SCIENCE EDUCATION 2000: LOOKING BACK, LOOKING AROUND, AND LOOKING AHEAD

LEADERSHIP INITIATIVE IN SCIENCE EDUCATION

CHEMICAL HERITAGE FOUNDATION

Philadelphia, Pennsylvania

July 21, 2000

PROFESSOR BASSAM Z. SHAKHASHIRI

DEPARTMENT OF CHEMISTRY

UNIVERSITY OF WISCONSIN-MADISON

"On the other hand, it's great to be out of Washington!"

• •

SCIENCE IS FUN

on the Web at

www.scifun.chem.wisc.edu

"Science is a hexagonal mountain with six faces.... The three beautiful faces of science are science as subversion of authority, science as an art form, and science as an international club... Science is presented to our young people as a rigid and authoritarian discipline, tied to mercenary and utilitarian ends, and tainted by its association with weapons of mass murder.... The way to attract young people into science is to show them all six faces and give them freedom to explore the beautiful and ugly as they please."

Freeman Dyson
From Eros to Gaia, 1997

"A failure of science to produce benefits for the poor in recent decades is due to two factors working in combination: the pure scientists have become more detached from the mundane needs of humanity, and the applied scientists have become more attached to immediate profitability."

Freeman Dyson
Imagined Worlds, 1997

PRIVILEGE:

A SPECIAL ADVANTAGE
OR IMMUNITY
OR RIGHT
OR BENEFIT
NOT ENJOYED BY ALL

CLARITY OF PURPOSE

THE PURPOSE OF EDUCATION:

TO ENABLE INDIVIDUALS TO FULFILLL THEIR HUMAN POTENTIAL.

THE PURPOSE OF RESEARCH:

TO ADVANCE KNOWLEDGE.

THE PURPOSE OF TECHNOLOGY:

TO ADVANCE THE HUMAN CONDITION.

