WELCOME FRIENDS

SMTE Advisory Board Meeting

Overall Meeting Goal:

To Obtain Critical Formative Feedback and Advice from Knowledgeable Educators, Game Developers, and Stakeholders.

Agenda for SMTE Advisory Board Meeting
Wednesday, March 23, 2010
ITEEA Conference, Minneapolis, MN

- **Introductions**
- **Overview of Project – Mike Hacker and Nick Cimorelli**
- **Research and Evaluation Report – Deborah Hecht and Laura Saxman**
- **Demonstration of Game Play – Jim Kiggens**
- **Discussion and Questions – Advisory Board Members/Team**

Survival Master - 3D Computer Game For Middle School Technology Education

Principal Investigator: *Michael Hacker*, Hofstra University
Co- Principal Investigators: *David Burghardt*, Hofstra University; *Deborah Hecht*, Center for Advanced Study in Education (CUNY Graduate Center); *Karl Kapp*, Bloomsburg University; *Gordon Snyder*, National ICT NSF Center.
Game Producer: *Jim Kiggens*, Hofstra University/Course Games

For Information, Contact: mhacker@nycap.rr.com **or** jkiggens@coursegames.com

WWW.GAMING2LEARN.ORG

SURVIVAL MASTER is being developed through the NSF-funded *Simulation and Modeling in Technology Education* (SMTE) Project.

HOFSTRA UNIVERSITY.

CENTER FOR TECHNOLOGICAL LITERACY

NSF

Bloomsburg UNIVERSITY

THE GRADUATE CENTER

THE CITY UNIVERSITY OF NEW YORK

We are developing and researching the academic potential of a *hybrid instructional model* and a set of *prototypical materials* that integrate 3D simulation, educational gaming, and real-world physical modeling into middle school technology education programs.

SURVIVAL MASTER ALASKA

The hybrid instructional model is curriculum that involves both virtual modeling in a gaming format, and real-world physical modeling.

- **In both modes, students are engaged in pre-design tasks called "Knowledge and Skill Builders" (KSBs).**
- **Once the KSBs are completed, students engage in the survival shelter design challenge.**

During the Survival Master video game, students will work in single player and multiplayer environments. They will assume roles of competitors in a disaster relief training program located in a remote Alaskan base camp.

Game Story: The ultimate goal of their competition is to beat other players' scores and become a National Disaster Relief Agency field expert, known as a Survival Master.

