Central Sound Regional Science & Engineering Fair

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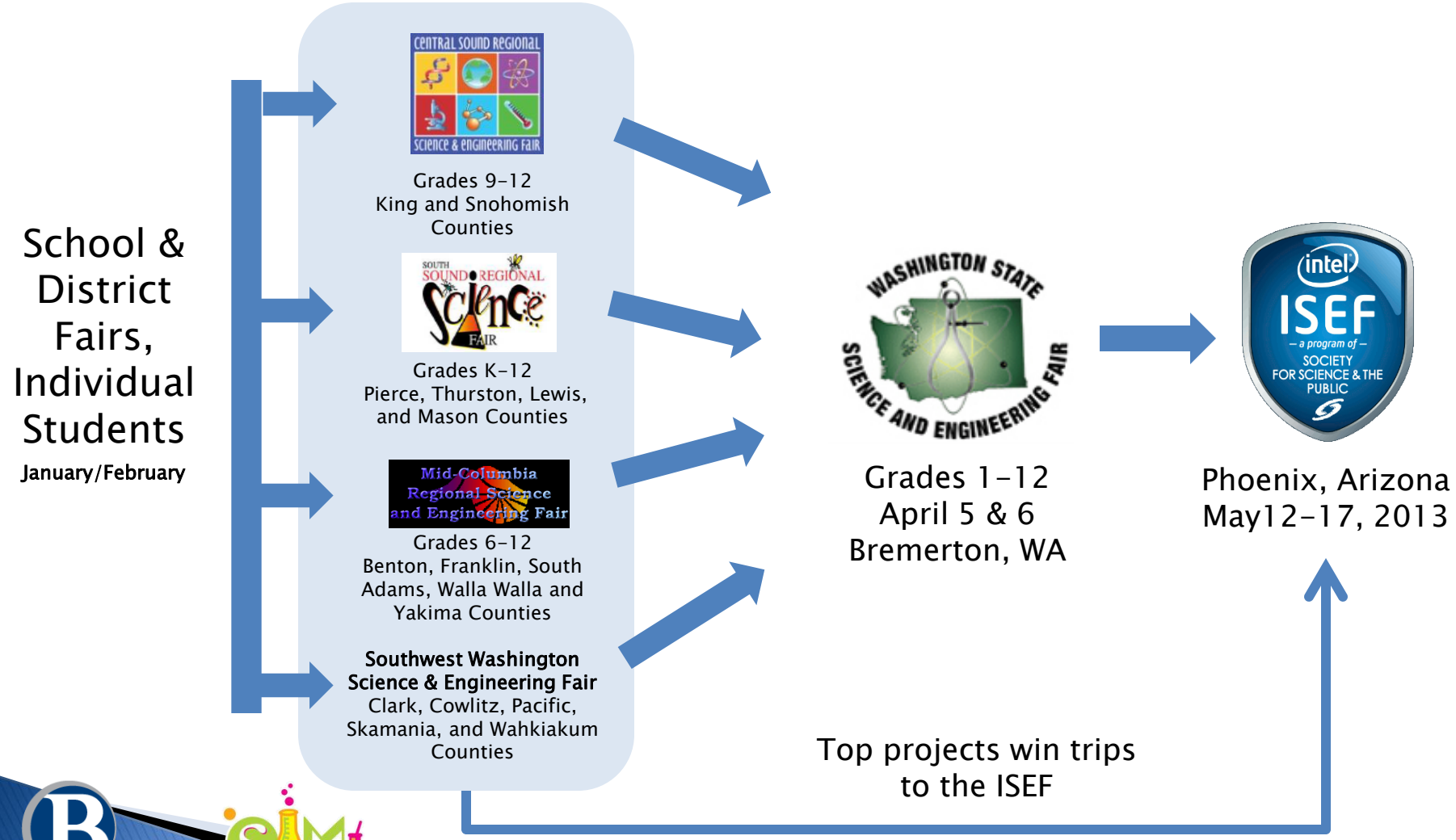
Overview

- ISEF Affiliated Science Fairs in Washington State
  - Central Sound Regional Science & Engineering Fair (CSRSEF)
- How students can participate in the CSRSEF
- Teacher Resources
- Getting Involved