ACHIEVING SCIENCE LITERACY

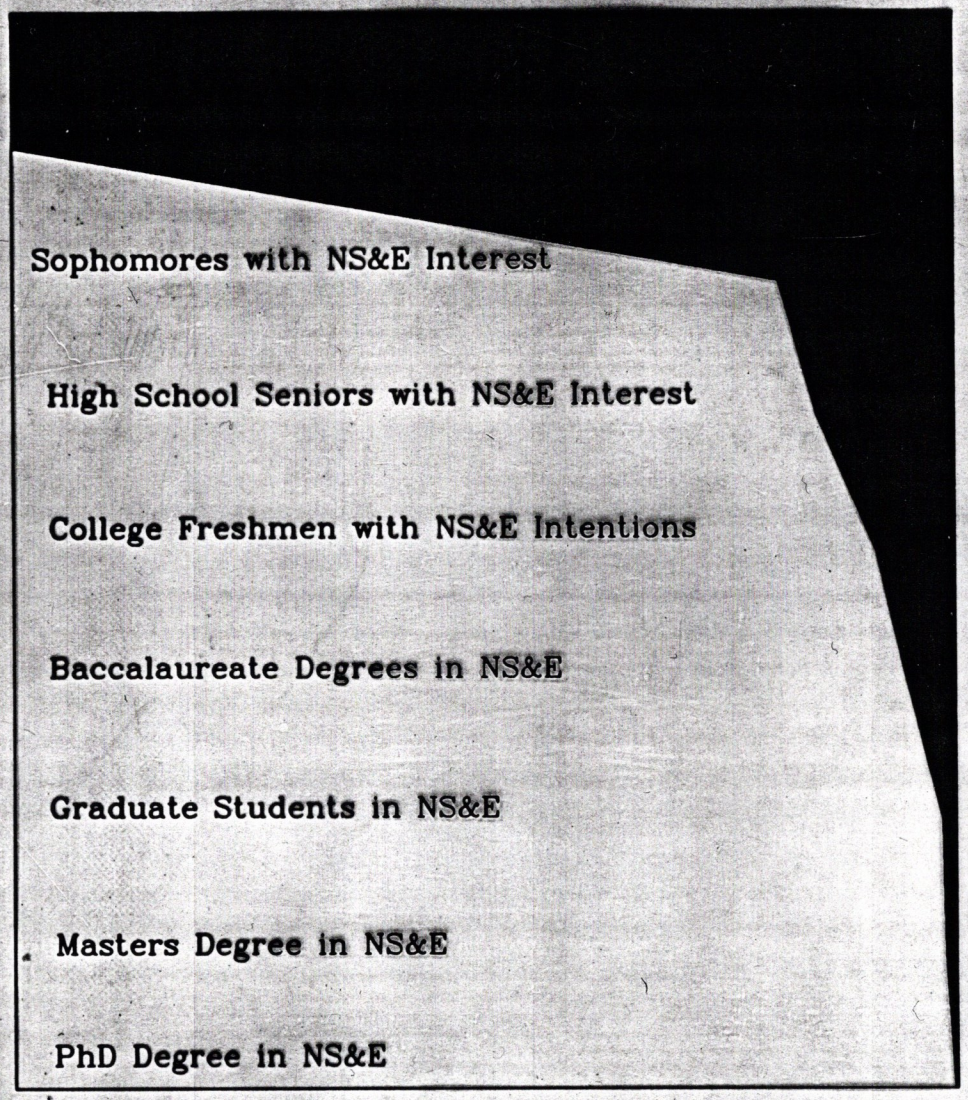
from UNDERSTANDING

to APPRECIATION

to FULFILLMENT

Persistence of NS&E Interest from High School through PhD Degree

← All High School Sophomores →



1977
4,000,000

750,000

1979
590,000

1980
340,000

1984
206,000

61,000

1986
46,000

1992
9,700

(The Pipeline)

STATEWIDE SYSTEMIC INITIATIVES IN SCIENCE, MATHEMATICS, AND ENGINEERING EDUCATION

Program Solicitation

DIRECTORATE FOR SCIENCE AND ENGINEERING EDUCATION
DIVISION OF TEACHER PREPARATION AND ENHANCEMENT
SCIENCE AND MATHEMATICS EDUCATION NETWORKS PROGRAM

