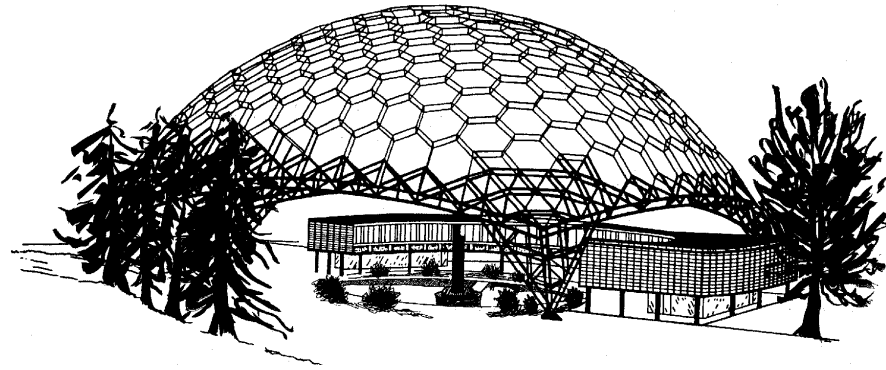


ASM Materials Education Foundation Mission



**“To excite young people in materials,
science, and engineering careers.”**

Report to University Materials Council

**Charles R. Hayes
Executive Director**

EDUCATIONAL OUTREACH

- **Materials Camp[®]**
- **Undergraduate Design Competition**
- **Under Graduate Scholarships**
- **Yearbook of MSE programs**
- **Student Chapter Grants**
- **Podcasts**
- **City of Materials**
- **K-12 teacher Grants**
- **“LeaderShape” ethical leadership skills**