Intel ISEF

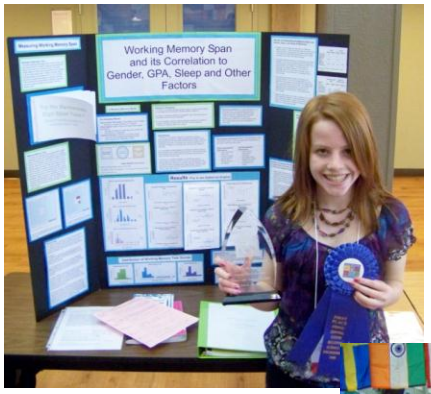
- Each year, millions of high school students worldwide compete in local and school-sponsored science fairs
- The ISEF was created in 1950 to allow the winners of fairs from around the world to come together to compete for prizes and scholarships
  - Only students in the high school division are eligible to compete in the ISEF
- Intel ISEF provides a framework for State and Regional Fairs
  - Rules and guidelines to make expectations clear and consistent
- Affiliated fairs must follow the ISEF's rules and guidelines in order to become affiliated

ISEF Affiliated Science Fairs in Washington



Central Sound Regional Science & Engineering Fair

March 9, 2013
Bellevue College
Bellevue, WA

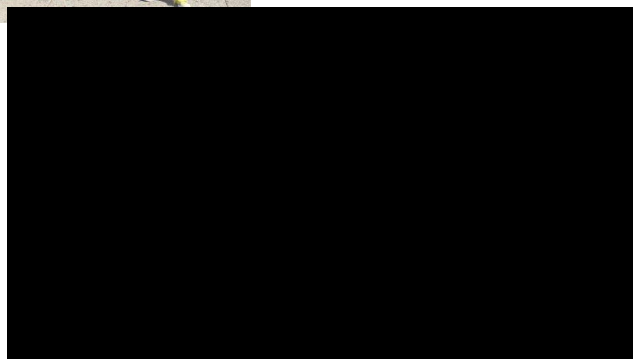


- Started by Bellevue College in 2010 to provide a regional fair to high school students in King and Snohomish Counties
- Prizes and ribbons awarded to top students in several categories
- Registration begins in January
  - $10 registration fee per student
- www.bellevuecollege.edu/sciencefair

Intel International Science & Engineering Fair

May12-17, 2013
Phoenix, Arizona

- World's largest international pre-college science competition
  - 1,500 high school students from nearly 60 countries, regions, and territories
- Students compete for over $4 million in prizes and scholarships
- Students MUST win a state or regional competition to go on to ISEF
- http://www.societyforscience.org/isef



Photos courtesy of Gary Foss, video from www.societyforscience.org

Basics of CSRSEF/ISEF Projects

- Students conduct independent research projects, individually or in teams of 2 and present a project display to a panel of judges

- Science projects MUST be hypothesis based
  - Survey projects will not be successful at the Regional, State, and International levels

- Engineering projects SHOULD be problem based
  - Students should:
    - Define a Need
    - Determine Design Criteria
    - Prepare Preliminary Designs
    - Build and test a Prototype
    - Redesign and Retest as Necessary

