The Joint Institute for Nuclear Astrophysics (JINA)

An NSF Physics Frontier Center at the University of Notre Dame, Michigan State University, and the University of Chicago.

JINA combines observation, theory/simulation and experimentation to pursue the study of nuclear astrophysics and to understand the origin of the elements in our Universe.

We are all … "made of star stuff."
Carl Sagan

February 22, 2007
Education Trust Statement on 12th Grade NAEP Results

The results released today from the 2005 12th grade National Assessment of Educational Progress are a sobering reminder of the need for increased focus on and support for the students and teachers in our nation's high schools.

Over a quarter of the nation's high school seniors lack even basic reading skills. Over forty percent lack even basic mathematics skills. Almost half are below the basic level in science. As bad as these numbers are, the data on the achievement of low-income students and students of color is even more painful and alarming.

"These low levels of high school achievement would be easier to bear if the trend line was moving upward, as it is for our younger students," said Kati Haycock, president of the Education Trust. "Sadly, though, this is not the case. Every data source over the last several years tells the same story: gains in elementary and middle schools are not translating into better prepared high school graduates."

Reading achievement has declined since 1998, with no significant difference since the last time the test was administered, in 2002. This echoes the downward trends in high school science achievement we saw in the spring of 2005. And while we cannot examine trends in math achievement because of changes to the test, a comparison of mathematics achievement between 2000 and 2005 shows that 12th-graders are no better prepared to meet the expectations we have of them today than they were to meet expectations five years ago. Results from the 2004 NAEP Long-Term Trends Assessment confirm this lack of progress in math achievement.

It is important to keep in mind here that these results reflect the achievement of just those students who actually *make it* to 12th grade. The best available estimates show that of every 100 students who enter 9th grade, just 75 will make it to 12th grade four years later. Those who do not make it that far are disproportionately low-income students and students of color who struggle academically.

School District Demographics System - Profile Comparison (1999-2000)

Comparison Districts:
COOK COUNTY SCHOOL DISTRICT #130, COOK COUNTY, ILLINOIS + City of Chicago
SOUTH BEND COMMUNITY SCHOOL CORPORATION,ST. JOSEPH COUNTY, INDIANA
LANSING PUBLIC SCHOOL DISTRICT,INGHAM COUNTY, MICHIGAN + East Lansing

Subject	SOUTH BEND Number	SOUTH BEND Percent	LANSING Number	LANSING Percent	E. LANSING Number	E. LANSING Percent	COOK CO. Number	COOK CO. Percent	CITY CHGO Number	CITY CHGO Percent
Total Population	166285	N/A	125326	N/A	52173	N/A	31469	N/A	2896016	N/A
SEX AND AGE										
Male	80098	48.2	60158	48.0	25057	48.0	15134	48.1	1405107	48.5
Under 5 Years	5989	3.6	5178	4.1	757	1.5	1285	4.1	111268	3.8
5 to 9 years	6044	3.6	4959	4.0	782	1.5	1309	4.2	114025	3.9
10 to 14 years	5729	3.4	4259	3.4	756	1.4	1239	3.9	101755	3.5
15 to 17 years	3392	2.0	2503	2.0	491	0.9	705	2.2	59476	2.1
18 to 19 years	3642	2.2	1600	1.3	4136	7.9	466	1.5	42647	1.5
Female	86187	51.8	65168	52.0	27116	52.0	16335	51.9	1490909	51.5
Under 5 Years	5897	3.5	4838	3.9	738	1.4	1224	3.9	107254	3.7
5 to 9 years	5729	3.4	4602	3.7	670	1.3	1257	4.0	109987	3.8
10 to 14 years	5460	3.3	4217	3.4	755	1.4	1170	3.7	99047	3.4
15 to 17 years	3102	1.9	2332	1.9	449	0.9	714	2.3	57028	2
18 to 19 years	3897	2.3	1646	1.3	5478	10.5	433	1.4	41811	1.4
AVERAGE FAMILY SIZE										
Average Family Size	3.06	N/A	3.06	N/A	2.85	N/A	3.45	N/A	3.5	N/A
SEX BY EDUCATIONAL ATTAINMENT FOR THE POPULATION 25 YEARS AND OVER										
Total	101985	N/A	78510	N/A	18885	N/A	19540	N/A	1815895	N/A
Male	47625	46.7	36390	46.4	8905	47.2	9140	46.8	857015	47.2
12th grade, no diploma	1910	4.0	1360	3.7	85	1.0	555	6.1	49605	5.8
High school graduate (includes equiv.)	13850	29.1	9455	26.0	595	6.7	2855	31.2	196325	22.9
Some college (1 or more yrs), no degree	6635	13.9	5985	16.4	905	10.2	1380	15.1	109085	12.7
Bachelor's degree	7230	15.2	5420	14.9	2605	29.3	825	9.0	134835	15.7
Master's degree	3125	6.6	1815	5.0	1725	19.4	175	1.9	52985	6.2
Doctorate degree	1045	2.2	490	1.3	1345	15.1	35	0.4	9925	1.2
Female	54360	53.3	42120	53.6	9980	52.8	10400	53.2	958880	52.8
12th grade, no diploma	1675	3.1	1170	2.8	140	1.4	505	4.9	51055	5.3
High school graduate (includes equiv.)	17940	33.0	11605	27.6	980	9.8	3460	33.3	221790	23.1
Some college (1 or more yrs), no degree	7170	13.2	7195	17.1	1185	11.9	1495	14.4	124455	13.0
Bachelor's degree	6845	12.6	5415	12.9	3210	32.2	1050	10.1	146715	15.3
Master's degree	3585	6.6	2220	5.3	2030	20.3	275	2.6	65415	6.8
Doctorate degree	465	0.9	355	0.8	610	6.1	25	0.2	6510	0.7