Materials Camp®

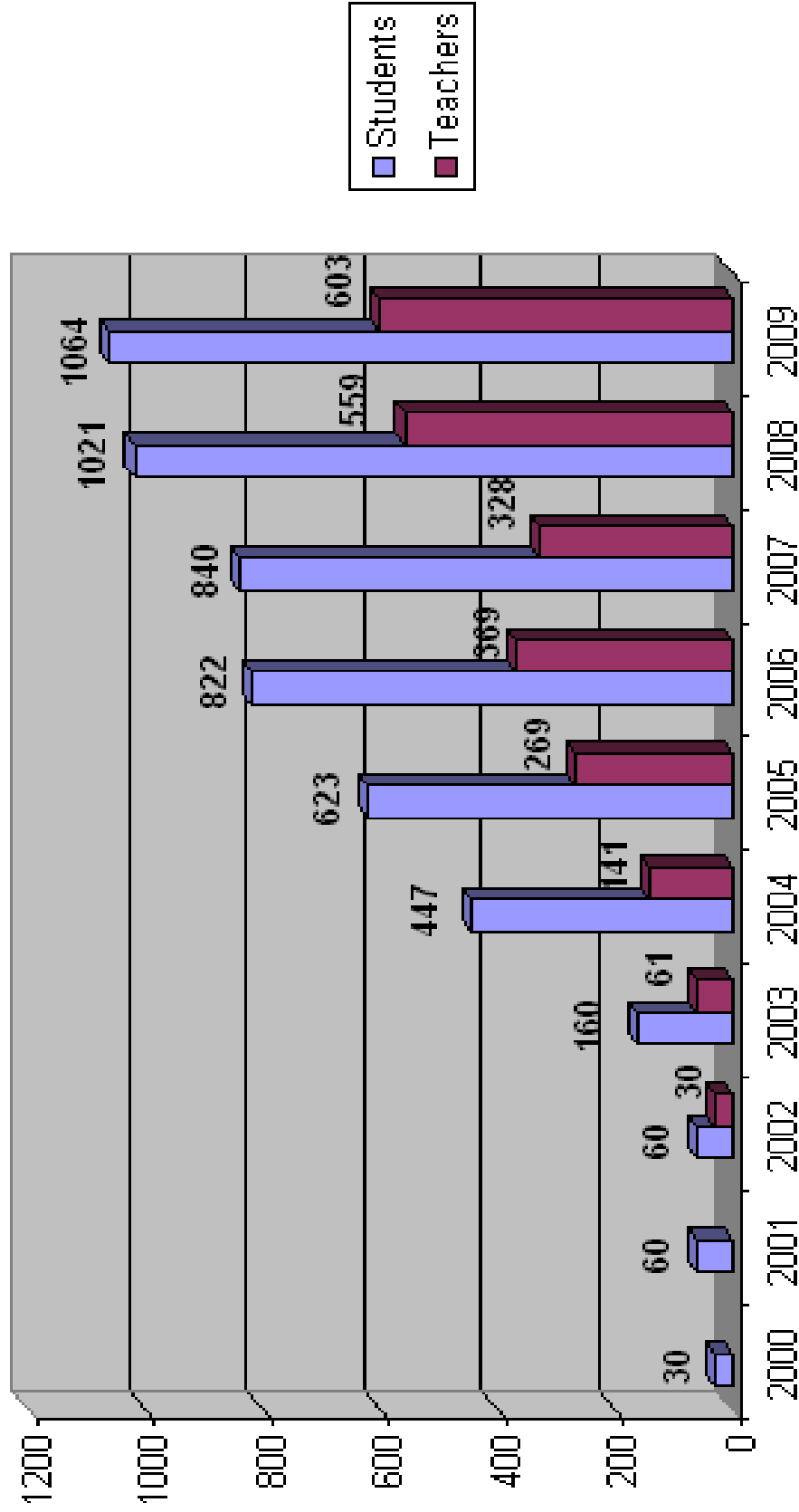
TARGET AUDIENCES

- High school **students**
- High school **teachers**

ASM Materials Camp®

Number of Participants

Total Thru 2009: 7,487 (Students: 5,127; Teachers: 2,360)



MATERIALS CAMP[®] - Teachers

TO DATE

- 8 years of operations
- 98 Materials Camps have been held
- 2,360 teachers trained

Materials Camp®

UMC FALL 2009 ATTENDEES

**18 OF 32 MSE DEPARTMENTS
ATTENDING TODAY NOW OR IN
THE PAST HOSTED AN ASM
MATERIALS CAMP**

Materials Camp® HOSTS

W.P.I.

RUTGERS

U. MARYLAND

U. TEXAS-DALLAS

LEHIGH

CORNELL

U. MICHIGAN

R.P.I.

U. FLORIDA

C.W.R.U

Materials Camp® HOSTS

PENN STATE

COLORADO SCHOOL OF MINES

U. TENNESSEE

U. ILLINOIS-URBANA

CARNEGIE MELLON

NORTH CAROLINA STATE

GEORGIA TECH

Materials Camp®

PHILOSOPHY

- ✓ LEARN BY TOUCHING
- ✓ GUIDED DISCOVERY
- ✓ NO “WRONG ANSWERS”

Materials Camp®

PHILOSOPHY

- ✓ EXPOSE TO APPLIED SCIENCE
- ✓ DO NOT ATTEMPT TO TEACH “MSE 101” CLASS

Materials Camp®

PHILOSOPHY

- ✓ HAVE LOTS OF FUN
- ✓ HAVE LOTS OF FUN
- ✓ HAVE LOTS OF FUN



MATERIALS CAMP

HIGH SCHOOL TEACHERS

MATERIALS CAMP[®] - Teachers

Participants Formal Education

- Chemistry
- Physics
- Math
- Industrial Arts (Shop)
- Computer
- Art

MATERIALS CAMP[®] - Teachers

Goals

- **Take advantage of “Multiplier Effect”**
- **Teachers as MSE career advocates**
- **Establish full MSE course in high schools**

MATERIALS CAMP[®] - Teachers

100 HOUR + FREE TRAINING PACKAGE

- **Basic: 40+ hours
(24 locations)**
- **Advanced '2.0': 40+ hours
(Ohio State University.)**
- **Support: 20+ hours
(Virtual / online, conferences)**

MATERIALS CAMP[®] - Teachers

2009 IMPACT

- 24 USA locations, 8 residential format
- 6 locations in Ohio = 180 Teachers
- 720 Teachers Trained in 2009 alone

WHY TEACHERS?