Key Players

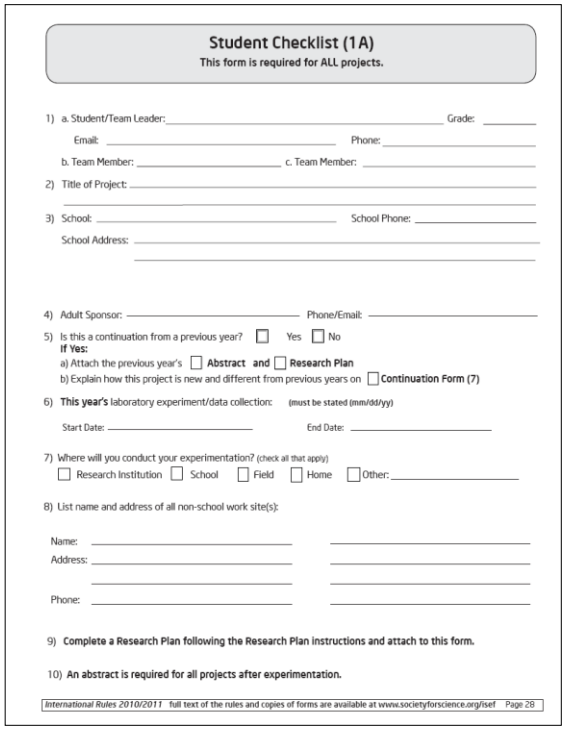
- Student(s):
  - Develop project idea,
  - Background research
  - Forming hypothesis/engineering goals
  - Planning and executing experiments/building prototypes
  - Collecting data
  - Analyzing data
  - Forming conclusions
  - Writing the research paper
  - Building a display board
  - Presenting to the judges at the fair
- Adult Sponsor (Can be teacher):
  - Review ISEF rules and guidelines
  - Direct students to resources
  - Review Student Paperwork
  - Sign off on experimental procedures/research goals
  - Discuss potential risks with students
  - Identify and minimize hazards
  - Assisting students with paperwork, rules, and regulations
  - Reminding students of important dates and deadlines

CSRSEF Registration

- The ONLINE registration and ALL required forms must be completed and postmarked by **February 27, 2013**

- Registration for the CSRSEF **requires** the following ISEF forms be submitted for ALL projects:
  - Checklist for Adult Sponsor Form
  - Student Checklist and Research Plan
  - Approval Form
  - Abstract form

- Students experimenting with **human subjects, vertebrate animals, hazardous chemicals, and potentially hazardous biological agents (tissues, blood, microorganisms, rDNA)** are required to submit additional forms and have their projects approved by the SRC/IRB ***BEFORE*** experimentation



Student Checklist (1A)
This form is required for ALL projects.

1) a. Student/Team Leader: _____ Grade: _____
Email: _____ Phone: _____
b. Team Member: _____ c. Team Member: _____
2) Title of Project: _____
3) School: _____ School Phone: _____
School Address: _____

4) Adult Sponsor: _____ Phone/Email: _____
5) Is this a continuation from a previous year? ☐ Yes ☐ No
If Yes:
a) Attach the previous year's ☐ **Abstract and** ☐ **Research Plan**
b) Explain how this project is new and different from previous years on ☐ **Continuation Form (7)**
6) **This year's** laboratory experiment/data collection: **(must be stated (mm/dd/yy)**
Start Date: _____ End Date: _____
7) Where will you conduct your experimentation? (check all that apply)
☐ Research Institution ☐ School ☐ Field ☐ Home ☐ Other: _____
8) List name and address of all non-school work site(s):
Name: _____
Address: _____
Phone: _____
9) **Complete a Research Plan following the Research Plan instructions and attach to this form.**
10) **An abstract is required for all projects after experimentation.**

International Rules 2010/2011 full text of the rules and copies of forms are available at www.societyforscience.org/isef Page 28

Science Fair Alignment with the WA State Learning Standards

Standards for Grades 9-12

EALR 2: **Inquiry**
Big Idea: **Inquiry (INQ)**
Core Content: ***Conducting Analyses and Thinking Logically***

In prior grades students learned to revise questions so they can be answered scientifically. In grades 9-12 students extend and refine their understanding of the nature of inquiry and their ability to formulate questions, propose hypotheses, and design, conduct, and report on investigations. Refinement includes an increased understanding of the kinds of questions that scientists ask and how the results reflect the research methods and the criteria that scientific arguments are judged by. Increased abilities include competence in using mathematics, a closer connection between student-planned investigations and existing knowledge, improvements in communication and collaboration, and participation in a community of learners.