Total Students	21300	17754	3607	3705	431750
Total FTE Teachers	1355	1082	231	222	23455
Total Schools	38	44	9	11	597

Source: National Center for Education Statistics, US Department of Education, Bureau of the Census, US Department of Commerce

Partners	Research Emphasis	Outreach Goal(s)
Michigan State University	Superconducting: unraveling the mysteries that reside at the center of atoms, in atomic nuclei; +cosmic rays, particle detection, nuclear science and cyclotron physics	We see our involvement with K–12 teachers and students as our golden opportunity to spread understanding of our work and science and to recruit the scientists who will follow in our footsteps.
University of Chicago	Astrophysical thermonuclear flashes: simulating the accretion of matter onto a compact star, and the subsequent stellar evolution, including nuclear burning either on the surface of the compact star, or in its interior; +basic and computational physics	Education and outreach efforts take advantage of the urban setting of the University of Chicago, the public's fascination with astronomy & fundamental questions of the Universe, and the unique resources associated with forefront research (people, ideas, expertise).
University of Notre Dame	Low energy nuclear physics: nuclear astrophysics, weak interactions and fundamental symmetries, nuclear structure, nuclear reactions with radioactive nuclear beams (RIBs);+proton induced x-ray emissions	**PRE-2007:** Our outreach goals include contributing to science education at K-12 level, reaching the public primarily through the internet, and increasing diversity in the field of nuclear astrophysics.

Outreach Project	Facilities	Logistical Issues	Evaluation Method(s)
MSU PAN (Physics of the Atomic Nuclei)	Cyclotron (viewing only); Adler Planetarium & Astronomy Museum	limited space	# participants who applied/were accepted to MSU Physics
UC Space Explorers (Inner-City K-12 Enrichment Program in partnership w/ UCs Ofc of Special Programs)	Kersten Physics Teaching Center; Yerkes Observatory; proximity to Argonne	multi-year, multi-dimensional commitment from the members of the Institute	track participants' academic success and field of choice
ND PIXE-(Proton Induced X-Ray Emissions) PAN	Accelerator labs; QuarkNet; DVT(Jordan Obs)	campus lodging expenses; summer salaries for teachers	# participants who applied/were accepted to UND Physics

Outreach Goals 2007+

Outreach is primarily communication-based. Activities are defined as those that support increased understanding of nuclear science and awareness of JINA. Our outreach goals involve assessing and developing an integrated description of JINA activities associated with the science, and developing a cohesive vision and description of how these activities will expand and improve in the future. Appropriate evaluation criteria will also be developed as part of each project/activity.

Outcomes Assessment

- Students will have an understanding of issues related to nuclear sciences, as well as an appreciation of the contributions made to their world.
- Students will be able to apply fundamental knowledge and methods of nuclear astrophysical processes to improve observational data protocols, collection, quality, etc.
- Students will have strong, independent learning, analytical and problem-solving skills.
- Students will be able to communicate both orally and in writing.
- Students will have the ability to work with others and on multi-disciplinary teams.
- Students will demonstrate the skills and motivation for continued self-education.

PIXE-PAN @ ND 2007 Summer Science Program





High School teachers and students will explore topics in modern science and nuclear physics in the Nuclear Science Laboratory at Notre Dame with senior faculty and staff.

High School Science Teachers: June 18 - 29
High School Students: June 25 – 29
Apply on line now at: www.JINAweb.org/outreach/PIXE
Deadline: May 1st

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