

# Solar Energy Presentation



# Recap/Agenda

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# What is Solar Energy?

☀ Solar Energy is energy (light or heat) that comes from the sun

## ☀ Solar Energy Examples

- ☀ What makes your car hot when it is parked in the sun?
- ☀ What makes your solar calculator work?
- ☀ What makes plants grow?
- ☀ What makes the solar panels work on the roof of your school?

# Forms of Solar Energy

- ☀ There are two basic categories of Solar Energy:
  - 1) Solar Thermal- Using the sun's energy to heat things like your house, water, food, etc.



- 7) Solar Electric- Turning light from the sun directly into electricity, using solar panels.

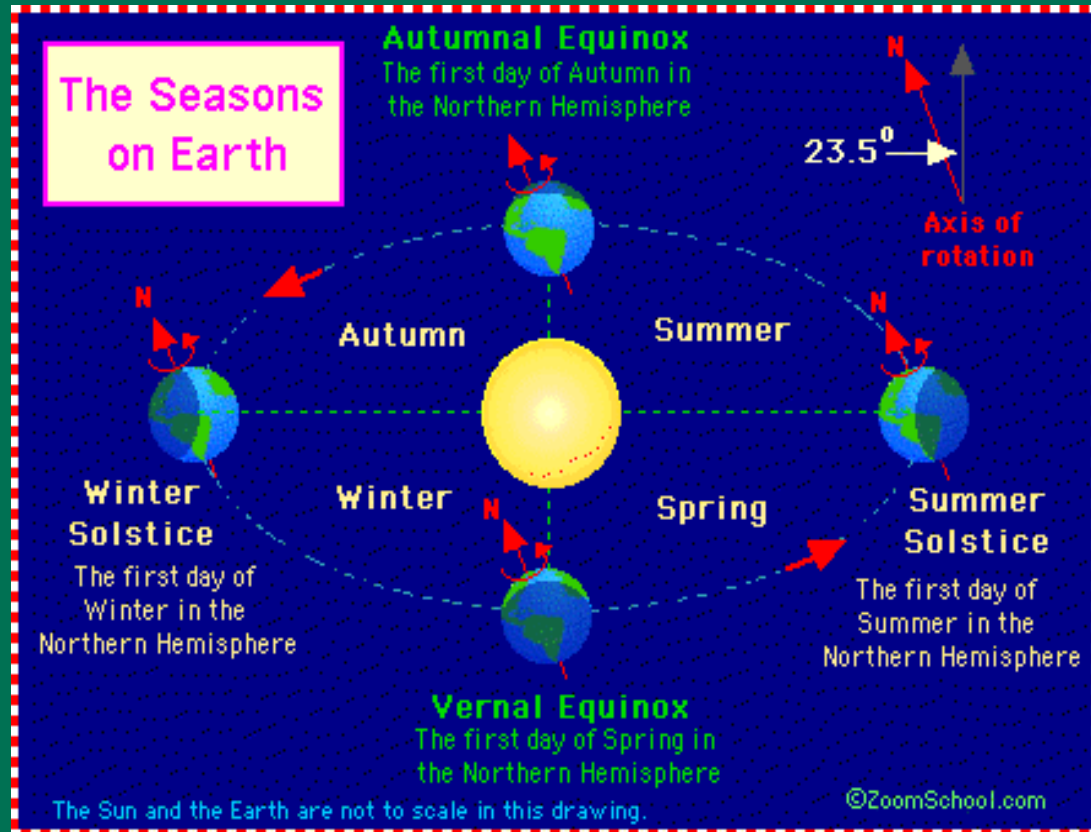
# What is a Solar Panel?

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- Solar Panels are commonly called Photovoltaic Panels (PV Panels)
- *Photo* means light and *voltaic* means electricity.
- Photovoltaic panels are made from Silicon which is the same material that makes up sand.
- Silicon is heated to extremely high temperatures at a factory, and then formed into very thin layers
- When the sunlight hits the PV panel, it moves around tiny particles of silicon called electrons.
- The silicon electrons travel through the wires that are built into the PV panel to create energy!

# Sunlight's Affect on the Earth

- The earth rotates on its axis which creates the change from day to night.
- The earth's axis is at an angle of 23.5 degrees, this tilt creates seasons.



