERGY come from?





MONTESSORI SCHOOL OF MAUI
GUIDELINES OF SUSTAINABILITY

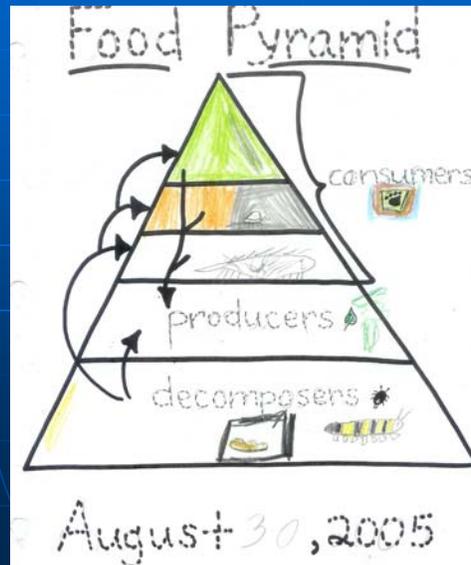


How does the Earth capture and transform the Sun's ENERGY?

- Producers-Plants and Bacteria
- Fossil Fuel-Biota produced, consumed, decomposed and then 'stored' ancient sunlight as hydrocarbons
- Solar, Wind, Wave, Geothermal and Nuclear Power: are they from the Sun?
- Is the Sun, our main source of Energy, an unlimited Energy resource?

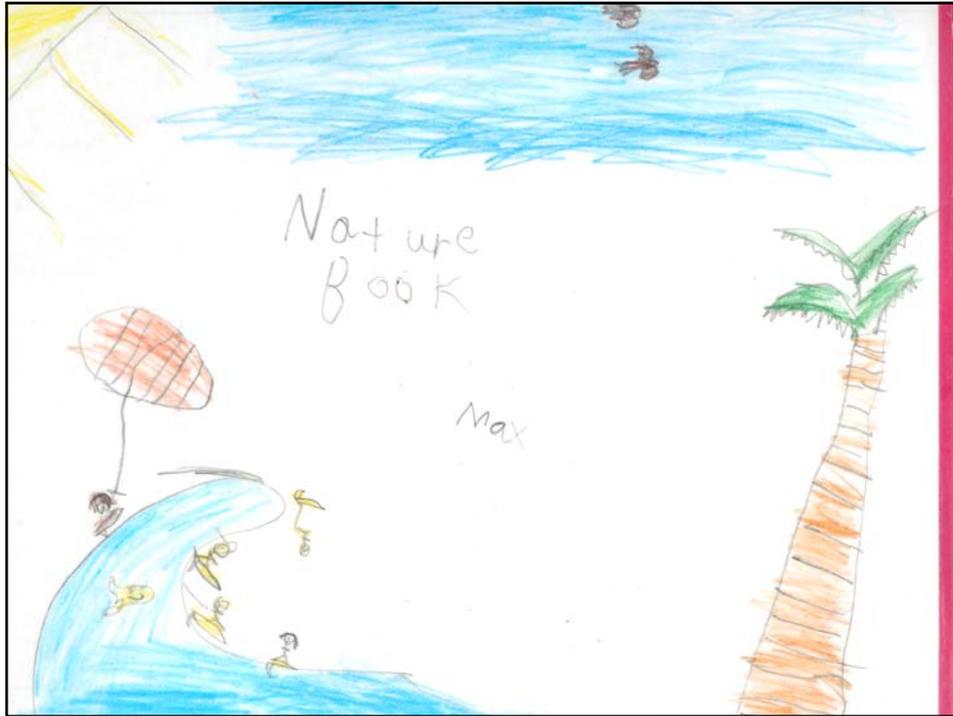


How do *our bodies* get ENERGY?



What others kinds of ENERGY do we need to live?

- Light Energy-so we can see indoors and when it is dark outside
- Heat (thermal) Energy-so we can feel comfortable at home and school, cook our food and move our bodies
- Love Energy-so we can bounce our stored Energy off others and know we are alive



Integrated Design Guidelines

SCALES AND CURRICULUM- Intent and Impacts

MACRO

- Provides metrics for identifying energy savings and best practice model
- Reduces consumption of finite fossil fuel resources

MESO

- Demonstrates the practice of best energy benchmarking in utility district
- Reduces reliance on foreign fossil fuels

MICRO

- Reduces electric bill
- Higher first cost
- Establishes baseline against which savings can be marked
- Clarifies operational energy usage

