

Advance SmartLab 2010: EPSCoR Teaching Course Outline

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Outcomes and Goals

- **Outcome:** Students will develop skills in Science, Technology, Engineering, Mathematics, (STEM) and Computer Science (CS).
- **Goals:**
- Through the use of Project Based Learning students will build science fair projects.
- Students to build simulation models with the use of programming tools.
- Increase ability to develop curricula in Science, Technology, Engineering, Mathematics, and Computational Science that meets the needs of all learners.

Course Description:

- Through a two semester course students will develop a scientific study using technology and computer science tools in the classroom, to create a computational model that will simulate data that is produced through their investigation. The course is developed through an approach to viewing environmental issues through scientific analysis. Students will learn the necessary skills in STEM. Focus for 2010 – 2011 is “Effects of Climate and Water Resources”. Other projects investigating environmental issues are encouraged.
- Students will be asked to complete a Scientific Investigation through the process of developing a science fair project. Students are asked to build a “Physical Model” for collection of data and compose this data into a computational model for presentation. A final technical research project and portfolio will be composed for presentation to EPSCoR.

Semester 1

Introduction

4 points

August 24 – September 2

- Intro to Smartlab 2010 and the 21 century classroom to include Experimental Program to Stimulate Competitive Research (EPSCoR)
- Intro to STEM's, Technology Education and Computer Science
- c. Intro to course description Outline

Concept Map using Inspiration

12 points

September 2 - 17

- Inspiration 9.0 Concept maps and idea organization
- World issues, Environmental Issues, Green Technologies, Current Solutions
- Project Ideas and Development

PowerPoint Phase 1 “Earths Destructions and Solution”

12 points

September 20 – Oct 1

- Internet research for issues concerning our world destruction.
- Internet research for solutions for corrections of environmental issues.
- Power point presentation

Proposal Scientific Investigation

12 points

October 4 – 15

- Presentation of the scientific Method of Investigation
- Students to recognize, choose, and research one environmental issue
- Development of 5 step scientific method of investigation

Project Development, Engineering Design and Schematic

12 points

October 18 - 29

- Introduction of the engineering design process
- Proposal development
- Schematic drawings of process

Materials List

12 points

November 1 - 12

- Design project material list
- Concept Map to include
 - Project proposal
 - Scientific Method of investigation
 - Steps in the design process

StarLogo TNG Program Development

12 points

November 15 – Dec 3

- Introduction to StarLogo TNG
- Tasmanian Devil real world problem power point
- Program simulation

StarLogo Basic Simulation of Project

12 points

December 6 - 17

- Develop situational problem
- Completion of StarLogo TNG simulation of proposed physical model solution

Physical Project Research

12 points

December 17 – Jan 8

- Research current proposed solution and model
- Order necessary materials list parts
- Commence building of physical model

Semester 2

Physical Model Completion

12 points

January 11 – 31

- Building
- Testing
- Data collection

PowerPoint Phase 2 Research and Investigation

12 points

February 1 – 18

- Scientific Method of Investigation
- Engineering Design Model
- Problem and Solutions Report
- Research for further investigation
- Five paragraph Thesis Introduction

Five Paragraph technical report Preliminary Study 12 points February 14 – 25

- Issues to the environment
- Possible solutions
- Project based physical model determinations
- Simulation or Computational Analysis of Physical Model
- Conclusion

Data Collection Ongoing Study and Collection

12 points

January 11 – February 25

- Data Collection using Excel Spread Sheets
- Data analysis
- Computational Modeling StarLogo or NetLogo optional

Computational Model StarLogo

12 points

March 1 – 11

- Build Simulation Model
- Test Simulation Model
- Present Simulation Model to class

SmartLab Independent Study STEM Video Presentation

12 points

March 21 – April 1

- Sony Vegas editing software Introduction
- Demo of Music Video
- Demo of Documentary
- Demo of Public Service Announcement (PSA)

Portfolio Presentation to EPSCoR of Student results 16 points April 4 – April 15

- Inspiration Concept Map\Outline
- PowerPoint presentation Word Destruction and Solutions
- Proposal to Include STEM
- Scientific Method of Investigation Analysis and Hypothesis Statement
- Engineering Schematic
- Design Process
- First StarLogo TNG Model
- Physical Model
- Data collection
- Second Model StarLogo TNG or Optional NetLogo
- Five Paragraph Technical report
- Final Video Presentation

Portfolio PowerPoint Video Contribution to Society 12 points May 1 - 20

- “How I Made A Difference” PowerPoint or video documentary
- Final Portfolio on CD