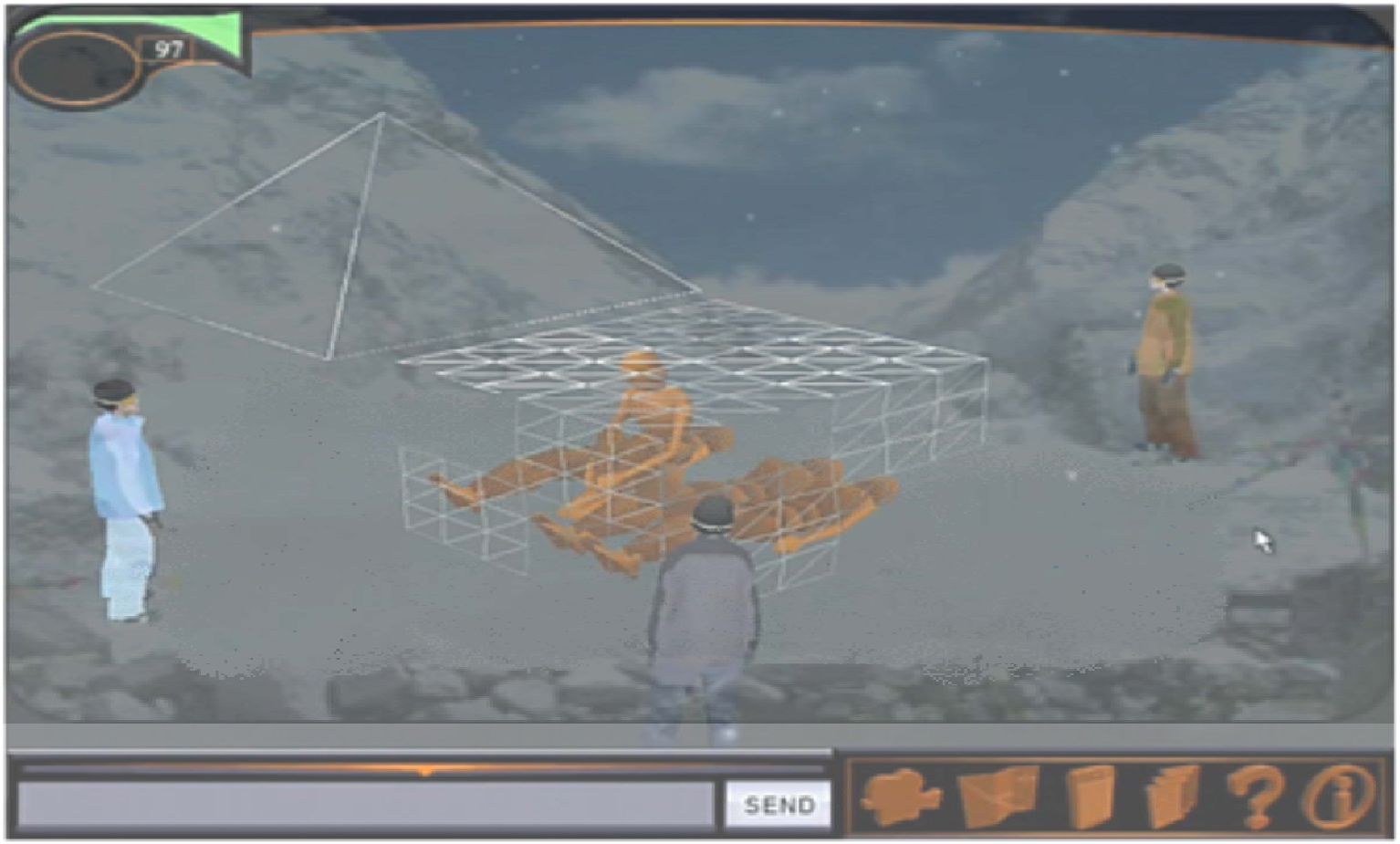
In the game, each player will race through four knowledge and skill building exercises, or KSBs. The KSBs teach students various STEM concepts related to the mathematics of geometric shapes, conductive heat flow, k and R value, and structural design.

KSB 1: Surface Area and Volume Calculations
KSB 2: Conductive Heat Flow
KSB 3: Relationship between "k" Value and "R" Value
KSB 4: Structural Design

These tasks will be performed individually by each player.

SURVIVAL MASTER
ALASKA

However, once the tasks are completed, an earthquake strikes the base camp, leaving only a handful of survivors. They band together in teams of four to build a shelter to survive the coming blizzard. The multiplayer design challenge requires students to apply all the knowledge and skill they've gained during the single player KSBs.



The first KSB has to do with learning about the volume and surface area of geometric shelter shapes.

In the “Cave of Volume”, the player is finding geometric shapes in the game environment (cubes, square-based pyramids, spheres) filled with liquid that will be poured through a funnel into cylinders. The player must choose the cylinder that holds the same volume as the geometric shape, then find keys to unlock prizes that require knowing surface area of geometric containers.

KSB 2 is about conductive heat flow.

In this KSB, a player jumps on a moving platform. The moving platform models heat flowing from hot to cold.

Key Ideas

- **Heat flows from hot to cold through a material by *conduction*.**
- **Reducing the amount of surface area reduces heat transfer**
- **Different materials conduct heat at different rates depending upon their thermal conductivity (their *k value*)**
- **Heat flow decreases with increasing thickness.**
- **The formula that relates heat flow (Q) to its determining factors is $Q = kA (T_h - T_c)/L$**

KSB 3 focuses on the relationship between k Value and R value.