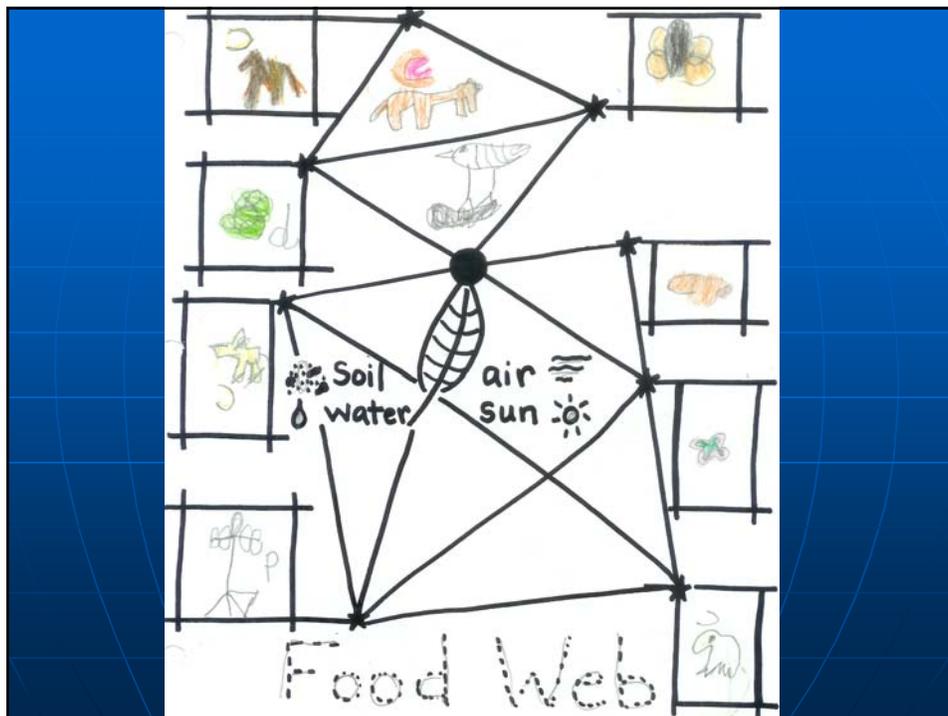
CURRICULUM

- Introduction to the laws of thermodynamics
- Introduction to baseline energy measurement
- Introduction to energy use and energy monitoring

Emergent Questions and Lessons

SCALES AND CURRICULUM – Emergent Questions and Lessons

MACRO: Social Action Middle School (ages 12-15)	MESO: Exploration Elementary (ages 7-11)	MICRO: Empathy Primary (ages 3-6)
<p><i>Do you set personal goals? I wonder if you think it is important for our school to set energy conservation goals? Why?</i></p> <p><i>Do you ever wonder what kind of equipment we would need to track energy performance in our new buildings?</i></p> <p><i>I am curious if it takes more energy to build an energy-efficient campus than we could possibly save over the life of the new campus? How could we find out? What alternatives are there to "new" construction?</i></p> <p><i>I wonder if optimal energy performance in our school can effect the quality of life on Maui? In the United States? For the rest of the world?</i></p>	<p><i>I'm curious if you remember what the word "baseline" means? Now, do you have an idea what the word "optimal" means?</i></p> <p><i>If you had to guess right now, what do you think it means to "conserve" energy? How do you think we can use energy "efficiently?" What do you think "renewable energy" is?</i></p> <p><i>I wonder how many ways we can think of to conserve energy at school? How many different ways can we use energy more efficiently at school?</i></p> <p><i>And how can we try to use more renewable energy at school?</i></p>	<p><i>I wonder why energy is so important...why people say that energy is so precious?</i></p> <p><i>If something is important—really special—how do you treat it?</i></p> <p><i>To try your very hardest is to give an "optimal performance." How do you think we can use energy in an "optimal" way?</i></p> <p><i>I wonder if animals and plants use energy in an optimal way, or if they waste energy sometimes. Do you have any ideas?</i></p> <p>Suggested Lessons</p> <p>Games to show the transfer of energy in food webs, as well as the loss/waste of energy.</p> <p>Pretend to be animals practic-</p>





Is our current ENERGY usage sustainable?

- Laws of Thermodynamics
- Carbon Cycle
- Water Cycle
- Nitrogen Cycle
- All ENERGY sources are finite, while population (consumers of stored ancient sunlight) seem to be infinite
- Conservation is absolutely essential



How can we 'Save' ENERGY?

Sustainable Guideline Goals:

- Achieve optimal energy savings on the MOMI campus and have the MOMI building designs and campus operations serve as a pollution-prevention model. Savings to be marked in kWh and at least a 40% energy savings will be achieved, as compared to the standards set in ASHRAE/IESNA 90.1-1999, or in the State of Hawaii Department of Education regulations.

ACTIONS:

- Buildings are to be passively designed
- Solar hot water is to meet all hot water needs on campus
- Existing buildings will, on aggregate, reduce their energy consumption by 20% as reflected by baseline
- New buildings will consume 40% less energy, as measured against standards listed above. Architects / engineers to provide metrics and narrative describing methods and amounts of energy savings
- MOMI Facilities head to provide Optimized Energy Performance Plan for existing buildings



Energy Conservation & Design

- Through the Integrated Curriculum, students of all ages become involved in the design process
- By attaining LEED's Certification, students learn the value of conservation, planning for the future
- As students move up and on from MOMI, they have a basic knowledge of sustainable design and living