	Content Standards	Performance Expectations
	Students know that:	*Students are expected to:*
9-12 INQA Question	Scientists *generate* and *evaluate questions* to *investigate* the *natural world*.	• *Generate* and *evaluate* a *question* that can be answered through a scientific *investigation*. Critique *questions generated* by others and *explain* whether or not the *questions* are scientific.*a
9-12 INQB Investigate	Scientific progress requires the use of various methods appropriate for answering different kinds of research *questions*, a thoughtful plan for gathering data needed to answer the *question*, and care in collecting, *analyzing*, and displaying the data.	• Plan and conduct a scientific *investigation*, choosing a method appropriate to the *question* being asked. • Collect, *analyze*, and display data using calculators, computers, or other technical devices when available.*b
9-12 INQC Explain	*Conclusions* must be logical, based on *evidence*, and consistent with prior *established* knowledge.	• Draw *conclusions* supported by *evidence* from the *investigation* and consistent with *established* scientific knowledge.*c • Analyze alternative explanations and decide which best fits the data and *evidence*.*d
9-12 INQD Communicate Clearly	The methods and procedures that scientists use to obtain *evidence* must be clearly reported to enhance opportunities for further *investigation*.	• Write a detailed laboratory report that includes: the *question* that motivated the study, a justification for the kind of *investigation* chosen, *hypotheses* (if any), a description of what was done, a summary of data in tables and graphs, and a *conclusion*, based on the *evidence*, that responds to the *question*.
9-12 INQE Model	The essence of scientific *investigation* involves the development of a *theory* or conceptual *model* that can *generate* testable predictions.	• Formulate one or more *hypotheses* based on a *model* or *theory* of a causal *relationship*. Demonstrate creativity and critical thinking to formulate and *evaluate* the *hypotheses*.
9-12 INQF Communicate	*Science* is a human endeavor that involves logical reasoning and creativity and entails the testing, revision, and occasional discarding of theories as new *evidence* comes to light.	• *Evaluate* an *investigation* to determine if it was a *valid* means of answering the *question*, and whether or not the results were *reliable*. *e • *Describe* the development of a scientific *theory* that illustrates logical reasoning, creativity, testing, revision, and replacement of prior *ideas* in light of new *evidence*.

	Content Standards	Performance Expectations
9-12 INQG Intellectual Honesty	Public *communication* among scientists is an essential aspect of research. Scientists *evaluate* the *validity* of one another's *investigations*, check the *reliability* of results, and *explain* inconsistencies in findings.	• Participate in a scientific discussion about one's own *investigations* and those performed by others. • Respond to *questions* and criticisms, and if appropriate, revise explanations based on these discussions.
9-12 INQH Intellectual Honesty	Scientists carefully *evaluate* sources of information for *reliability* before using that information. When referring to the *ideas* or findings of others, they cite their sources of information.	• Provide appropriate citations for all *ideas*, findings, and information used in any and all written reports. • *Explain* the consequences for failure to provide appropriate citations.

Mathematics Connections

*a	8.5.H	Make and test conjectures based on data or information collected from explorations and experiments.
*b	8.5.D	Represent a problem situation, describe the process used to solve the problem, and verify the reasonableness of the solution.
	A1.8.A	Analyze a problem situation and represent it mathematically.
	A2.1.A	Select and justify functions and equations to model and solve problems.
	A2.6.F	Calculate and interpret measures of variability and standard deviation, and use these measures to describe and *compare* data sets.
	A1.8.F	Summarize mathematical ideas with precision and efficiency for a given audience and purpose.
	A1.6.E	Describe the correlation of data in scatter plots in terms of strong or weak and positive or negative.
*c	A1.6.B	Make valid inferences and draw conclusions based on data.
	A1.8.G	Synthesize information to draw conclusions and evaluate the arguments and conclusions of others.
*d	A1.6.D	Find the equation of a linear function that best fits bivariate data that are linearly related, interpret the slope and the y-intercept of the line, and use the equation to make predictions.
	A1.8.H	Use inductive reasoning about algebra and the properties of numbers to make conjectures, and use deductive reasoning to prove or disprove conjectures.
*e	G.7.C	Evaluate a solution for reasonableness, verify its accuracy, and interpret it in the context of the original problem.
	A1.8.C	Evaluate a solution for reasonableness, verify its accuracy, and interpret the solution in the context of the original problem.