# Solar Collector Position

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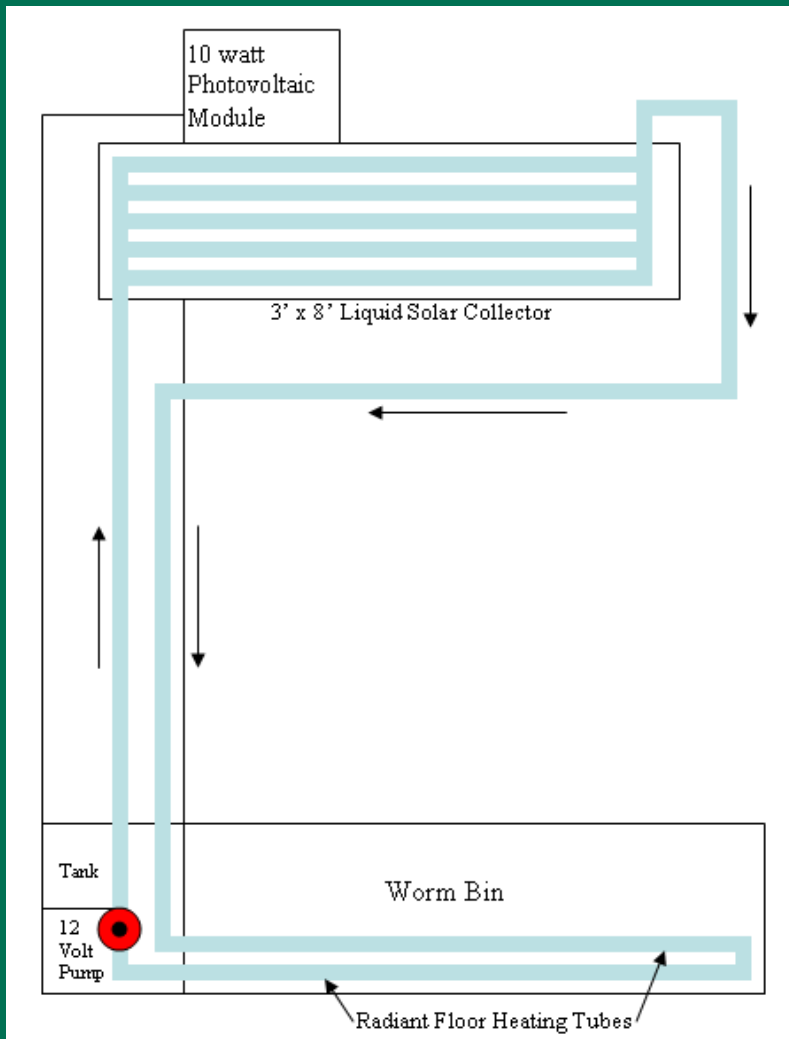
- ☀ So the optimal tilt angle for solar panel for a certain month/season is based on:
  - ☀ Season
  - ☀ The location (North/South) on the planet

# How do you conserve energy?





# Solar Thermal Design



- ☀️ PV panel will collect the solar energy and convert it into electricity to be stored within the battery
- ☀️ The battery will operate the pump device which will force liquid through the system
- ☀️ The liquid runs through the solar collector, collecting heat from the sun and then flows through the worm bin transferring heat to the compost
- ☀️ Thermostat will be used to control the temperature and keep the worm bin within the desired range