- **Inspiration**: Many students become inspired to seek applied science careers through practical hands-on engagement
- **Mentorship**: High school teachers exert significant career choice influence and are gate keepers who remove perceived academic roadblocks
- **Leverage**: Reaching one teacher leads to reaching many hundreds of young people

MATERIALS CAMP® - Teachers

Total Cost (USD)

- Residential = \$45 – 60K
- Local / Commuter = \$15K
- Cost sharing for sustainability



Materials Camp®

COST TO UNIVERSITY TO PARTICIPATE

- **\$5,000 CASH (TEACHERS CAMP)**
- **5 DAYS USE OF LAB / CLASSROOM**
- **LAB TECHNICIAN / GRAD STUDENT**

MATERIALS CAMP[®] - Teachers

Core Faculty “Master Teachers”

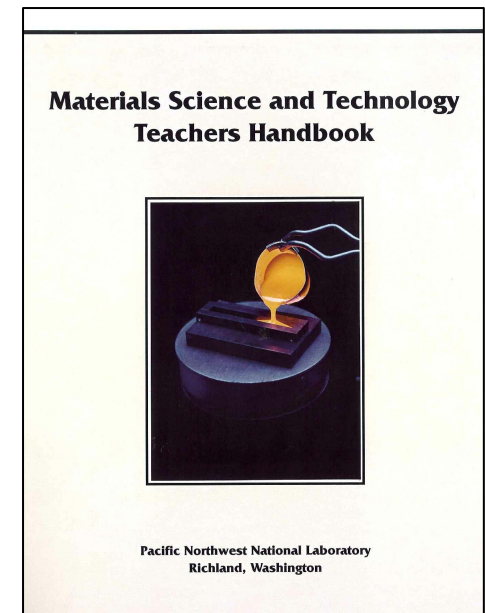
- 20 + Years in Classroom Experience
- Teach High School Materials Class
- **“Teachers Teaching Teachers”**



MATERIALS CAMP[®] - Teachers

Curriculum

- **Materials Science and Technology Teachers Handbook,**
(Pacific Northwest National Lab
Battelle Memorial Institute)
- Numerous ASM Resources



HANDS ON CONTENT

Corrosion Module

- “C-Kit” with tools & supplies
- 4 hour activity (10% of program)
- C kit provided to each teacher
- NACE Foundation Partners




NACE FOUNDATION
ADVANCING CORROSION EDUCATION
PARTNER

HANDS ON CONTENT

Metal Casting Education Module

- Foundry Education Foundation Partners
- Portable melting oven with tools, supplies & DVD
- Environmentally safe
- Created by Kent State and Tri-State Universities
- OmniSource Company volunteers

MATERIALS CAMP[®] - Teachers

- 98 North American Locations thru 2009
- 2,360 teachers have graduated from program

MATERIALS CAMP[®] - Teachers

IMPACT

100% Will use in classroom

- “I can use most of these experiments right now.”



MATERIALS CAMP[®] - Teachers

IMPACT

100% Will use in classroom

- “I saw things that I would never have thought of using as a classroom activity.”

MATERIALS CAMP[®] - Teachers

IMPACT

**100% More confident explaining
complicated concepts**

- “My level of knowledge increased so I can better assist my students.”

MATERIALS CAMP[®] - Teachers

IMPACT

100% More confident explaining complicated concepts

- “Even though I have done some of these labs in the past, I now know how to fully explain them to my students.”

MATERIALS CAMP® - Teachers

IMPACT

100% New ideas gained

“I got so much material and so many new ideas.”



MATERIALS CAMP[®] - Teachers

IMPACT

100% New ideas gained

“This would rank in the upper 10% of all workshops I have attended.”

MATERIALS CAMP[®] - Teachers

IMPACT

Albuquerque NM Public Schools

- “**Chemistry Materials Science**” approved elective
- 600+ students enrolled in 5 High School locations annually

MATERIALS CAMP[®] - Teachers

IMPACT

Sample: High School Materials Course
Title

- “**M**aterials **S**cience’
- “**M**aterials **S**cience **T**echnology’
- “**C**hemistry **M**aterials **S**cience”

IMPACT IN HIGH SCHOOLS

A. MOST incorporate content into existing class

- 42% (181 teachers) report they are using 4 or more Materials Camp labs / demos in their classrooms
- Quite often in Chemistry class

MATERIALS CAMP[®] - Teachers

B. Growing Number Now Teach Stand Alone Course

- **133** teachers report now or by 2010 offering semester or year-long stand alone ‘materials’ course
- **19** states

MATERIALS CAMP[®] - Teachers

STUDENT RECRUITMENT IMPACT

EXAMPLE:

NORTH CAROLINA STATE UNIVERSITY

- **5 YEARS, RESIDENTIAL FORMAT**
- **15 STUDENTS**
- **45% OF ALL IN-COMING FRESHMAN ARE FROM CAMP**
- **‘SUCCESS IS IRREFUTABLE...’**
- **POSSIBLY EXPAND TO 2 CAMPS IN 2010**