SUBMISSION DEADLINES:
LETTER OF INTENT: JULY 9, 1990
FORMAL PROPOSALS: OCTOBER 15, 1990

NATIONAL SCIENCE FOUNDATION

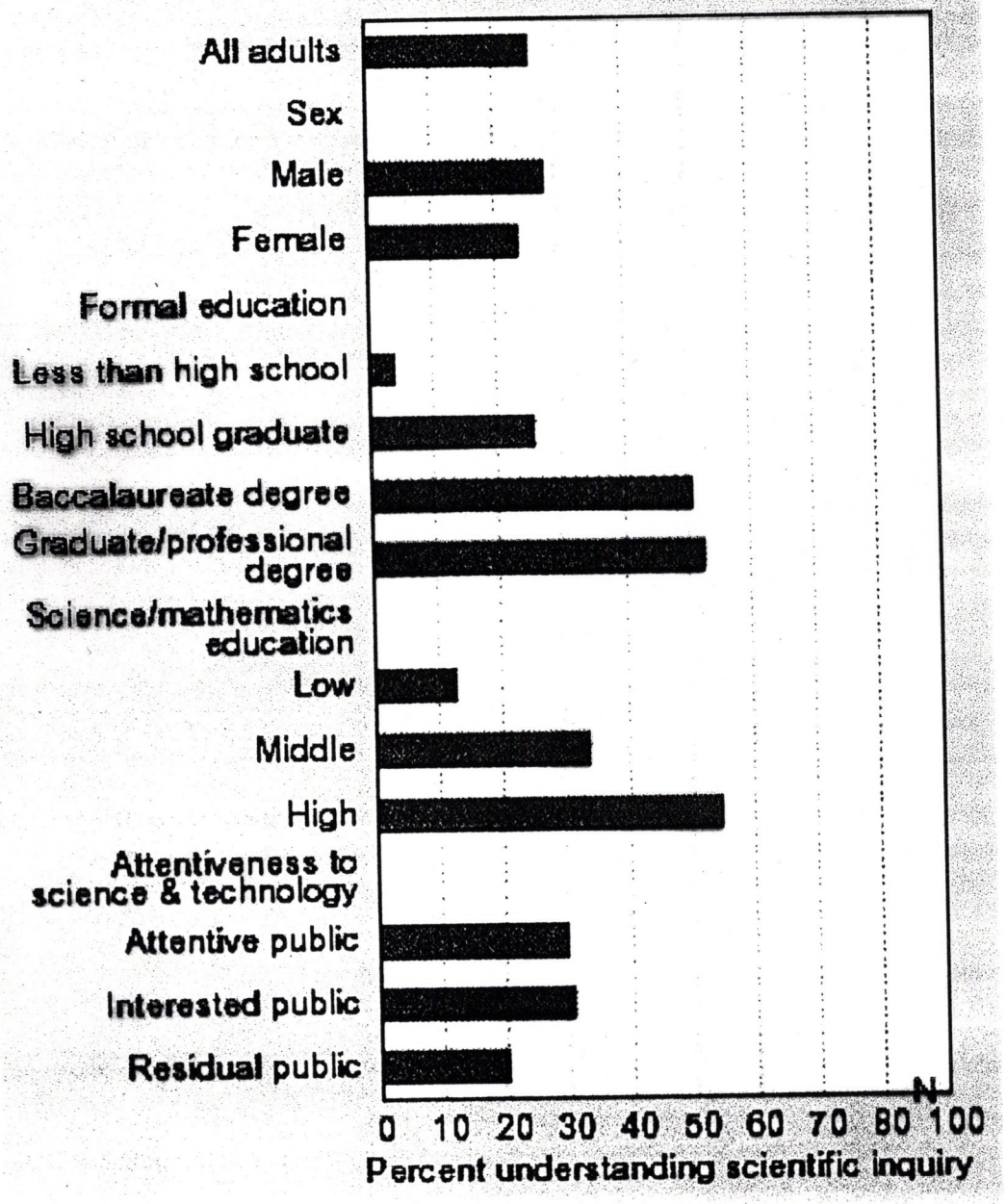
SCIENCE AND ENGINEERING INDICATORS 2000

VOLUME 1

National
Science
Foundation

NSB NATIONAL SCIENCE BOARD

Figure 8-6.
Public understanding of the nature of scientific inquiry: 1999



See appendix table 8-11. *Science & Engineering Indicators – 2000*

Classroom teachers in public elementary and secondary schools: 1985-2009

(Thousands)

Year	K-12	Elementary	Secondary
1985	2,206	1,237	969
1990	2,398	1,429	969
1995	2,598	1,525	1,073
1999[a]	2,700	1,580	1,120
2000[a]	2,712	1,583	1,129
2005[a]	2,765	1,581	1,184
2008[a]	2,768	1,578	1,190
2009[a]	2,766	1,578	1,188

[a]Projected.

SOURCE: National Center for Education Statistics (NCES). 1999. *Projections of Education Statistics to 2009*. NCES 1999-038. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.

Average Teacher Salary in 1998-1999, State Rankings

Rank	State	Total Teachers	Average Salary
1	New Jersey	93,102	$51,692
2	Connecticut	40,754	50,277
3	New York	201,000	49,686
4	Michigan	90,200	48,711
5	Pennsylvania	108,350	48,457
6	Alaska	7,858	48,275
7	District of Columbia	4,115	48,275
8	California	270,639	46,326
9	Rhode Island	10,704	46,286
10	Illinois	122,775	45,286
11	Massachusetts	68,482	44,051
12	Oregon	27,289	43,789
13	Delaware	6,701	43,223
14	Maryland	49,490	42,545
15	Nevada	16,835	42,528
16	Indiana	57,927	41,159
17	Ohio	111,283	40,734
18	Hawaii	10,550	40,416
19	Minnesota	52,700	39,809
20	Wisconsin	50,757	39,374
21	Georgia	87,555	38,993
22	Washington	49,316	38,530
23	Colorado	38,975	38,157
24	Virginia	76,791	37,709