# Solar Thermal Design

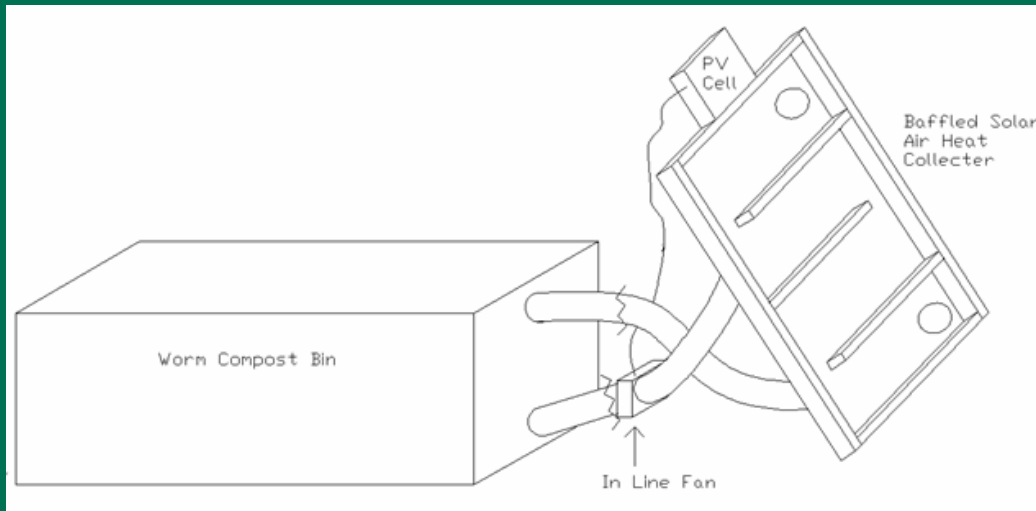
## DESIGN POSITIVES

- Simple Design
- Inexpensive

## DESIGN NEGATIVES

- Complicated piping system
- Leakage may create overall energy losses, environmental concerns, and even safety hazards
- Difficult to build
- May need to hire experts for help to build the system

# Solar Air Collector Design



- ☀ The collector portion will be attached to the roof
- ☀ Tubes or pipes will run down from the collector portion to the worm bin
- ☀ Two PV panels will be used to collect energy and power a fan
- ☀ The fan will circulate warm air flow to the worm bin

# Solar Air Collector Design

## DESIGN POSITIVES

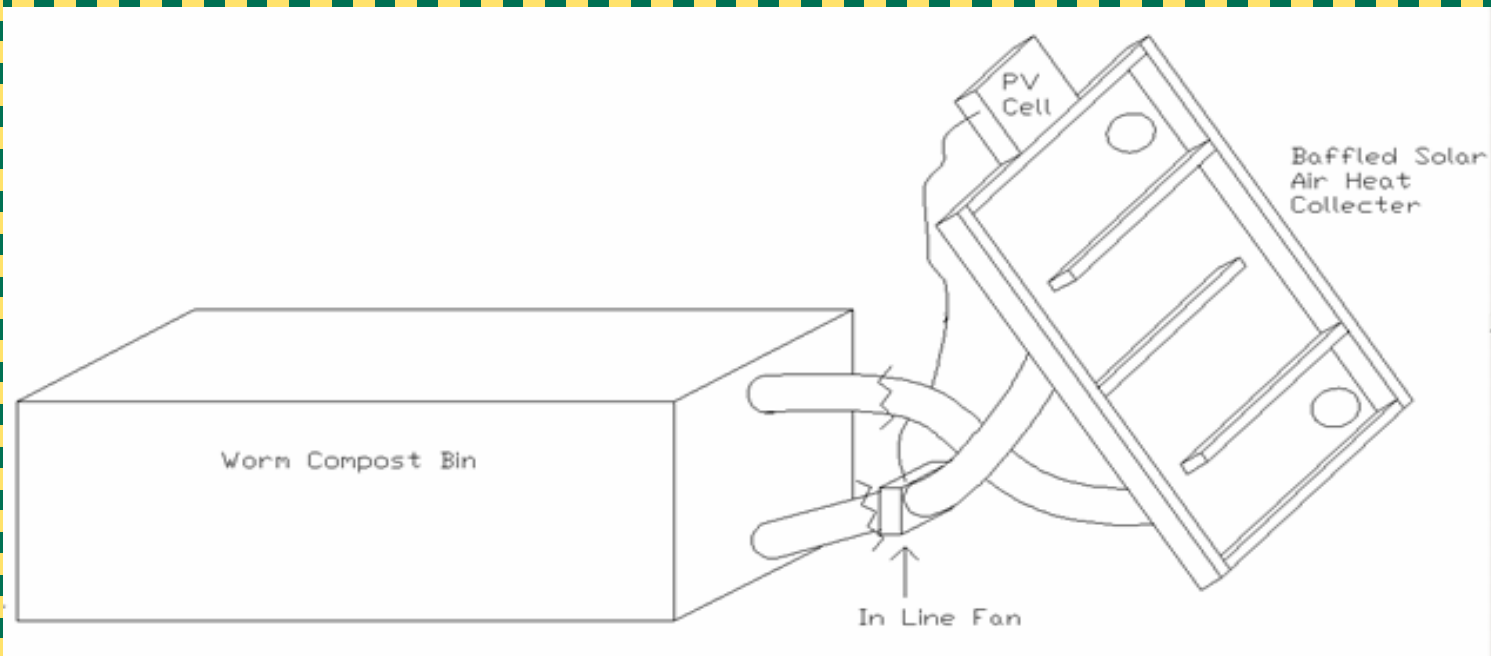
- Extremely Efficient!
- Only 2 PV panels required
- Inexpensive
- Materials are easily obtainable
- System can be built by the team