NEW

AVAILABLE TO MSE SCHOOLS

- **ROSTER OF HIGH SCHOOL STUDENTS WHO ATTENDED A MATERIALS CAMP**
- **EXCELLENT STUDENT PROSPECTS**
- **VERY AWARE OF MSE**
- **AWARE OF FINANCIAL AID SUPPORT**

PROGRAM SUMMARY

- 50 + YEARS OF OPERATIONS
- DIVERSE PROGRAMS
- GOAL TO 'FILL HUMAN PIPELINE'
- VOLUNTARY CONTRIBUTIONS ENABLE ALL OPERATIONS
- 3 FULL TIME STAFF
- \$12.0 MILLION RESOURCES
- \$1 MILLION ANNUAL BUDGET

OTHER SERVICES

Undergraduate Design Competition

Student Chapter Grants

Podcasts

City of Materials

Under Graduate Design Competition

New in 2007

- Encourage design curricula in MSE
- Recognizes student teams
- 3 cash prizes+ travel grants
- First Place: \$2,000 prize + \$500 travel + \$500 to department
- Second Place: \$1,500 prize + \$500 travel
- Third Place: \$1,000 prize + \$500 travel

Under Graduate Design Competition

New in 2007

WINNERS

2009

#1 : Cal. State Polytechnic, Pomona

#2: Northwestern

#3: Georgia Tech

Under Graduate Design Competition

New in 2007

WINNERS

2008

#1 : Northwestern

#2: Boise State

#3: Cal. Polytechnic, San Luis Obispo

Under Graduate Design Competition

New in 2007

WINNERS

2007

1 :Northwestern

2: Cal. Polytechnic, San Luis Obispo

#3: Montana Tech, Butte

STUDENT CHAPTER GRANTS

- BEGAN IN 2001: 39 AWARDS TO DATE
- \$800 GRANT FOR OUTREACH
- 28 'MATERIAL ADVANTAGE" STUDENT CHAPTERS
- TOP SCHOOLS:
 - A.) NORTHWESTERN (5 AWARDS)
 - B.) WASHINGTON STATE (3 AWARDS)

Under Graduate MSE Scholarships

- Began in 1953
- Many Thousands of past student recipients
- Many hold senior leadership positions in :
industry, research labs, academia, ASM, ASM
Foundation
- 15 awards in 2009

ASM POD CASTS

STRATEGY

**TAKE THE CONTENT TO
YOUNG KIDS IN A FORMAT
THEY USE EVERY DAY**

ASM POD CASTS

- 37 DIVERSE TOPICS NOW ON ASM WEBSITE
- MATERIALS ADVANTAGE STUDENT CHAPTER ENTRIES
- PEER-REVIEWED BY: EDUCATORS, PARENTS, ASM MEMBERS
- \$500 CASH PRIZE FOR BEST TEAM
- 2 YEARS OF EFFORT TO DATE

ASM POD CASTS

12 SEPARATE MATERIALS ADVANTAGE
STUDENT CHAPTERS HAVE WON
\$500 CASH PRIZES

TOP 3 WINNING SCHOOLS TO DATE:

1. BOISE STATE UNIVERSITY
2. UNIVERSITY OF WASHINGTON
3. ROSE HULMAN INSTITUTE

ASM POD CASTS

SAMPLE TOPICS : MIDDLE SCHOOL KIDS

Ductility

Elasticity

Electric Properties

Energy

Extractive Metallurgy

Extrusion

Failure Analysis

Fatigue

Footwear

Forging

Fractures

Glass

Heat Treating

Joining

Lavatory fixtures

Magnetic

Materials Analysis

Materials Engineering

Materials Types

Melting Point

Melting Temperature

Metals

STRATEGIC PLAN

“Picking Up the Pace” (“PUP”)

- **DOUBLE NUMBER OF TEACHER CAMPS IN NEXT 5 YEARS**
- **EXPAND FROM 24 TO 50 ANNUAL LOCATIONS**
- **TRAIN 1,500 HIGH SCHOOL TEACHERS EACH YEAR**

Investment Earnings

Pay All Overhead Costs

- **100%** of all contributions used to directly impact young adults
- **No** administrative or overhead costs
- **Unique situation**, few Foundations can claim

CONTACT

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