Average Teacher Salary in 1998-1999, State Rankings

25	New Hampshire	12,469	37,405
26	North Carolina	77,486	36,883
27	Vermont	8,069	36,697
28	Florida	128,791	35,916
29	Alabama	46,196	35,820
30	Tennessee	53,119	35,490
31	Kentucky	40,381	35,383
32	Iowa	33,686	35,007
33	Maine	16,877	34,906
34	Kansas	31,493	34,634
35	Arizona	42,032	34,582
36	South Carolina	42,120	34,506
37	Texas	254,811	34,448
38	West Virginia	20,856	34,248
39	Idaho	14,100	34,062
40	Utah	21,000	34,007
41	Wyoming	6,630	33,480
42	Missouri	61,790	33,463
43	Nebraska	20,237	32,880
44	Arkansas	26,971	32,761
45	New Mexico	19,786	32,161
46	Louisiana	48,928	32,000
47	Montana	10,200	31,536
48	Oklahoma	40,943	31,107
49	Mississippi	29,840	29,550
50	North Dakota	7,840	29,002
51	South Dakota	9,275	28,386
	U.S. Average	2,780,074	$40,574

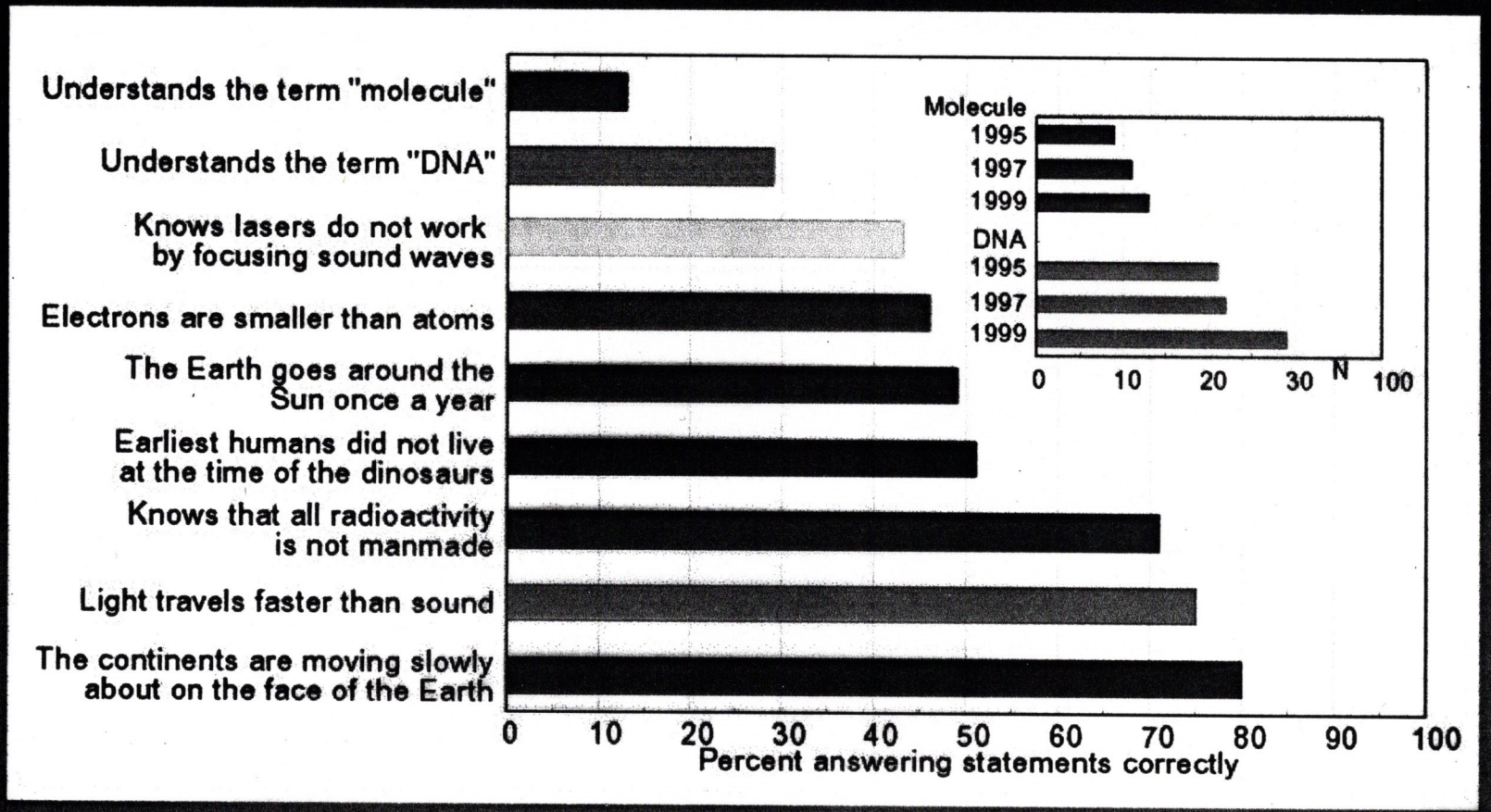
Salary Survey
TABLE I

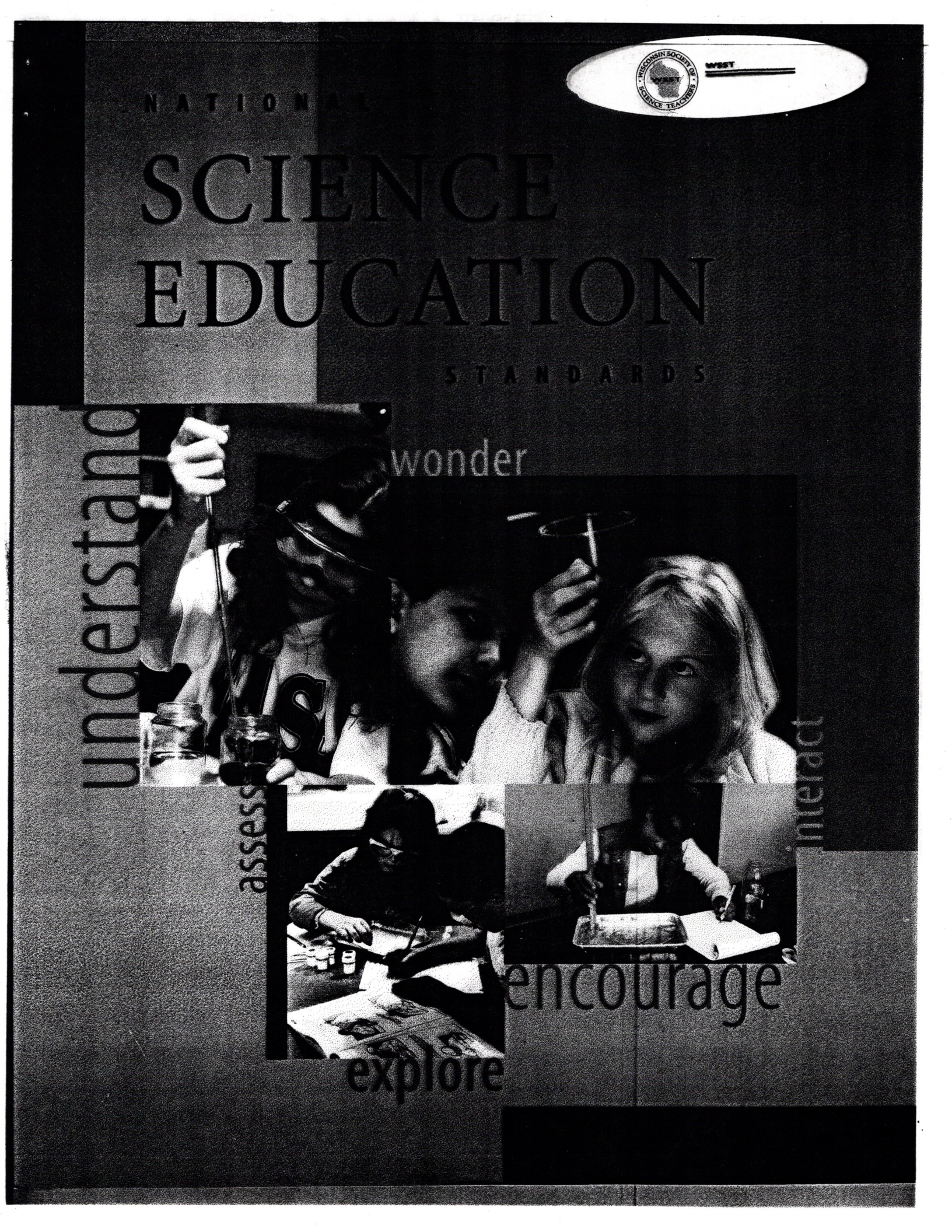
AVERAGE TEACHER SALARY IN 1997-98
STATE RANKING

