NSEC
Education and Outreach
Activities

NSEC Annual Workshop
10 May 2002
Making connections

- K-12 Students
- General Public
- UG Students
- NSEC Faculty
- Teachers
- Graduate Students
- Industrial Partners
Making connections

EDUCATION
- K-12 STUDENTS
- GENERAL PUBLIC
- UG STUDENTS

RESEARCH
- TEACHERS
- NSEC FACULTY
- GRADUATE STUDENTS
- INDUSTRIAL PARTNERS

Research connections

Research

Research
Making connections

EDUCATION

K-12 STUDENTS

GENERAL PUBLIC

RESEARCH

TEACHERS

NSEC FACULTY

GRADUATE STUDENTS

INDUSTRIAL PARTNERS

UG STUDENTS

interns

Research

Research

Research

Research
Making connections

EDUCATION

K-12 STUDENTS

GENERAL PUBLIC

RESEARCH

TEACHERS

GRADUATE STUDENTS

NSEC FACULTY

INDUSTRIAL PARTNERS

UG STUDENTS

Research

REU

Research

Research

interns
Making connections
Making connections

EDUCATION

- K-12 STUDENTS
- GENERAL PUBLIC

RESEARCH

- GRADUATE STUDENTS
- INDUSTRIAL PARTNERS

TEACHERS

- RET
- Teach
- RET
- RET

NSEC FACULTY

- Research
- REU
- lectures
- Research
- Research

UG STUDENTS

- interns

GENERAL PUBLIC

- K-12 STUDENTS

Making connections
Making connections
Broad Faculty Involvement
Campus visits
Research Experience for Undergraduates:

- Summer research projects for undergraduates
- Matching funds provided DEAS and College
- Interdisciplinary research environment
- Use of shared experimental facilities
Teacher Workshops

- Concept Tests
- Feedback
- Problem with Problems
- Discussion
Teacher Workshops

- On average 1/year
- Attended by ~50 teachers/yr
- Run by RET teachers in future?
Teacher Workshops

- high impact (100 teachers x 60 students/year)
- very positive feedback
- good attendance
- high involvement
- excellent RET recruiting opportunity
RET recruitment

- RET flyer
- MASS newsletter
- Peer Instruction Workshop
- Boston Science Teachers Association
RET applications

- 13 applicants for first round
- 10 women, 3 men
- 13 public school
- 7 high school, 3 middle school, 3 elementary
RET activities

- direct exposure to research environment
- development educational activities
- weekly meetings
- joint final meeting with REU participants
Charles Hughes
Elementary
Horace Mann School for the Deaf

Project (Weitz Group):
Multiparticle tracking in cells
RET participants
REI participants

James McNeil
Geology
Middle School

Project (Stone Group):
Effect of bubble size on foam drainage
Kristy Lenihan
Physics
High School

Project (Mazur Group):
Research: Micromachining of transparent materials
Education: Development of optics curriculum
Goals

- learn and participate in graduate level physics
- design lesson plans for AP students
- observe procedures and interactions
- augment and improve instructional strategies
FCI data

The histogram represents the score distribution of the FCI pretest for the year 2000. The average score was 44%.
FCI data

2000 FCI posttest

average: 66%
FCI data

gain: 22%
FCI data

The graph illustrates the change in score, $S_f - S_i$ (%), against the initial score, $S_i$ (%). The data is combined for analysis.
FCI data

The diagram shows the change in score, $S_f - S_i$ (%), on the y-axis against the initial score, $S_i$ (%), on the x-axis.
change in score, $S_f - S_i$ (%) vs. initial score, $S_i$ (%)
traditionally taught courses

FCI data

change in score, $S_f - S_i$ (%) vs. initial score, $S_i$ (%)
FCI data

traditionally taught courses

\[ g = \frac{S_f - S_i}{1 - S_i} \]

FCI data

interactively taught courses

\[ g = \frac{S_f - S_i}{1 - S_i} \]

$g = \frac{S_f - S_i}{1 - S_i}$

RET program

- great success!
- satisfied teachers
- broad NSEC personnel involvement
- rapidly growing program
Harvard NSEC Education & Outreach program:

- faculty commitment
- broad involvement
- diverse target audience
- high impact