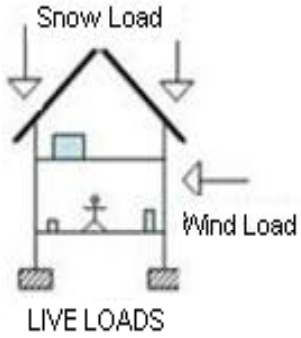
Key Ideas

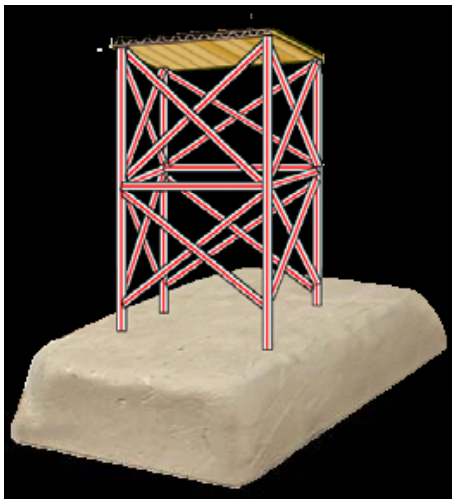
- k value and R value are both measures of a material's resistance to heat flow.
- k is a value that relates only to the material.
- R is a value also takes into account the material's thickness.
- The total R value (R_t) of a system of materials is the sum of each of the individual R values ($R_t = R_1 + R_2 + R_3 + R....$).

Material	Thickness in inches	Thickness in Feet (inches/12)	K value	Calculate R Value (L/k)
Aluminum	¼ “	0.25/12 = 0.02	144	
Brick	4 “	4/12 = 0.333	0.41	
Fiberglass	3.5 “	3.5/12 =0.29	0.019	
Stone	4 “	4/12 = 0.333	1.04	

SURVIVAL MASTER
ALASKA

KSB 4 has to do with structural design.





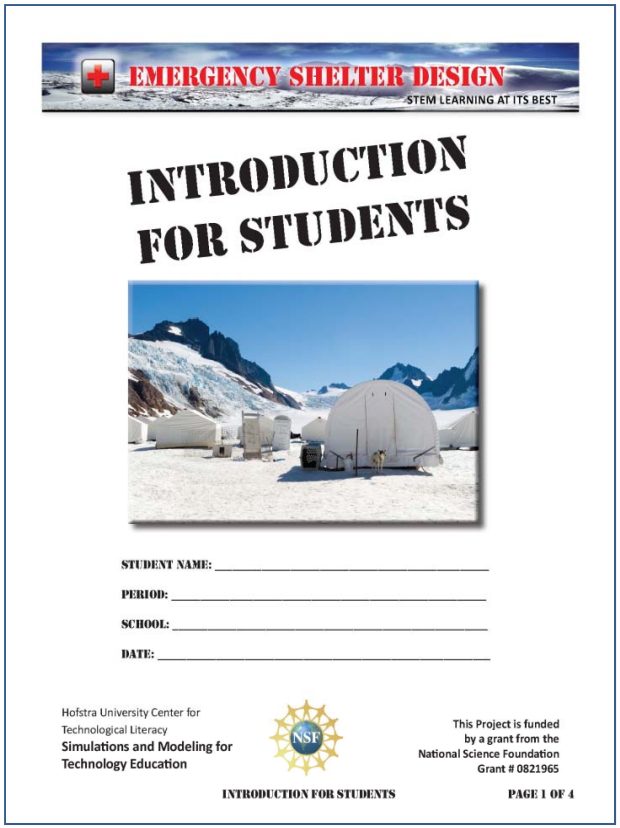
Key Ideas

- Dead loads, live loads, and wind loads are among those have to be taken into consideration when designing a structure.
- The overall stability of a structure and its foundation refers to its ability to resist overturning and lateral movement under load.
- Structural integrity refers to the ability of individual structural members that comprise the structure (and their connections) to perform their functions under loads.
- Selecting materials involves making tradeoffs between qualities.
- Structural design is influenced by function, appearance, cost, and climate/location.

The game is designed to be played in school.