36	Texas	33,537	85.2%
37	West Virginia	33,396 f	84.9%
38	North Carolina	33,123	84.2%
39	Utah	32,981 a	83.8%
40	Idaho	32,834	83.4%
41	Alabama	32,799	83.4%
42	Nebraska	32,668	83.0%
43	Arkansas	32,119 a,f	81.6%
44	Wyoming	32,022	81.4%
45	Oklahoma	30,940	78.6%
46	Montana	30,617	77.8%
47	New Mexico	30,309 b	77.0%
48	Louisiana	30,090	76.5%
49	Mississippi	28,691	72.9%
50	North Dakota	28,231	71.7%
51	South Dakota	27,839	70.8%
	U.S. Average	$39,347	100.0%

a=estimate or preliminary; b=AFTestimate; c=median; d=estimated to exclude fringe benefits at 8%; e=includes employer pick-up of employee pension contribution, where applicable; f=includes extra duty pay. **Source: American Federation of Teachers, annual survey of state departments of education.**

Public understanding of scientific terms and concepts: 1999




WSST
NATIONAL
SCIENCE EDUCATION
STANDARDS
understand
wonder
assess
explore
encourage
interact

Facing the Consequences

Using TIMSS for a Closer Look at U.S. Mathematics and Science Education

William H. Schmidt
Curtis C. McKnight
Leland S. Cogan
Pamela M. Jakwerth
Richard T. Houang

Kluwer Academic Publishers

TEACHING

RESEARCH

SERVICE

COMMUNICATING CHEMISTRY

Formal

- **classroom**
- **journals**
- **books**
- **professional meetings**

Informal

- **radio**
- **TV**
- **the Web**
- **print media**
- **schools**
- **shopping malls**
- **museums and science centers**
- **political conventions**
- **State government**
- **Halls of Congress**

THE INTEGRATION OF RESEARCH AND EDUCATION

"Doctoral programs typically overemphasize research and underemphasize teaching and service"

Jerry Gaff, vice president of the Association of American Colleges and Universities (AACU)

PhD thesis to include:

chapter on educational experiment:
- **K-21**
- **museum or science center**
- **public media**

chapter explaining the research to:
- **family members**
- **friends**
- **civic groups**
- **newspaper reporters**
- **state legislators**
- **members of Congress**

ISSUES

Creationism

AIDS

Drugs and Alcoholism

Standards

Teachers

Integrity

Responsibility

Trust

Accountability

Respect

Community

Loyalty

Professorial Duty

Institutional Commitment

Leadership

Behavior

THE CHRONICLE OF HIGHER EDUCATION
Today's News - Thursday, July 15, 1999

Former Head of Virginia Tech Research Center Indicted for Misusing State Funds

A grand jury indicted the former director of a Virginia Tech research center Tuesday on charges of misappropriating state funds and obtaining money under false pretenses. Craig A. Rogers, who is now dean of the University of South Carolina's College of Engineering, is accused of putting an undisclosed amount of state funds into a personal account and using it for airline tickets, among other things.

by Danielle Stanfield

"The essence of lying is in deception, not in words; a lie may be told by silence, by equivocation, by the accent on a syllable, by a glance of the eyes attaching a peculiar significance to a sentence; and all these kinds of lies are worse and baser by many degrees than a lie plainly worded."

John Ruskin
Modern Painters, IX, 1872

"Hypocrisy is the most difficult and nerve-racking vice that any man can pursue; it needs an unceasing vigilance and a rare detachment of spirit. It cannot, like adultery or gluttony, be practised at spare moments; it is a whole-time job."

Somerset Maugham
Cakes and Ale, 1930