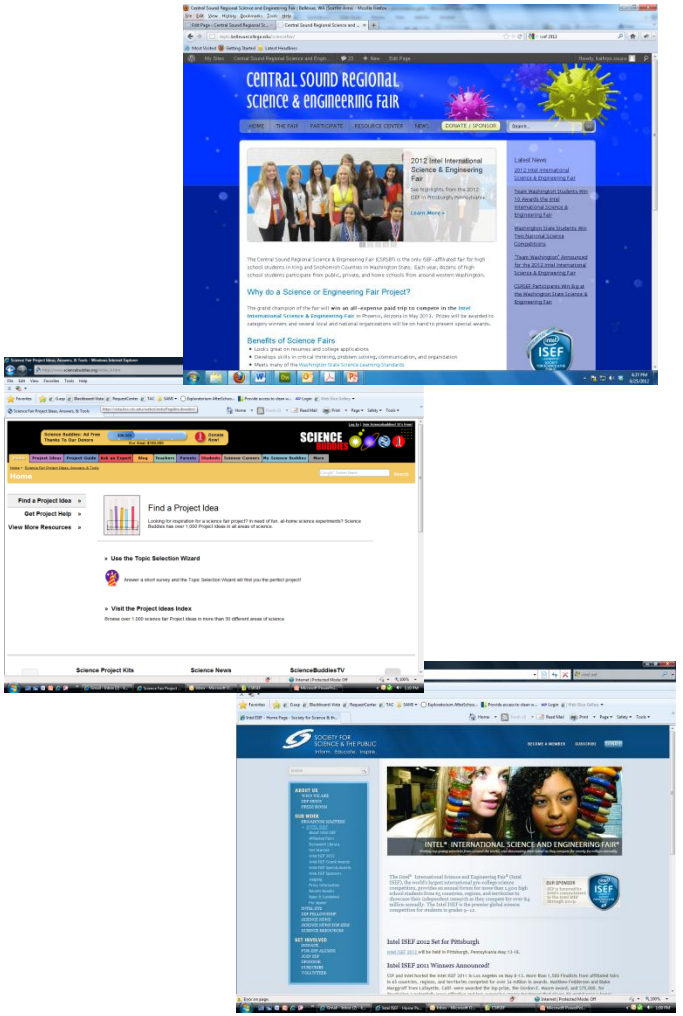
Note: This standard is closely aligned to Mathematics Core Processes A1.8 and G.7.

Resources for Teachers

- CSRSEF Website
  www.bellevuecollege.edu/sciencefair
  - Step-by-step registration instructions
  - Links to science fair resources
  - Links to other ISEF science fairs
  - CSRSEF director (me!): Kathryn.souza@bellevuecollege.edu

- Science Buddies www.sciencebuddies.org
  - Lots of science fair ideas and resources for students

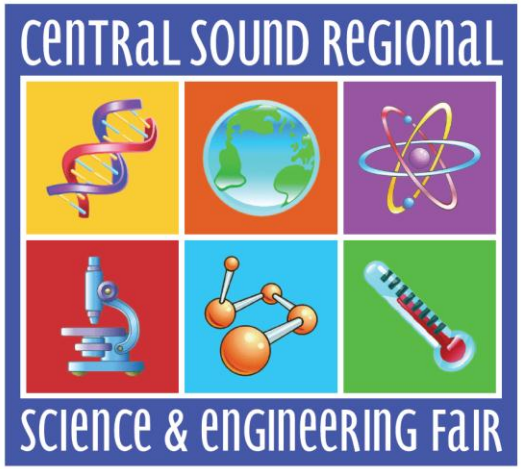
- Intel ISEF website
  www.societyforscience.org/isef/
  - Full Rules and Regulations
  - Information about ISEF competition
  - Descriptions of winning projects



Get Involved!