- **The KSBs will take about 3 – 4 weeks.**
- **The design challenge will take 1-2 weeks.**

Physical Modeling Curriculum


EMERGENCY SHELTER DESIGN
STEM LEARNING AT ITS BEST

INTRODUCTION FOR STUDENTS

STUDENT NAME: _____

PERIOD: _____

SCHOOL: _____

DATE: _____

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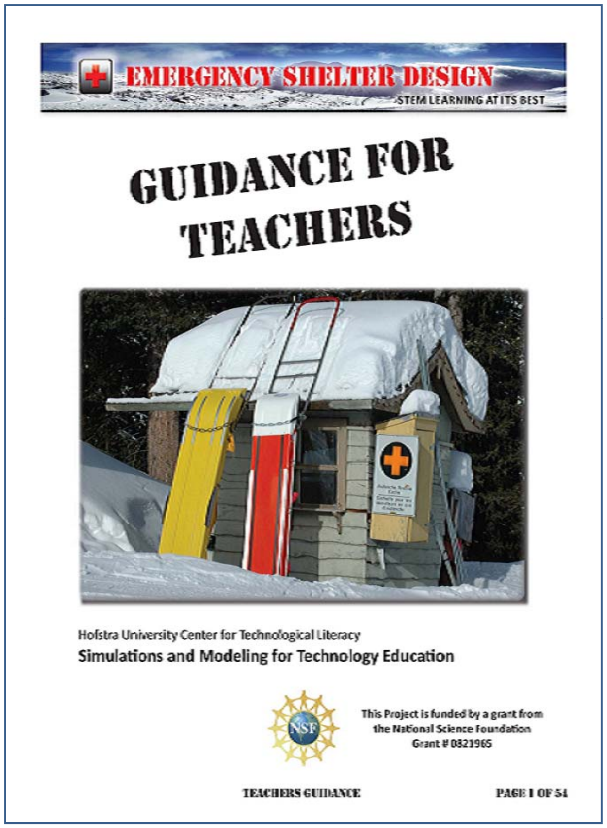
This Project is funded by a grant from the National Science Foundation Grant # 0821965

INTRODUCTION FOR STUDENTS PAGE 1 OF 4

- Learning objectives are the same.
- Also includes KSBs and a team-based design challenge.
- Originally designed to be the same instructional length; it may take a bit longer.


EMERGENCY SHELTER DESIGN
STEM LEARNING AT ITS BEST

GUIDANCE FOR TEACHERS

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TEACHERS GUIDANCE PAGE 1 OF 54

SURVIVAL MASTER ALASKA

Research will compare the efficacy of virtual and physical modeling

- **Two different field test conditions will exist:**
- **<u>Condition 1</u>: teachers and students implement the Survival Master computer game (approximately 4 weeks) AND then construct a physical model (approximately one week); or,**
- **<u>Condition 2</u>: teachers and students implement the physical curriculum (approximately 4 weeks) AND then engage in the game-based multiplayer design challenge (approximately one week).**

High Level Timeline

Development:	Years 1-2
Pilot Testing:	Year 3 (Now, 4 schools)
Field Test Teacher Training:	Summer 2011 (F2F); Fall 2012 (web).
Field Testing:	Year 4 (January 2012)

Field Test Overview

- As of March 17, 2011, 139 teachers have applied to field test Survival Master
- Teachers represent 27 States
- Excellent gender diversity: 30 % female
- Formal application sent to teachers – 27 received
- Recruitment will continue during the ITEEA conference
- Field Test Teacher Selection Criteria Being Developed
  - Teacher Quality
  - Population diversity
  - Geographic diversity
  - Experience and leadership
- Selections will be made by on or about May 1

Plans for Dissemination and Sustainability

- NCICT will provide the tools and expertise required for Project dissemination primarily through ATE Centers. NCICT Executive Director Gordon Snyder is a Project Co-PI.
- Use of the Gaming2Learn.org, Hofstra University, Bloomsburg University, and Dassault Systems Websites.
- Social Networking - Blogs, Facebook, Twitter, Flickr
- Presentations will be made at national conferences: ASEE, ITEEA, GDC.
- Articles and chapters will be published in professional journals and books describing the project and results.

A Reality Check……

Nick Cimorelli, East Rockaway, NY
Technology Education