## DESIGN NEGATIVES

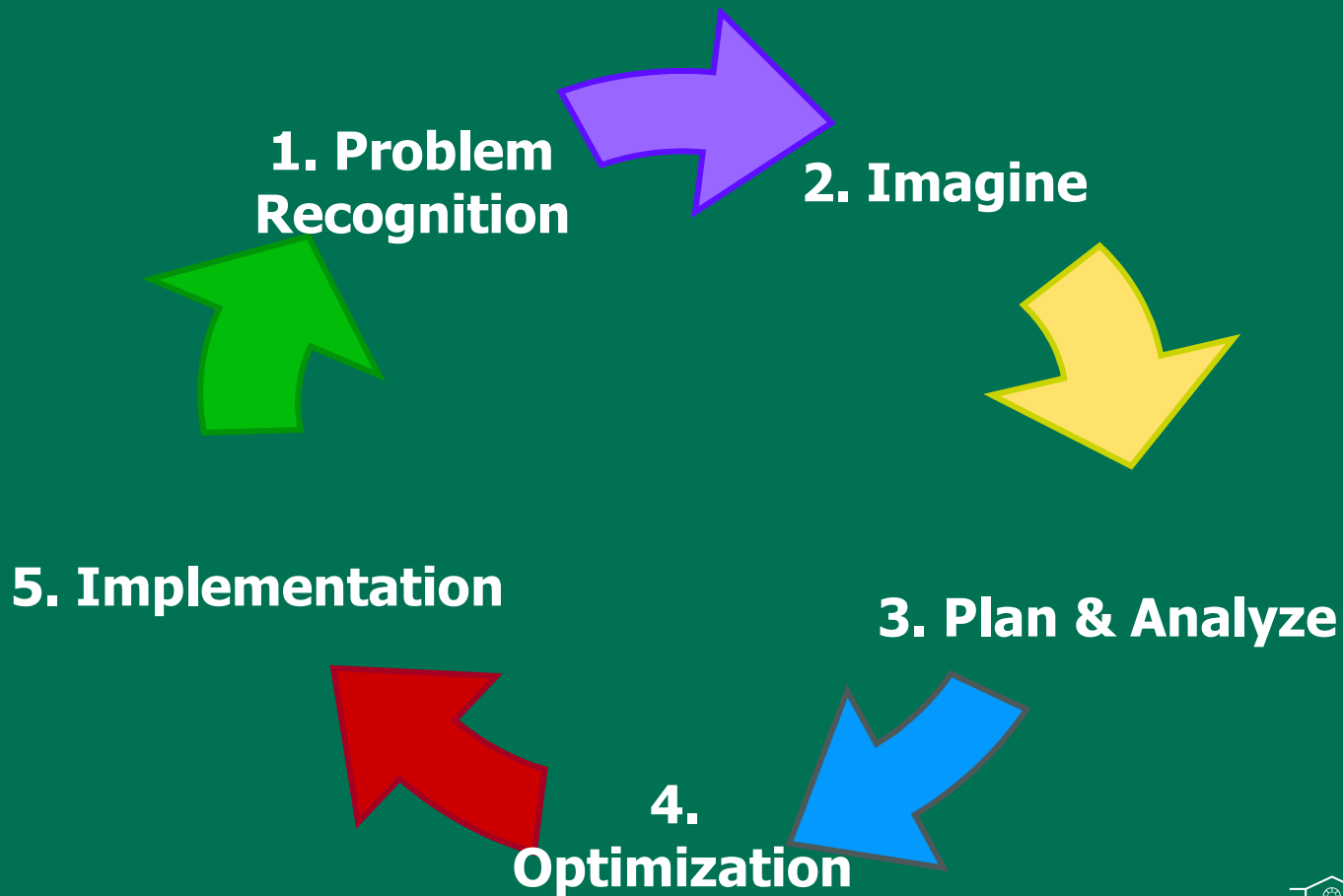
- Design will not be able to run on cloudy days
- Design will only run for an average of three hours per day

# Final Design Choice: Solar Air Collector

- ☀ This design is better than the other designs in the following categories: cost, operating cost, energy consumption, delivery date, weight, size, and quantity



# Design Process



# Questions?

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# How do you conserve energy?