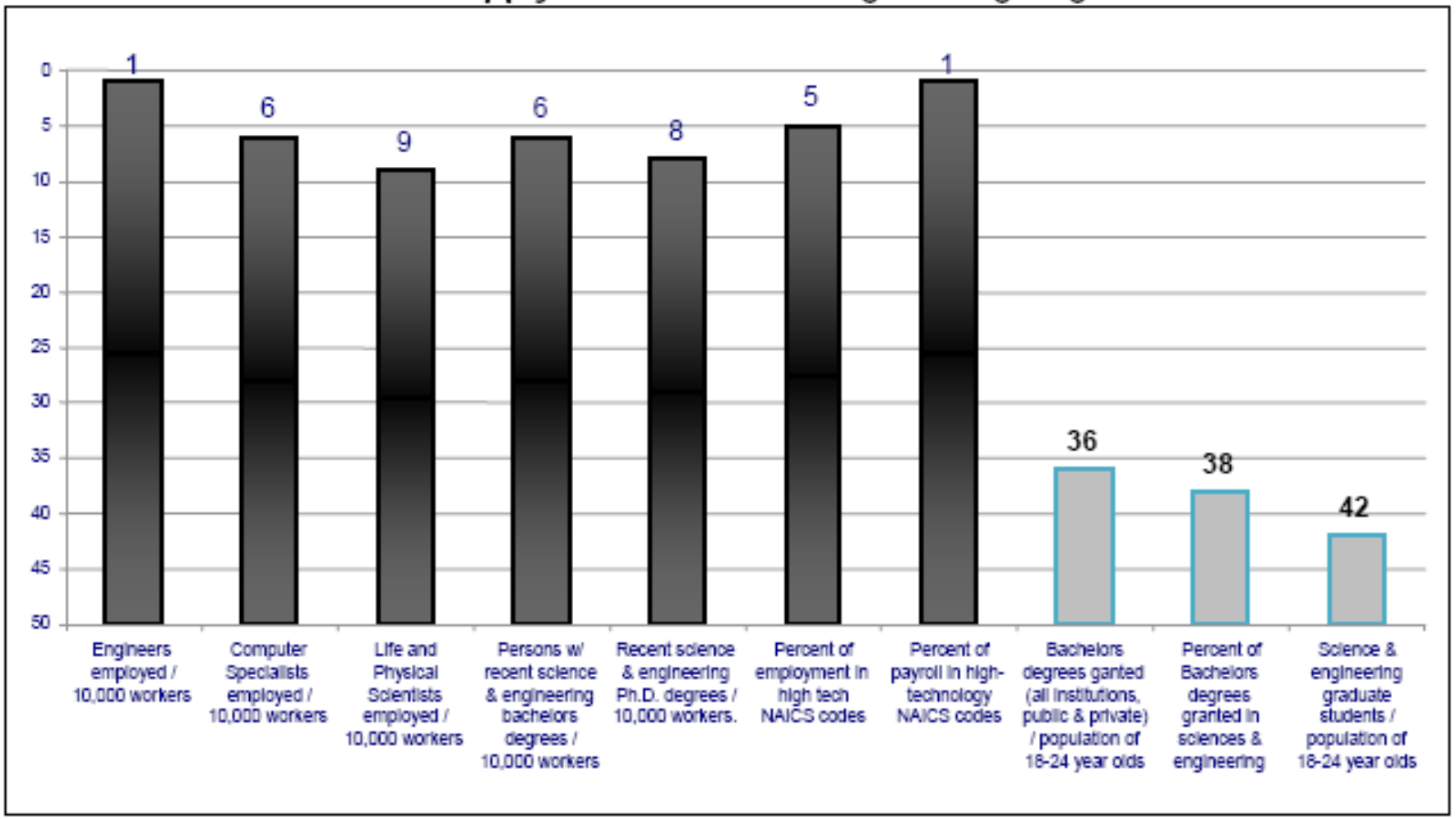
- Encourage your students to participate in the fair
  - Advertise in your schools/classrooms
  - Extra Credit
- Volunteer with the CSRSEF
  - Planning, setting up, recruiting judges, tabulating scores, taking pictures, etc.
  - Volunteer form is available on the fair website
- Join the CSRSEF mailing list
  - CSRSEF Website
  - Facebook Page
    - Search for Central Sound Regional Science and Engineering Fair
  - Twitter: @CSRSciFair
- Volunteer to be a part of the Scientific Review Committee/Institutional Review Board (SRC/IRB)
  - Need ONE school administrator, ONE school counselor, and ONE high school teacher to meet affiliation requirements

Hope to see you on March 9, 2013 at the Central Sound Regional Science & Engineering Fair!



www.bellevuecollege.edu/sciencefair

Washington's Ranking among U.S. States on the Use and Supply of Science and Engineering Degrees



Source: US Department of Commerce 2004 State Science & Technology Indicators [11]