

## Syllabus: Developing World Technologies Class

### **Grading:**

70% Homework:

Students will be required to write summaries of seven of the technologies mentioned in classes with an evaluation of how useful they think the technology is.

30% Final Presentation:

Students will give a 15 minute final presentation to the class about an additional technology used the developing world that they have researched through the term.

A grade of 60% will be needed to pass to course.

### **Weekly Syllabus:**

Week 1:

Broad Introduction

- Introduction
  - Purpose of the course
  - Problems in the developing world by sector
    - Energy
    - Agriculture
    - Water
    - Housing
    - Health
  - Technology slideshow of technologies that have impacted the world already
    - IDE Treadle Pump
    - Hippo water roller
    - Drip Irrigation system
- Appropedia

- IDDS

Later Classes: Focused on specific technologies

Lecture portion:

- Introduction of technology
  - Who invented it, if applicable
  - Sector it is from
  - Where the technology is used/available
  - Dissemination strategy, if applicable
  - Problem it solves
- Science behind technology
  - How it works
- Materials/Cost analysis
  - Materials used in the product
  - Cost of product

Hands on portion:

- Step by step guide to making the device
  - If applicable/funding available have students make the project following instructions
  - Test the device to see if it works, if possible

Discussion portion:

- Discuss the device
  - Pros and Cons
  - Changes or modifications that could be made
  - Additional uses
  - Material substitutions

- Ideas on how assembly could be expedited

Weeks 2 through 9:

- Week 2: Pot-in-Pot
  - Evaporative cooler/refrigerator used in the storage of vegetables and other perishables. Keeps food 20 degrees cooler than outside temperatures and allows for storage of food for an additional 3 or 4 days.
- Week 3: Water pumps and filters
  - There are many types of water pumps used to collect water from wells. We will talk about treadle pumps, rope pumps, and hand pumps, all of which cost less than \$10 dollars. We will look at different types of filters such as sand filters.
- Week 4: Charcoal burn/briquette maker
  - Charcoal is far more efficient to burn in stoves than wood, and a simple method of charcoal production has been created by Amy Smith, a professor at MIT. We will go over this method of charcoal creation from agricultural waste. Many charcoal burns leave charcoal powder that needs to be briquetted, so we will also review briquetting technology.
- Week 5: Pedal Powered Generator/Bicycle Dynamo
  - Using a dynamo, it is possible to use a bicycle to produce electricity cheaply, and since bicycles are available throughout the developing world, this technology has a good deal of promise.
- Week 6: Biogas Digester
  - A biogas digester collects methane gas produced from the anaerobic digestion of waste, which can then be used to fuel lighting or cooking. A cheap, small-scale digester can be made with plastic sheeting and PVC connectors.
- Week 7: Solar Still/SODIS/Water Testing
  - Solar water stills are used in parts of the developing world to purify water using the sun's energy through evaporation and condensation. SODIS, or Solar Distillation, is another water purification technology that uses the sun's energy. Finally, we will discuss a cheap water testing method.
- Week 8: Microbial Fuel Cell

- Microbial fuel cells produce low voltages and small amounts of power from anaerobic respiration of bacteria found in soil. However, they scale up cheaper than solar cells, but a good way to scale them up has yet to be created.
- Week 9: Peanut Sheller
  - Jock Brandis and his organization the Fully Belly Project devised a peanut sheller that separates peanuts from their shells. This project has already been implemented throughout the Philippines, where it revolutionized the peanut industry.

Week 10:

- Week 10: Final Presentations
  - Students will give their final presentations to the class